5 Theory and measurement in the macroeconomy *Core*

On completion of this core section you should know:

- what constitutes the labour force in an economy
- what is meant by labour productivity and how it can be measured
- how to measure unemployment and determine trends in employment and unemployment
- how to measure the general level of prices in an economy; money and real data
- the determinants of aggregate demand and aggregate supply and the shapes of these functions
- the interaction between aggregate demand and aggregate supply.

The labour force

The **labour force** in an economy is defined as the total number of workers who are available for work. It therefore refers to all males and females, normally 15–16 years and over, who can contribute to the production of goods and services. As well as those actually in employment, it also includes those who are unemployed as these people are available for work. The size of the labour force depends upon a wide range of demographic, economic, social and cultural factors, such as:

- the total size of the population of working age
- the number of people who remain in full-time education after leaving secondary school
- the normal retirement age for males and females
- the number of women who join the labour force on a full- or part-time basis.

Table 5.1 shows the size of the population for selected economies in 2008 projected to 2050. In themselves these aggregate statistics have little meaning – they really need to be seen in relation to the productive potential of these economies. However, they do give a very crude indication of the relative strength of these countries from an economic standpoint. In virtually all developed economies, the labour force has increased at a steady rate over the past generation. However, some have been slowing down in more recent years, largely as a result of workers retiring before the statutory retirement age and an increase in the number of school leavers remaining in higher education. By 2050, according to Table 5.1, Japan and Russia will have experienced large falls in population. In contrast the growth in southern Asia is substantial and has major implications for the future balance of power in the global economy.

	2008	2050	% change
EU 27	498	494	−0.8
USA	304	438	+44.1
Russia	142	110	−22.5
Japan	128	95	−25.8
China	1325	1437	+8.5
India	1150	1755	+52.6
Pakistan	173	295	+70.5

Table 5.1 *Population projections for selected countries in 2050 (m)*

Source: Population Reference Bureau, United Nations, *2009*

An essential complementary measure is the **labour force participation rate**. This refers to the percentage of the total population of working age who are actually classified as being part of the labour force. Table 5.2 shows these rates for selected economies. In developed economies the rate is typically 50–70%. A lower participation rate usually indicates that an economy has a high participation rate in higher education and a relatively large number of people opting for early retirement. In the case of some developed economies, government policy in recent years has been to increase the higher

education participation rates as a supply side policy to enhance competitiveness.

Comparable statistics for most developing economies are unreliable for various reasons including:

- the existence of a large subsistence sector
- differences in the official secondary school leaving age
- differences in attitudes towards married women seeking paid employment
- practical problems of data collection.

Table 5.2 indicates that there are substantial variations between developing economies. These differences are most likely due to the contribution of women to the labour force being constrained by social and cultural factors.

From a general perspective the following demographic trends are having an important influence on the size of the labour force in most developing economies:

- Contrary to developed economies **birth rates** exceed **death rates** in developing economies. Consequently, the total population and hence the labour force in these countries is increasing.
- Dependency ratios in most developing economies are high as a result of high birth rates and an increasing life expectancy. Consequently, there are relatively more economically inactive people than those who constitute the labour force.
- Many developing economies have experienced a rapid growth in their urban populations, as there has been significant **migration** from rural areas. This ever-increasing **urbanisation** has made it very difficult for these economies to provide enough jobs to meet the needs and aspirations of its labour force. Rural dwellers unfortunately are often unaware of the realities of life in grossly over-populated cities.

Labour productivity

Productivity refers to the quantity of goods and services that a worker is able to produce in a particular period of time. (It should not be confused with production which is an aggregate measure not directly related to a particular input.)

In looking at measurement in the macroeconomy, it is invariably true that variations in living standards between economies can often be explained in terms of variations in the productivity of the main factors of production (see Chapter 6 Supplement). Labour is not a uniform resource. Variations in the productivity of labour depend on the education, training, experience and skills of the workforce. Clearly, when

	Male		Female		Total	
	15–24	25+	15–24	25+	15–24	25+
France	40.3	66.5	33.0	53.9	36.7	59.9
Italy	37.8	64.4	26.9	39.6	32.5	51.4
Poland	37.5	68.2	30.7	50.0	34.2	58.5
USA	63.3	75.5	57.9	59.6	60.6	67.3
Pakistan	72.2	90.5	18.6	22.4	45.9	56.8
Malaysia	n/a	n/a	n/a	n/a	n/a	64.1
Maldives	58.6	85.3	47.1	56.3	52.8	70.8
Sierra Leone	35.9	81.6	48.3	73.5	42.2	77.1

Table 5.2 *Labour force participation rates in 2006*

Source: Key Indicators of the Labour Market, ILO, *2009*

a skilled workforce is equipped with large stocks of capital and technological know-how, productivity is invariably higher than when this is not the case. The formal relationship between all inputs and outputs is represented in the production function (see Chapter 2 Supplement). The importance of productivity is in recognising that although the labour force in an economy is a key resource, the output it is able to produce is to a large extent directly related to the technical knowledge, skills and motivation of that workforce.

Employment and unemployment

Countries measure the numbers in employment and the numbers of those unemployed. The sum total of these is the labour force or **working population** as described above.

SELF-ASSESSMENT TASK 5.1

Read the feature below and then answer the questions that follow.

Labour productivity growth in Pakistan

Vulnerable employment is a relatively new term. It is defined as the number of family workers and own account workers as a percentage of the total employed. There are strong linkages between this, working poverty and labour productivity.

Productivity increases can be obtained through investment, trade, technological progress or changes in working practices. The significance is that such increases can lead to increases in spending on social protection and poverty reduction. Vulnerable employment may also be reduced. Although there is no guarantee, without productivity growth and hence induced economic growth, improvements in the quality of life are highly unlikely. Pakistan has millions of people living below the poverty line although the trend is falling. Productivity growth is vital if the percentage is to continue to fall especially as the total population is projected to increase

There is no clear pattern in labour productivity growth rates since 1990. Negative rates were recorded in the late 1990s, although more recently, the positive growth rates have seen a corresponding reduction in poverty. Economic and social reforms have paved the way for higher economic growth rates. A particular challenge though is to improve the position of women in the labour market. Participation rates are low and there is a need to give women better access not only to jobs but to quality jobs. If achieved, this would help to reduce vulnerable employment and poverty.

Family-owned business in Pakistan

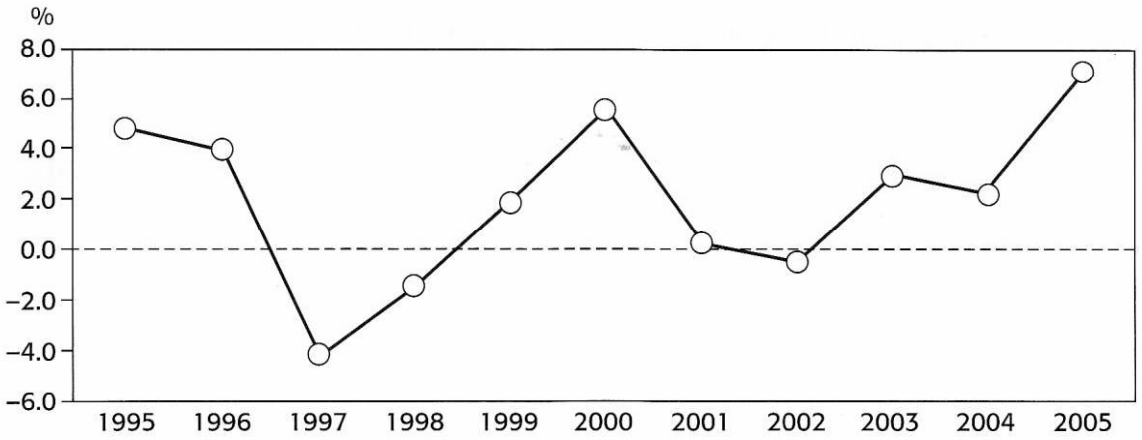


Figure 5.1 *Labour productivity growth rate based on constant US$ 1990 at PPP (%)*

1 Give some likely reasons for the volatile annual changes in labour productivity shown in Figure 5.1.

2 As well as more women entering the labour force, analyse other policies that might be used by the Pakistan government to increase labour productivity.

This is calculated:

working population = total number of workers in employment + total number of workers who are unemployed

Data on Pakistan's working population is shown in Figure 5.2.

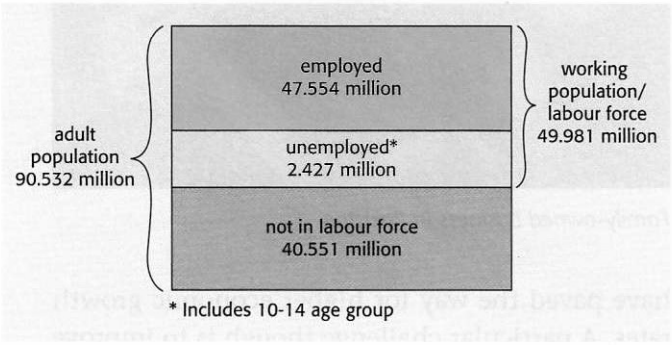


Figure 5.2 *Composition of adult population of Pakistan, 2007*

Data such as that in Figure 5.2 is usually collected annually through a **labour force survey**. For Pakistan in 2007, this survey recorded that 2.8 million people aged 10–14 years were also in employment. Compared to developed economies, the adult population not in the labour force is high at around 45%. As explained above, this is largely due to a low female activity rate of around 21% in 2007. The **dependency ratio** was also high at 68%.

The measurement of employment and **unemployment** is very important from the standpoint of the macroeconomy. For example, if there is unemployment in an economy:

- Output will be below its potential level. The economy will be operating inside its production possibility curve (see Chapter 1). Resources are not being used to the full, but, as the number of employed increases towards full employment, the economy will reach its production possibility frontier.
- The tax revenue received by the government will be lower than with a higher level of employment. If applicable, the amount of money paid out in the form of state benefits for the unemployed will in turn be lower (see Chapter 7).
- A high level of unemployment may result in civil unrest, increased crime rates and substantial social problems for those unemployed and

their families. The gap in economic well-being between those in work and those who are unemployed can be substantial, particularly in developing economies where the degree of state support is limited.

Unemployment can cause significant social problems

The level of unemployment should be distinguished from the rate of unemployment. The level of unemployment refers to the total number of people who are unemployed whereas the rate of unemployment is the number of unemployed people divided by the labour force. So, in an economy with a labour force of 50 million people, 4.3 million of whom are unemployed, the rate of unemployment is 8.6%.

There is no universal measure of employment, but the term does cover some or all of the following:

- those in full-time paid employment
- those on recognised training schemes
- those working for a minimum number of hours per week.

Normally, those working in subsistence non-monetarised situations would be excluded, as would unpaid volunteers.

There is though a standard international definition of unemployment. This covers

- those who are not classified as employed
- those available for work
- those actively seeking work.

Most developing countries including Pakistan do not include the latter in their unemployment data.

Material on the difficulties of measuring unemployment can be found on page 261.

SELF-ASSESSMENT TASK 5.2

1 For your own country, see what information you can obtain on:
   - the number of people in employment
   - the number of people who are unemployed.
2 Can you identify any trends in these important variables over the past ten years?
3 Comment on the macroeconomic significance of the size of the working population and the dependency ratio.

The general price level and price indices

A further important macroeconomic variable is the general price level. This is measured by governments in all types of economy and is a recognised measure of the **cost of living** in an economy at any one point in time. Changes in the general price level on a year-by-year basis in turn are a measure of the rate of inflation in an economy (see Chapter 6 for more details).

In its simplest form, the general price level in an economy is calculated periodically using some form of **consumer price index**. In the UK, the **Retail Prices Index (RPI)** is a measure of changes in the prices of consumer goods bought by people in the UK. Much attention is paid to this index by the media, politicians, business people and consumers.

The RPI is a weighted price index. Its calculation is a major statistical task, involving three main stages:

1 A survey to find out what families buy and how much they spend on particular items – this provides the **weights.**
2 Recording how much the prices of some 600 selected items have changed – this information is

collected from all main types of retail outlet, as well as from gas, water, electricity and transport suppliers at a **base date.**

3 The percentage change in price for each item is then multiplied by its weight – from this the average change in the RPI is determined.

Although not all countries have such a comprehensive price index as in the UK, the basic principles of construction remain the same irrespective of the level of sophistication.

SELF-ASSESSMENT TASK 5.3

Read the feature below and then answer the questions that follow.

So you think London's expensive? It isn't any more

It might be surprising for Londoners to hear that the capital city has fallen down a league table of the world's most expensive cities, sliding from second to 22nd.

The precipitous slide in the pound from the heady heights of $2.11 in November 2007 to $1.41 in January 2009 has triggered a sudden drop in the cost of living in London, according to research by UBS, the investment bank. Oslo is now the world's most expensive city, followed by Zurich, Copenhagen, Geneva, Tokyo and New York.

Oslo is now the world's most expensive city

Other big fallers include Moscow, Mexico City and Seoul, where the cost of living was also hit by currency devaluations and, in the case of the Russian capital, falling oil prices.

The cheapest cities are Kuala Lumpur, Manila, Delhi and Mumbai, according to the UBS calculations, which are based on a basket of 144 goods and services.

Within these categories, London residents suffer because their rail travel is the most expensive. A second-class, one-way ticket for a 125-mile rail journey costs £58.69 – double the fare for a comparable distance in some other Western European cities.

Oslo tops the league because of its strong currency and its relative strength during the global economic crisis. Residents also pay some of the highest taxes and social security contributions in the world. The gap in the cost of living between Eastern and Western Europe has not narrowed quickly, despite the huge changes in the former communist bloc.

The basket was roughly 35% cheaper in the cities of Eastern European EU member states than in their Western counterparts – down from 38% in 2006. UBS expects a catch-up in prices to take more than a decade.

And, as the pound falls, Eastern European workers in the UK will have to work harder to send the same amount home. Polish people with a job in London have to put in an extra hour and a half each month, compared with 2006, to send home £200.

Someone earning the average wage in Zurich and New York can afford an iPod Nano after nine hours of work, while employees in Mumbai need to put in 20 nine-hour days, or about a month, to purchase the same music player.

Tokyo workers have to spend only 12 minutes at their desks before they can buy a Big Mac for lunch, while their counterparts in Nairobi, the Kenyan capital, have to work for more than two and a half hours.

However, going out for a meal is an expensive business for the average resident of Tokyo, where a three-course dinner without wine comes to an average of £53, compared with £33 in London.

Prices for postage stamps and cleaning services showed the greatest variation, with stamps almost 90% more expensive in some cities than others.

Employees in Asian and Middle Eastern cities are spending much longer at work, averaging 2119 and 2063 hours per year respectively. The treadmill is at its most demanding in Cairo, where the average employee clocks up 2373 hours per year, followed by Seoul with 2312 hours.

In contrast, French workers are at their jobs for much shorter times. Staff in Lyon and Paris put in, respectively, 1582 and 1594 hours per year.

Source: The Times, *20 August 2009 (adapted)*

1 Account for the variation in the cost of living between cities.

2 Discuss the use and limitations of the information contained in the article.

$$\text{cost of living index, year 1} = \frac{\sum_{i=1}^{n} W_{i1}P_{i1}}{W_{i0}P_{i0}} \times 100$$

where W = weight of item in family expenditure
P = price of item
n = total number of items in index.

If the index is calculated to be over 100 in year 1, then the cost of living has increased compared with the base date, year 0. For example, if the index is 105, then the cost of living has increased by 5% since the base year. An index of below 100 in year 1 would indicate a fall in the cost of living.

Table 5.3 is a summary of the annual change in the monthly Consumer Price Index for Mauritius for the period December 2007 to December 2008. It stood at 108.2 at the start of this period; by December 2008 it was 115.5, a net increase of 7.3 points or 6.7%. The most substantial increase was for food and non-alcoholic drinks. Rice, meat, bread and vegetables also increased in price. The impact of this increase would be felt most by the poorest families.

Category	Weight	% change Dec'07–Dec'08
Food and beverages	286	+11.7
Alcohol and tobacco	92	+5.6
Clothing and footwear	51	+5.3
Housing	131	+2.2
Furnishings	64	+5.1
Health	30	+5.3
Transport	147	+6.6
Communications	36	−3.5
Recreation	48	−0.6
Education	32	+4.9
Restaurants and hotels	43	+13.6
Miscellaneous	40	+4.3
	1000	+6.7

Table 5.3 *Consumer Price Index, Mauritius*
Source: Central Statistics Office

SELF-ASSESSMENT TASK 5.4

1 With reference to your own country, briefly describe how you might construct an appropriate price level index.
2 If such an index exists, how does it compare with your own ideas on how it might be constructed?

Money and real data

Finally, a word of caution when handling data such as that on prices in the last section. The data quoted in the self-assessment task above and in Table 5.3 is given in monetary terms. This is also known as a **nominal value** since no allowance is made for inflation. Any remaining increase will be a real increase in prices due to market forces.

The **real value** shows how prices change over time once the effects of inflation have been removed. With a price index, this occurs when the data is expressed at constant prices using a base year.

The shape and determinants of aggregate demand

Aggregate demand is the total spending on an economy's goods and services in a given time period. It consists of four components: consumption, investment, government spending and net exports. So $AD = C + I + G + (X - M)$. Figure 5.3 shows a typical aggregate demand curve.

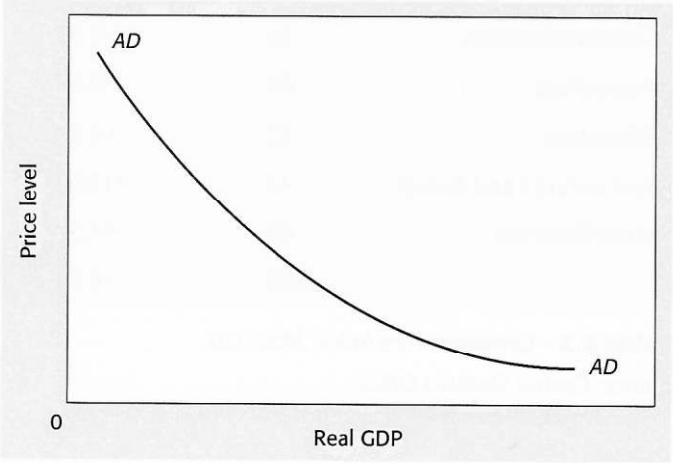


Figure 5.3 *The aggregate demand curve*

It slopes down from left to right because a lower price level will:

- raise demand for net exports because the country's goods and services will have become more price competitive
- increase the purchasing power of households with savings in the form of bank and building society deposits and other financial assets because their wealth will enable them to buy more
- reduce the rate of interest and so stimulate consumption and investment.

A change in the price level causes a movement along the *AD* curve. If, however, any of the components of *AD* change for reasons other than a change in the price level, the *AD* curve will shift. Figure 5.4 illustrates an increase in aggregate demand. This could occur because of, for example, a rise in expectations about the future, a cut in direct tax, an increase in the money supply, a fall in the exchange rate and a rise in the quality of domestically produced products.

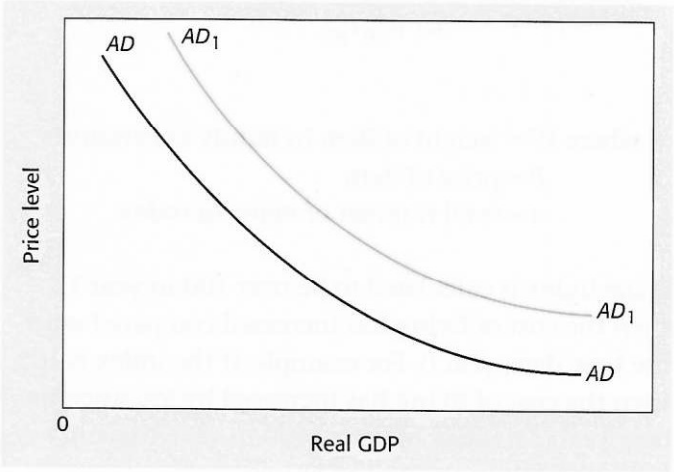


Figure 5.4 *An increase in aggregate demand*

Aggregate supply

Aggregate supply (AS) is the total output that firms in an economy are willing and able to supply at different price levels in a given period of time.

It is possible to distinguish between short run aggregate supply (SRAS) and long run aggregate supply (LRAS). Short run aggregate supply is the output which will be supplied at different price levels in a period of time when the prices of the factors of production remain unchanged. Figure 5.5 shows a typical *SRAS* curve. It slopes up from left to right.

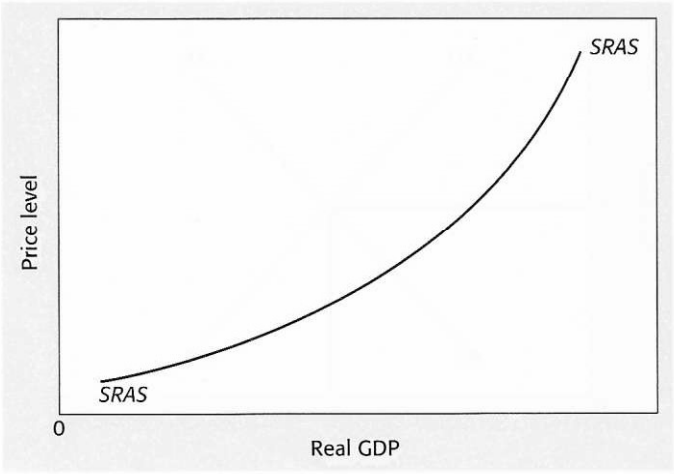


Figure 5.5 *The short run aggregate supply curve*

This is because a higher price level will enable firms to meet any extra unit costs in the form of, for example, overtime payments, and to enjoy higher profit margins.

The *SRAS* curve will shift if productivity or the payments to factors of production change. For example, an increase in wage rates, not matched by an increase in productivity, will shift the *SRAS* curve to the left, as illustrated in Figure 5.6.

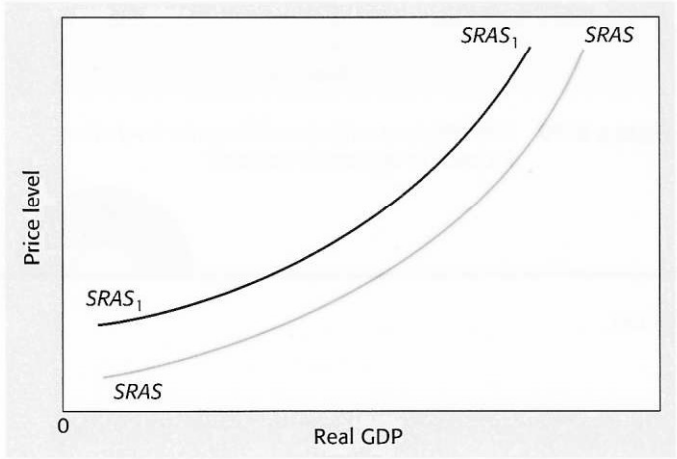


Figure 5.6 *A reduction in short run aggregate supply*

Long run aggregate supply is the output which firms would produce after the price level and factor prices have fully adjusted after any shift in aggregate demand. Keynesians often represent the *LRAS* curve as perfectly elastic at low levels of output, then upward sloping over a range of output and finally perfectly inelastic. This is to emphasise their view that in the long run the economy can operate at any level of output and not necessarily at its full capacity. Figure 5.7 shows that from 0 to Q, output can be raised without increasing the price level. When output and hence employment are low, firms can attract more resources without raising their prices. As output rises from Q to Q_1, firms begin to experience shortages of resources and bid up wages and the cost of land and capital equipment. When output hits Q_1, the economy reaches the maximum output it can make with existing resources.

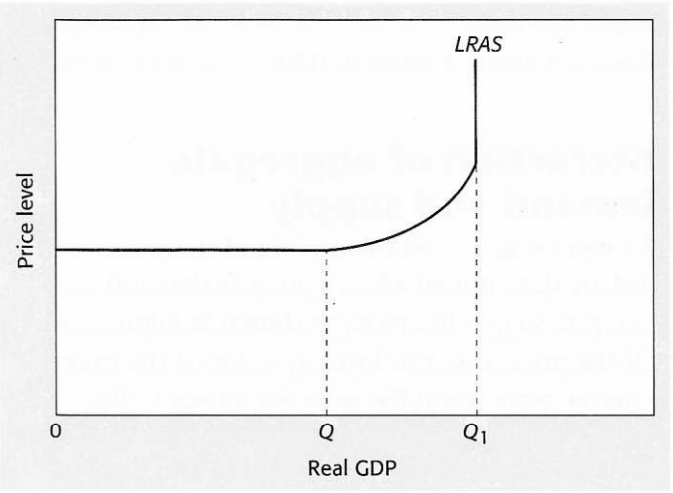


Figure 5.7 *The long run aggregate supply curve*

New classical economists illustrate the *LRAS* curve as a vertical line because they believe that, in the long run, the economy will operate at full capacity. This version of the *LRAS* curve is shown in Figure 5.8.

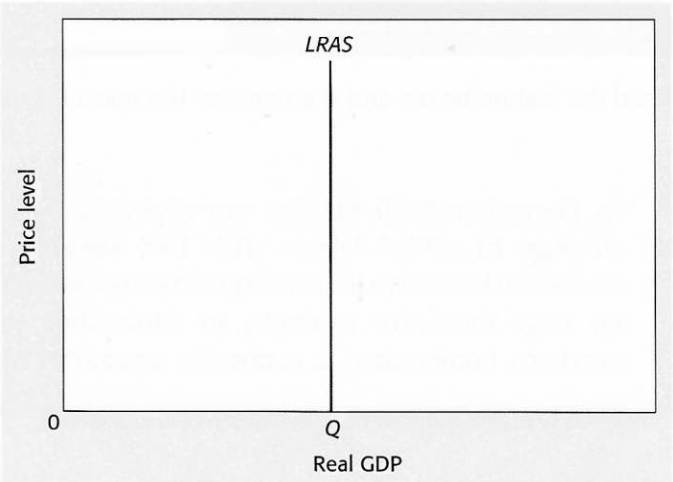


Figure 5.8 *A vertical long run aggregate supply curve*

Both Keynesian and new classical economists agree that the factors which will shift the vertical part

of the *LRAS* curve are changes in the quantity and quality of resources as these will affect the productive capacity of the economy.

The *LRAS* curve will shift to the right if there is an increase in the quantity and/or quality of resources. For example, improvements in training will raise the quality of the labour force and an increase in investment will raise the quantity and, possibly, the quality of capital goods. Both of these changes will increase the maximum amount of output the country can produce. Other causes of changes in the *LRAS* include changes in technology, the quality of education and net immigration (see also Chapter 7).

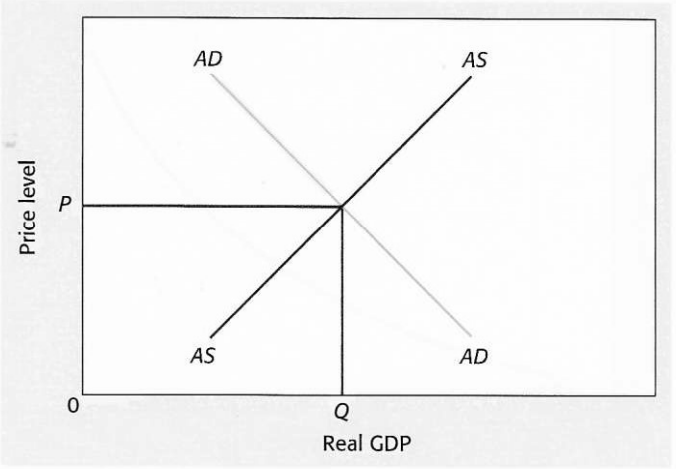


Figure 5.9 *The interaction of aggregate demand and aggregate supply*

Interaction of aggregate demand and supply

The equilibrium level of output and the price level are determined when aggregate demand and aggregate supply intersect, as shown in Figure 5.9.

If the price level was initially below *P*, the excess demand would push the price level back to the equilibrium level, whereas, if price was above *P*, some goods and services would not be sold and suppliers would have to cut their prices.

An increase in aggregate demand resulting from, for example, an increase in government spending is likely to increase output and raise the price level, at least in the short run. This outcome is illustrated in Figure 5.10.

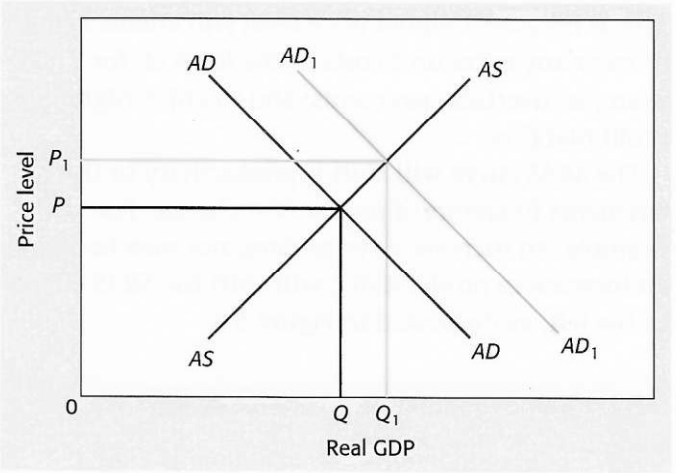


Figure 5.10 *The effect on output and the price level of an increase in aggregate demand*

SELF-ASSESSMENT TASK 5.5

Read the feature below and then answer the questions that follow.

In December 2000 Mexico was experiencing a shortage of skilled labour. This had begun to create bottlenecks to increased growth and pushed up wage rates. For example, in Chihuahua, a northern border state, a centre for assembly-for-exports plants, real wages had risen by 32% over the year. The government was seeking to raise productivity, in the short run, by introducing more flexible labour laws and, in the long run, by improving education and training.

1 Using a Keynesian LRAS curve, explain at what position on the curve the Mexican economy was seemingly operating in December 2000?

2 Illustrate, and explain, the effect of:
- **a** a rise in wage rates on the SRAS curve
- **b** improved education and training on the LRAS curve.

An increase in aggregate supply will also be likely to raise output and so lower the price level, as shown in Figure 5.11.

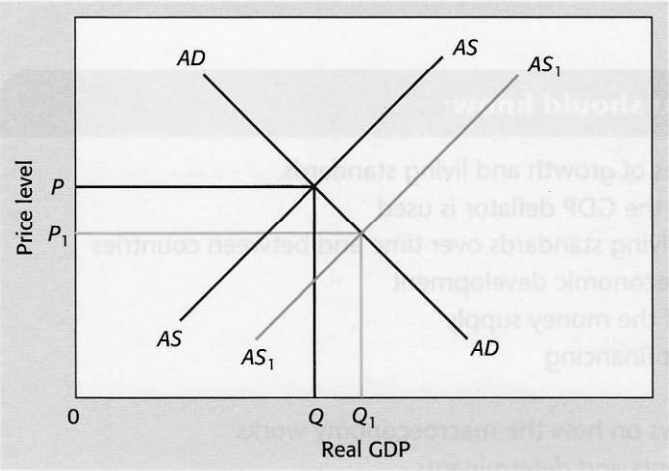


Figure 5.11 *The effect on output and the price level on an increase in aggregate supply*

SELF-ASSESSMENT TASK 5.6

Identify the effects of the following on aggregate demand, aggregate supply, output and the price level:

a a reduction in the rate of interest
b an increase in government spending on health care
c advances in information technology
d an increase in the quality of training
e a cut in income tax
f an increase in wealth.

SPECIMEN EXAM QUESTIONS

1 a Explain the possible reasons for a change in size of a country's labour force. [8]
b Discuss the likely effects on the macroeconomy of a large increase in inward migration into a country. [12]
[20 marks]

SUMMARY

In this core section it has been shown that:

- The measurement of certain macroeconomic variables is important for economists to understand differences between various types of economy.
- The labour force is an important economic resource; variations in both its size and participation rate can be measured across different types of economies.
- The productivity of labour has an important bearing on the living standards in an economy.
- Unemployed labour is a resource which can be used to help an economy achieve its productive potential.
- The general price level in an economy can be measured by means of a weighted price index.
- Aggregate demand is total spending on goods and services produced in an economy at different price levels.
- The aggregate demand curve is downward sloping.
- Aggregate supply is total output in an economy at different price levels.
- The long run aggregate supply curve will shift to the right if the quality and/or quantity of resources increases.
- Equilibrium output and the price level are determined where the AD and AS curves intersect.

5 Theory and measurement in the macroeconomy *Supplement*

On completion of this supplement section you should know:

- how national income statistics can be used as measures of growth and living standards
- the difference between money and real data and how the GDP deflator is used
- how economic growth rates can be used to compare living standards over time and between countries
- that there are other indicators of living standards and economic development
- the difference between broad and narrow measures of the money supply
- about the nature of a government's budget and deficit financing
- what is meant by the circular flow of income
- the key principles of Keynesians' and Monetarists' views on how the macroeconomy works
- what is meant by aggregate expenditure, its components and determinants
- how national income is determined
- how inflationary and deflationary gaps can be analysed
- the difference between the equilibrium level of income and the full employment level of income
- what is meant by the multiplier process
- the difference between autonomous and induced investment
- what is meant by the accelerator
- why and how the money supply can increase
- how commercial banks can create credit
- how to explain the relationship between the money supply, the price level and output
- what constitutes the demand for money
- the different theories of interest rate determination.

Introduction

In drawing up their policies, governments and their advisors rely on data about the current and forecasted performance of the economy. They also draw on a wide range of tried and tested concepts. Over time more aspects of the economy have come to be measured and professional economists have promoted changes in the schools of economic thought. In this section we will explore some of the key measures used by governments and consider differences between the Keynesian and Monetarist approaches.

National income statistics

Use of national income statistics

A government measures the total output of a country in order to assess the performance of the economy. An economy is usually considered to be doing well if its output is growing at a high and sustainable rate. A government uses a variety of measures of the country's output. These are collectively known as **national income** statistics. This is because the total output of the country is equal to total income (and total expenditure).

The most widely used measure of national income is known as **Gross Domestic Product (GDP)**. Gross means total, domestic refers to the home economy and product means output. So, for example, Pakistan's GDP is a measure of the total output by the factors of production based in Pakistan. GDP is calculated by adding up consumers' spending, government spending on goods and services, total investment, changes in stocks and the difference between exports and imports.

From GDP, a number of other measures of national income can be found. GDP plus **net property income from abroad** gives **Gross National Product (GNP)**. Net property income from abroad is the income which the country's residents earn on their physical assets (such as factories and leisure parks) owned abroad and foreign financial assets (such as shares and bank loans) minus the returns on assets held in the country but owned by foreigners. So GNP gives a measure of the income of a country's residents.

GNP minus capital consumption gives **Net National Product (NNP)**. This is also referred to as national income. Capital consumption, depreciation or replacement investment covers investment undertaken to replace worn out and out-of-date capital. GDP minus capital consumption gives **Net Domestic Product (NDP)**. So gross measures include all investment whilst net measures only include investment which *adds* to the capital stock.

GDP is first measured at market prices, that is, the prices charged for goods and services in shops and other types of retail businesses. However, all the measures are recorded in terms of both market prices and factor cost. The latter is the value of output excluding indirect taxes and subsidies. So, to convert a measure from market prices to factor costs, indirect taxes are deducted and subsidies are added.

The ways of measuring GDP

There are three ways of calculating GDP. These are the output, income and expenditure methods. They should give the same total because they all measure the flow of income produced in an economy. So the value of output is equal to the incomes which it generates, that is wages, rent, profit and interest. If it is assumed that all incomes are spent, expenditure will, by definition, equal income.

The output measure

The output method measures the value of output produced by industries such as the manufacturing, construction, distributive, hotel and catering and agricultural industries or sectors.

In using this measure it is important to avoid counting the same output twice. For example, if the value of cars sold by manufacturers is added to the value of output of tyre firms, double counting will occur. Value added is the difference between the sales revenue received and the cost of raw materials used. It is equal to the payments made to the factors of production in return for producing the good or service, so that if a TV manufacturing firm buys components costing £60000 and uses them to make TVs which it sells for £130000, it has added £70000 to output. It is this £70000 which will be included in the measure of output.

The income measure

The value of output produced is based on the costs involved in producing that output. These costs include wages, rent, interest and profits. All these payments represent income paid to factors of production. For instance, workers receive wages and entrepreneurs receive profits. In using this measure it is important to include only payments received in return for providing a good or service. So transfer payments, which are transfers of income from taxpayers to groups of individuals for welfare payments, are not included.

The expenditure measure

What is produced in a year will either be sold or added to stocks. So, if additions to stocks are added to expenditure on goods and services, a measure is obtained which will equal output and income. In using this method it is necessary to add expenditure on exports and deduct expenditure on imports. This is because the sale of exports represents the country's output and creates income in the country,

SELF-ASSESSMENT TASK 5.7

Which of the following should be included in measuring GDP by the income method:

- government subsidies to farmers
- the pay of civil servants
- the pay of nurses
- supernormal profits
- state pensions?

whereas expenditure on imports is spending on goods and services made in foreign countries and creates income for people in those countries. It is also necessary to deduct indirect taxes and add subsidies in order to get a value which corresponds to the income generated in the production of the output.

Money and real GDP

Money (or nominal) GDP is GDP measured in terms of the prices operating in the year in which the output is produced. It is sometimes referred to as GDP at current prices and is a measure which has not been adjusted for inflation.

Money GDP may give a misleading impression of how well a country is performing. This is because the value of money GDP may rise not because more goods and services are being produced but merely because prices have risen. For example, if 100 million products are produced at an average price of $5, GDP will be $500 million. If in the next year the same output of 100 million products is produced but the average price rises to $6, money GDP will rise to $600 million. So to get a truer picture of what is happening to output, economists convert money into real GDP. They do this by measuring GDP at constant prices, that is at the prices operating in a selected base year. By doing this they remove the distorting effect of inflation. For example, in 2009 a country's GDP is $800 billion and the price index is 100. Then in 2010, money GDP rises to $864 billion and the price index is 105.

$$\text{real GDP} = \text{money GDP} \times \frac{\text{price index in base year}}{\text{price index in current year}}$$

$$\text{So: } \$864\text{bn} \times \frac{100}{105} = \$822.86\text{bn}$$

The price index used to convert money into real GDP is called the **GDP deflator**, which measures the prices of products produced rather than consumed in a country. So it includes the prices of capital as well as consumer products and includes the prices of exports but excludes the prices of imports.

SELF-ASSESSMENT TASK 5.8

In 2008 a country's GDP is $1000 billion. In 2009 nominal GDP rises to $1092 billion and the price index increases by 4%. Calculate:

a real GDP

b the percentage increase in real GDP.

Comparison of economic growth over time and between countries

Changes in real GDP are used to calculate economic growth rates. So, for example, if the real GDP of a country grows from $50 billion in 2008 to $52 billion, the annual economic growth rate for 2009 is 4%. Table 5.4 shows the average annual economic growth rates for a range of countries during the period 2000 to 2006.

	%		%
Argentina	4.7	Singapore	5.8
China	10.2	South Africa	4.3
France	1.7	Tanzania	2.5
Hong Kong	5.2	UAE	8.2
Indonesia	5.1	UK	2.6
Malawi	3.2	USA	2.7
Pakistan	5.8	Zambia	−5.7
Saudi Arabia	4.1	Zimbabwe	−4.4

Table 5.4 *Real GDP: average annual change 2000–2006*

Source: World Development Report, *2009*

In comparing economic growth rates over time and between countries, care has to be taken over a number of issues. One of these is that the official real GDP figures may understate the true change in output. This is because of the existence of, and changes in, what is called the hidden, informal or underground economy. These terms refer to undeclared economic activity. There are two main reasons why people may not declare their earned income to the authorities. One is that they are seeking to evade paying tax. For example, a plumber

may receive payment for undertaking jobs in his spare time and not declare the income he receives to the tax authorities. So some of the services he produces will not be included in GDP. Another reason for not declaring economic activity is that the activity is itself illegal, for example smuggling goods.

Illegal market traders in West Africa

Some idea of the size of the hidden economy can be found by measuring any gap between GDP as measured by the expenditure and income methods. This is because people will be spending income they have not declared!

If the size of the hidden economy is relatively constant, the rate of economic growth may be calculated reasonably accurately. However, even a stable hidden economy can make international comparisons of economic growth rates difficult. This is because the size of the hidden economy varies between economies. It is influenced by the marginal rates of taxation, the penalties imposed for illegal activity and tax evasion, the risk of being caught and social attitudes towards, for example, different illegal activities. Table 5.5 shows some research findings into the scale of the underground economy in a number of diverse economies. Of the most developed economies, Greece had the highest percentage of unmeasured economic activity, 28%, and the USA the lowest, 8%. Higher levels were recorded in Central and Eastern European countries and in most developing economies.

Official GDP figures may also not provide an accurate measure of output and changes in output because of low levels of literacy, non-marketed goods and services and the difficulties of measuring government spending.

In countries with low levels of literacy, it will be difficult for government officials to gather information about all economic activity. Some people will be unable to fill out tax forms and others will fill them out inaccurately, so estimates will have to made for some output. This is a particular problem in Pakistan, which had an adult literacy rate of just 50%

Developed economies	%	CEE economies	%	Emerging economies	%	Developing economies	%
Austria	10.9	Azerbaijan	61.3	China	15.6	CAR	46.1
Belgium	21.0	Estonia	40.1	Vietnam	17.9	Dem Rep Congo	49.7
Greece	28.2	Georgia	68.0			Nigeria	59.4
Ireland	15.3	Hungary	26.2			Sierra Leone	43.9
Italy	25.7	Poland	28.9			Zimbabwe	63.2
Japan	10.8	Russia	48.7				
Switzerland	9.4	Ukraine	54.7				
UK	12.2						
USA	8.4						

Table 5.5 *Estimated underground economy (% official GDP), 2002–2003*

Source: Schneider, F. and Bajada, C. An International Comparison of Underground Activity, *2005*

in 2005. The female literacy rate was much higher than that for males.

Estimates also have to be made for non-marketed goods and services. The GDP figures only include marketed goods and services, that is goods and services which are bought and sold and so have a price attached to them. Goods and services which are produced and which are either not traded or which are exchanged without money changing hands go unrecorded. For example, domestic services provided by home owners, painting and repairs undertaken by home owners and voluntary work are not included in the official figures. The proportion of goods and services which people produce for themselves and the amount of voluntary work undertaken vary over time and between countries.

It is also difficult to value the output of government goods and services which are not sold, such as defence. In the past in the UK the output was valued at cost, normally in terms of the value of inputs. This gave a somewhat distorted view of what was happening to output. For instance, if productivity increased in the fire service, fewer firefighters might have been needed. This would have reduced the cost of providing the fire service. Output as officially recorded would have fallen, although the level of service provided might have been unchanged or may even have increased. To overcome this problem, the Office for National Statistics (ONS) in the UK developed a system for measuring government outputs of services other than through the value of inputs. This method covers education, health and social security – around 50% of the public sector – and uses a variety of key performance indicators (such as student numbers for education and claimant numbers for social security) in order to estimate output.

The nature of economic growth

In comparing economic growth rates it is also important to consider the nature of economic growth. A very high rate of economic growth may initially appear to be very impressive. However, this may not be sustainable in either the short run or long run.

For a few months a country's output may increase by a rate greater than the rise in the productive potential of the economy (trend growth) because, in response to high demand, machinery may be worked flat out and workers may be persuaded to work long hours of overtime. However, this cannot be sustained since a time will come when machines have to be repaired and when workers will want to reduce the number of hours' overtime they work.

High growth, achieved by depleting natural resources and creating pollution, will also not be sustainable in the long run. Increasing fish catches,

SELF-ASSESSMENT TASK 5.9

Read the feature below and then answer the questions that follow.

Nature is taking a hammering from the law breakers

Nature is taking a hammering from the law breakers. To damage the environment in the process of industrialising a country and making its people wealthy – as occurred in Europe, America and parts of Asia – is bad enough; to do so before achieving prosperity is even worse.

That is the risk faced by Ghana. With the economy still struggling to maintain consistent growth, Ghana's environment – and several industries that could contribute to future economic success, including logging and tourism – are threatened by deforestation, desertification and pollution. 'We have serious environmental problems,' says Lee Ocran, deputy minister for environment, science and technology.

Ghana's forests, which once covered much of the south and centre of the country with mahogany and other valuable trees, will need a ruthlessly

efficient protection programme if they are to survive for more than a decade.

Forest depletion in Ghana

At the turn of the twentieth century, Ghana had 8.2 million hectares of forest, falling to half that amount by 1950 – according to the ministry – 1.4 million hectares today, although environmentalists say the true figure is well under 1 million hectares.

It is estimated that the sustainable yield of the remaining forest is about 1 million cubic metres of timber a year, but farmers, illegal timber merchants and the big logging companies whose trucks can be seen on the roads to Takoradi port are thought to be extracting 2.3 million–3 million cubic metres annually. The installed capacity of the saw-milling industry is even higher.

Source: Victor Mallet, Financial Times, *29 November 2000*

1 Explain what is meant by sustainable economic growth.

2 What evidence is provided in the feature to suggest that Ghana's economic growth is not sustainable?

chopping down more areas of tropical rainforests and rapidly increasing manufacturing output may appear attractive ways of raising economic growth. However, such methods may reduce future generations' ability to achieve economic growth if fish stocks are exhausted, new trees are not planted or the environment is destroyed by pollution, which in turn reduces the fertility of the land and the health of the labour force.

Comparison of living standards over time

Real GDP per head figures have traditionally been used as one of the main indicators of living standards. If a country's real GDP per head is higher this year than last year, it is generally expected that the country's inhabitants will be enjoying higher living standards. This is indeed often the case but it is not always so.

Real GDP per head is found by dividing total real GDP by the country's population to give an average figure. However, real GDP is not evenly distributed. It is possible that, whilst real GDP per head rises, some people may not experience rises in income and some may even suffer reductions in their income. For instance, in the mid-1990s the Indian economy grew at 7.5% a year but the proportion of Indians living in poverty dropped just 1% to 34%.

The change in real GDP figures may not reflect the true change in the quantity of goods and services that consumers can enjoy if the level of undeclared economic activity changes over time. A rise in the hidden economy may mean that people are experiencing a higher standard of living than first appears to be the case as described earlier.

To assess changes in living standards, changes in the type of products produced and the ways in which they are made must be considered. A rise in real GDP does not guarantee a rise in living standards. During a war, output may rise because more weapons are being produced but not many people will say that the quality of their lives is improving. The recruitment of more police to cope with more crime will again increase real GDP but will be unlikely to cause people to feel better off.

The type of products which raise people's living standards are better consumer goods and services, such as housing, food, clothing and transport. A shift of resources from consumer products to capital goods will enable more consumer products to be produced

and enjoyed but only in the future. However, in the short run if the economy is operating at the frontier of its production possibility curve, such a move will cause people to enjoy fewer consumer products (see Chapter 1).

Even if people are able to enjoy more consumer goods and services it does not necessarily mean that they will be happier. As access to more and higher-quality products rises, the desire for even more and better products may increase at an even faster rate. For example, people who do not have a car are happy when they buy their first car but often within a short space of time they want a better model. This has particular implications for people in China and India where incomes and car ownership are increasing rapidly.

Real GDP measures the quantity of output produced but not the quality. Output could rise but if the quality of what is produced declines, the quality of people's lives is likely to fall. In practice, though, the quality of output tends to rise over time.

Working conditions also tend to improve over time and working hours usually fall. If real GDP per head stays constant from one year to the next but working conditions rise and/or working hours fall, people's living standards will rise.

However, whilst workers tend to enjoy improved conditions over time, the quality of the environment in some countries declines as a result of pollution and, for example, deforestation. A decline in environmental conditions will lower living standards but not real GDP. Indeed, if more resources have to be devoted to cleaning up the environment, real GDP will increase whilst living standards decline.

Figures 5.12 and 5.13 show a comparison of the quality of life in a number of the world's cities. It is based on an annual survey by William M. Mercer which ranks cities on the basis of 39 criteria that constitute the quality of life, ranging from recreational and transport facilities to crime and education. New York, which ranked 49th, is used as the base for this survey and is given an index of 100.

European cities dominate the top positions. Within Asia, Singapore has the top ranking and is 32nd in terms of the survey's criteria. Elsewhere, Kuala Lumpur is 75th. Pakistani cities score badly in terms of personal safety factors which are seen by the report's compilers as being very important when businesses are seeking to attract top managers. Within Africa, Cape Town and Port Louis (Mauritius) are the cities with the best quality of living; Lagos, Port Harcourt and Bangui are regarded as having the

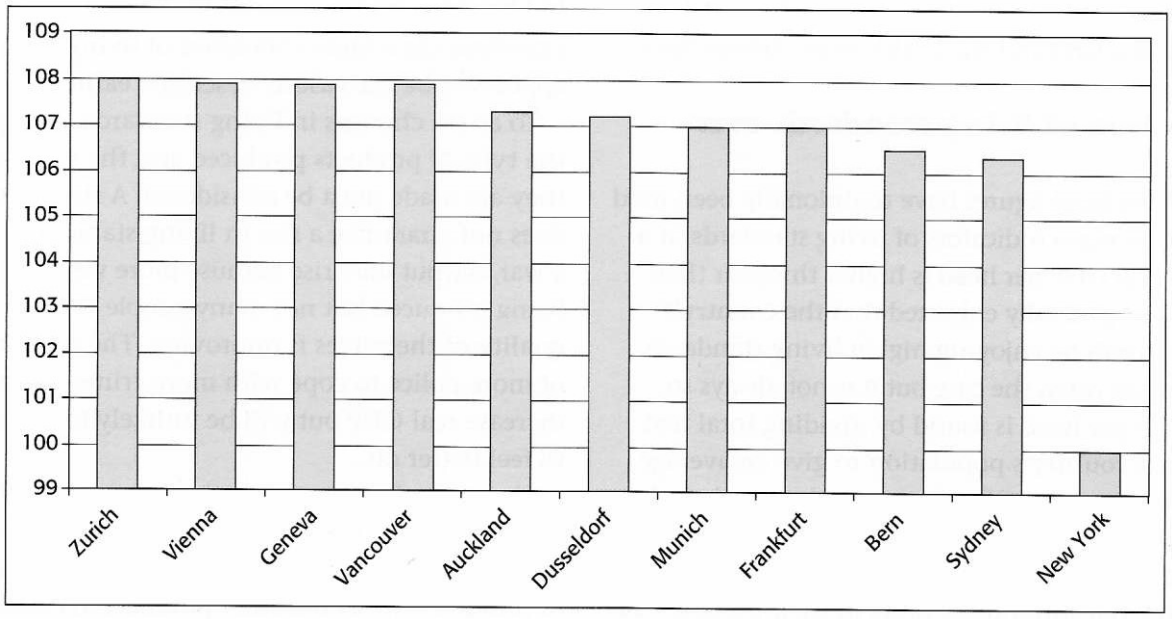


Figure 5.12 *Top performing cities*

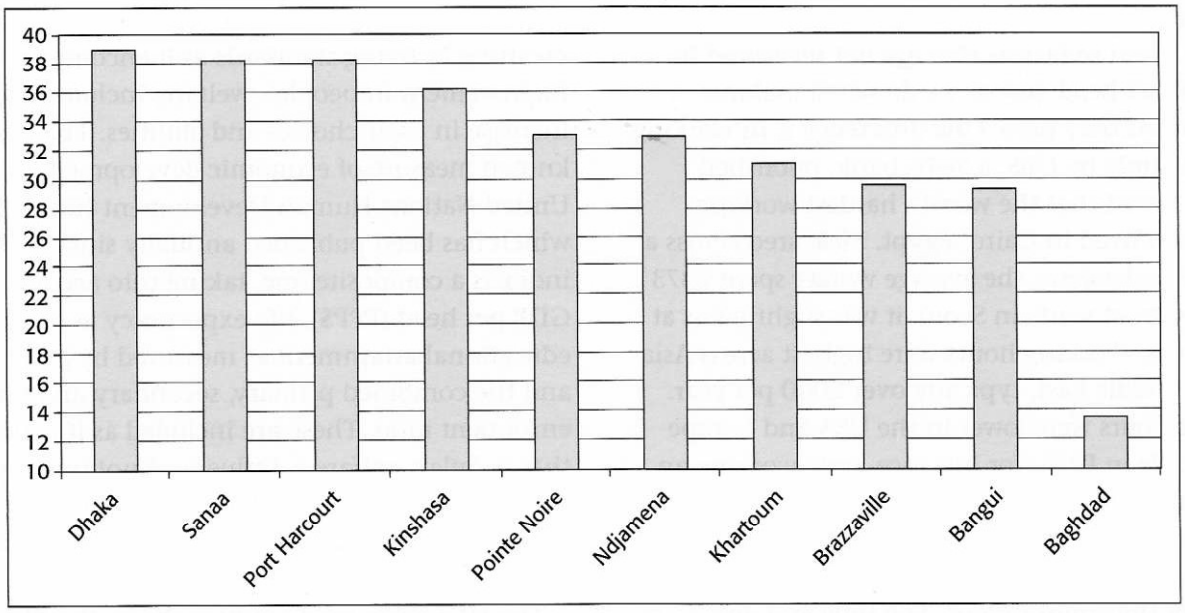


Figure 5.13 *Worst performing cities*

poorest quality of life. Results from surveys such as this do though need to be interpreted with caution. For example, a European living in Kuala Lumpur (KL) may well have a better quality of life than a person living in London which has a ranking of 38th. For the same rent, an apartment in a good part of KL is likely to be much bigger, with access to a pool and other facilities. In addition, the cost of living in KL is much lower than in London.

Comparison of living standards between countries

The citizens of a country with a higher real GDP per head are likely to enjoy higher living standards than people living in a country with a lower real GDP per head, but this is not necessarily the case.

Real GDP figures may give a misleading impression of a country's output because of the same problems of measurement as stated earlier in comparing living standards over time.

To compare living standards between countries we need to convert the real GDP per capita into a common currency. To avoid the comparison being distorted by exchange rate changes, economists usually adjust exchange rates to take into account their purchasing power parities. For example, suppose the exchange rate is 6 Malaysian ringgits equals US $1 and the USA has a real GDP per head of $25 000 whilst Malaysia has a real GDP per head of 6000 ringgits. From this information it might appear that, when Malaysia's real GDP per head is converted into dollars ($1000), people in the USA are, on average, 25 times better off than people in Malaysia. However, if $1 can buy more goods and services in the USA than in Malaysia, then using the exchange rate to convert ringgits into dollars will exaggerate Malaysia's output. In terms of ability to buy products (purchasing parities), 12 ringgits may be worth $1. Using this as the basis for converting Malaysia's output into dollars would show that people in the USA are 50 times better off than people in Malaysia.

Even if a country is found to have a higher real GDP per head than another country using purchasing power parities, it does not necessarily mean that its inhabitants will enjoy higher living standards. For example, Kuwait has a very high real GDP per head but some immigrant workers in the country receive relatively low wages. Where income is very unevenly distributed, only a small number of households may benefit from a high average income.

When assessing living standards consideration must be given to factors that are not measured in real GDP per head, just as we do when making comparisons over time. One difference is in working hours. A study by UBS, a Swiss bank, published in 2009 found that the world's hardest working population lived in Cairo, Egypt. Measured across a range of professions, the average worker spent 2373 hours a year at work; in Seoul, it was slightly less at 2312 hours. Working hours were highest across Asia and the Middle East, typically over 2000 per year. Working hours were lower in the USA and Europe with people in Paris, for instance, only working an average of 1594 hours. Other factors which are not measured in real GDP per head include working conditions, political freedoms, fear of crime and the quality of the environment. The type and quality of products produced also has to be taken into account.

Other indicators of living standards and economic development

In assessing living standards, economists can use a wide range of indicators, e.g. the number of TVs per household, infant mortality rates and energy use per capita. What they normally do is to use composite indicators which include a number of indicators of living standards. For example, in 1972 two American economists William Nordhaus and James Tobin developed a new measure of economic welfare. They called this Net Economic Welfare (NEW), although it is now sometimes also referred to as Measurable Economic Welfare (MEW). This measure seeks to give a fuller picture of living standards by adjusting GDP figures to take into account other factors which have an impact on the quality of people's lives. Factors which improve living standards such as increased leisure hours are added to the GDP figure, whilst factors which reduce living standards, including rising crime and pollution levels, are deducted. Of course, in practice, it is difficult and expensive to measure the value of non-marketed economic 'goods' and 'bads'.

Economic development involves a wider meaning of living standards as it encompasses an improvement in people's welfare, including an increase in their choices and abilities. The best-known measure of economic development is the United Nations Human Development Index (HDI) which has been published annually since 1990. The index is a composite one, taking into account real GDP per head (PPP$), life expectancy at birth and educational attainment as measured by adult literacy and the combined primary, secondary and tertiary enrolment ratio. These are included as it is thought that people's welfare is influenced not only by the goods and services available to them but also by their ability to lead a long and healthy life and to acquire knowledge.

The HDI value for a country shows the distance a country has to make up to reach the maximum value of 1. Table 5.7 (see Self-assessment task 5.11 on page 201) shows the HDI indexes and the data from which these have been computed for a range of countries in 2007. A country's ranking by HDI does not always match its ranking in terms of real GDP per capita as is the case with Ireland and the USA. Indeed, in some cases there are marked differences.

A more recent composite measure from the UN has been the Human Poverty Index, HPI-1. This measures longevity (probability at birth of not surviving to 40), adult literacy and deprivation in terms of the percentage of people not using improved water sources and the percentage of children under 5 who are underweight. As expected the lowest ranked HPI-1 countries are in Africa. Some of the highest ranking countries are the former socialist republics of Central and Eastern Europe. A third measure is HPI-2. Figure 5.16 summarises the data from which each is compiled.

The money supply

The **money supply** is the total amount of money in an economy. This consists of currency in circulation plus relevant deposits. Governments measure the money supply to gain information about trends in aggregate demand, the state of financial markets

SELF-ASSESSMENT TASK 5.10

Read the feature below and then answer the questions that follow.

'Big Mac' economics

The Economist's Big Mac Index offers a light-hearted, but relevant guide to whether currencies are at their correct levels, based on 'purchasing power parity'.

This states that exchange rates should adjust to equalise the price of a basket of goods and services across all countries; the Big Mac PPP is the exchange rate at which a Big Mac, a standardised product, would cost the same in America as in other countries. In 2008, a Big Mac cost $3.54 in the US. So if the price of a Big Mac in dollars is above $3.54, a currency is dear or over-valued; if the price is below $3.54, then the currency is cheap, or undervalued, relative to the dollar. So as shown in Figure 5.14, the Swiss franc and the Norwegian krone are seriously over-valued against the US dollar. In contrast, the South African rand and Chinese yuan are under-valued.

The Big Mac concept can also be used to show variations in the purchasing power of international wage rates (Figure 5.15). Here, compared to the UK, the data shows a worker in Nairobi has to work around 12 times longer than one in London to earn the local price of a Big Mac lunch.

Figure 5.15 *Time taken to earn a Big Mac*

Source: The Economist, *22 January 2009 (adapted)*

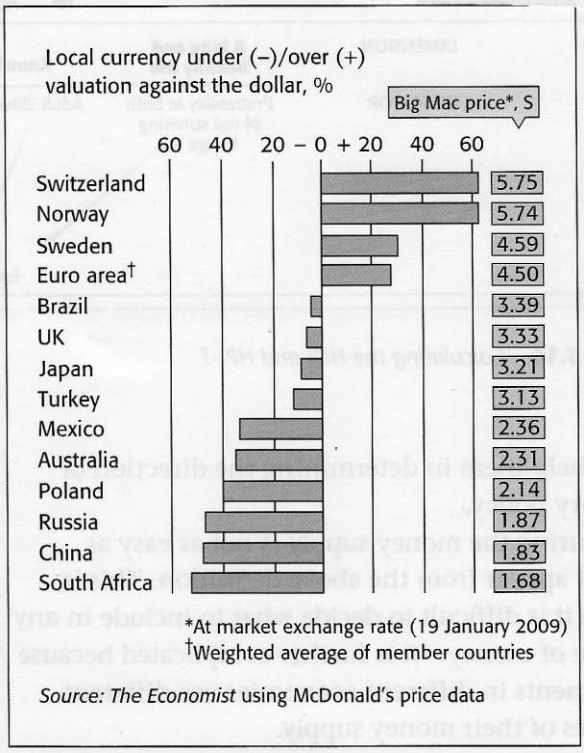


Figure 5.14 *Big Mac index*

1 Explain what is meant by purchasing power parity.
2 Explain what effect using an under-valued exchange rate for the Polish zloty would have when comparing the GDP of Poland with that of the USA.
3 Explain how information on the purchasing power parity of wage rates can be used to draw conclusions about the cost of living in different countries.

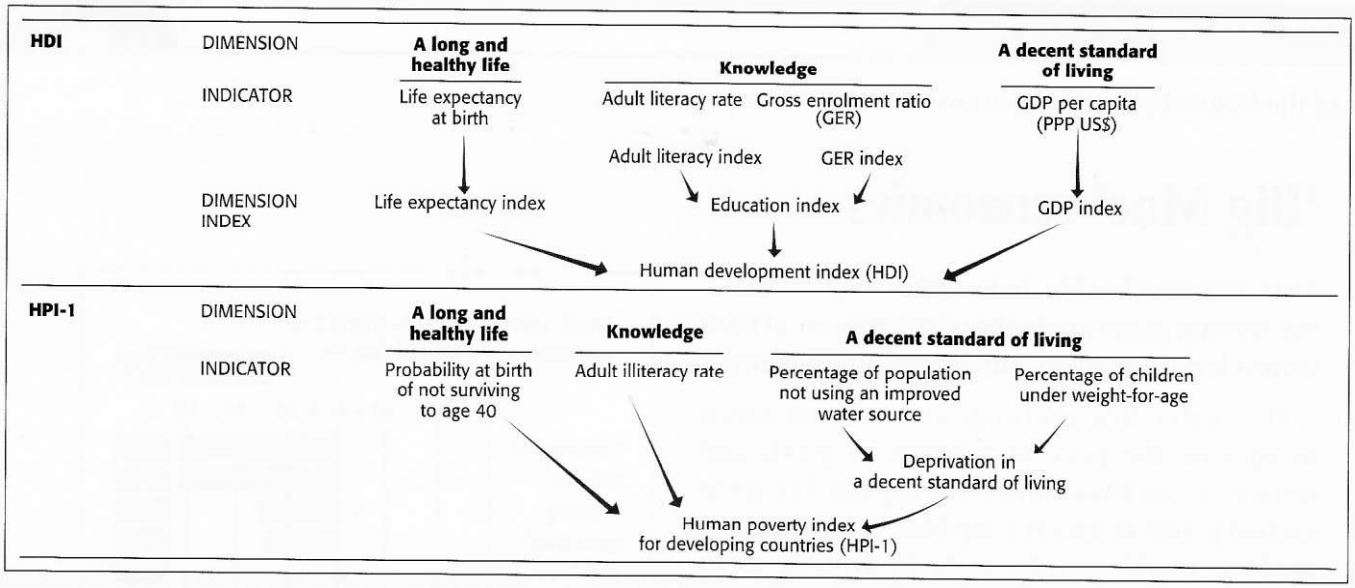


Figure 5.16 *Calculating the HDI and HPI-1*

and to help them in determining the direction of monetary policy.

Measuring the money supply is not as easy as it might appear from the above definition. This is because it is difficult to decide what to include in any measure of money – it is further complicated because governments in different economies use different measures of their money supply.

Economists define items as money if they fulfil the functions of money described earlier in Chapter 1. However, the extent to which items carry out these functions varies and can change over time. As a result governments use a variety of measures of the money supply which are occasionally altered to reflect developments in the roles carried out by particular items.

There are two main measures of money supply:

- **Narrow money** is money which is used as a medium of exchange and consists of notes and coins in circulation and cash held in banks and in balances held by banks at the central bank. This is sometimes referred to as the monetary base.
- **Broad money** consists of the above plus a range of items that are commensurate with money's function as a store of value.

Within the Caribbean, for example, the control of the money supply lies with the various central banks such as the Central Bank of Barbados and the Bank of Jamaica. The standard measures of money supply used are shown in Table 5.6.

Measure	Definition
M0	Currency in the hands of the public plus reserves held on behalf of commercial banks.
M1	Notes and coins outside the banking system plus current account balances.
M2	M1 plus short-term time and savings deposits, foreign currency transferable deposits, certificates of deposit and repurchase agreements.
M3	M2 plus travellers cheques, short-term bank notes, long-term foreign currency time deposits and money market mutual funds.
M4	M3 plus treasury bills, negotiable bonds and pension funds

Table 5.6 *Standard measures of the money supply*

SELF-ASSESSMENT TASK 5.11

1 Use Figure 5.16 to compare the difference between HDI and HPI-1.

2 Table 5.7 shows that Russia has a higher GDP per head than Malaysia, but a lower HDI value. How might this be explained?

3 Make a few notes on how the information produced by the HDI and HPI-1 might be used by UN policy makers.

Rank	Country	Life expectancy at birth	Adult literacy rate	Combined primary, secondary, tertiary enrolment	GDP per head, PPPUS$	HDI value
	Very high					
1	Norway	80.5	99.0	98.6	53 433	0.971
5	Ireland	79.7	99.0	97.6	44 613	0.965
13	USA	79.1	99.0	92.4	45 592	0.956
23	Singapore	80.2	94.4	n.a.	49 704	0.944
	High					
43	Hungary	73.3	98.9	90.2	18 755	0.879
66	Malaysia	74.1	91.9	71.5	13 518	0.829
71	Russia	66.2	99.5	81.9	14 690	0.817
81	Mauritius	72.1	87.4	76.9	11 296	0.804
	Medium					
92	China	72.9	93.3	68.7	5 383	0.772
95	Maldives	71.1	97.0	71.3	5 196	0.771
102	Sri Lanka	74.0	90.8	68.7	4 243	0.759
141	Pakistan	66.2	54.2	39.3	2 496	0.522
	Low					
176	DR Congo	47.6	67.2	48.2	298	0.389
179	CAR	46.7	48.6	28.6	713	0.369
180	S. Leone	47.3	38.1	44.6	679	0.365
182	Niger	50.8	28.7	27.2	627	0.340

Table 5.7 *Human Development Index, 2007*

Source: Human Development Report, UNDP, *2009*

Table 5.8 shows the money supply for Barbados at the end of December 2005. The control of M1 and M2 is particularly important.

Notes in circulation		532 824
Coins in circulation		43 038
Less: Treasury and Bank Cash	127 296	
Total currency with public (M1)		448 566
Demand deposits		2 738 895
Total money supply (M2)		3 187 461

Table 5.8 *Money supply in Barbados (BDS$000)*
Source: Central Bank of Barbados

Because of an increasing quarterly inflation rate, M1 has consistently increased on a month-by-month basis. More specifically, in July and December especially, increased seasonal demand forced the Bank to increase the total value of notes in circulation. The change in M2 has been less consistent, with falls recorded in five months of 2005 as the Bank sought to control the amount of lending by commercial banks in order to reduce the rate of inflation.

The budget and deficit financing

Managing the economy is a complex task. The annual **budget** is eagerly awaited and attracts much media attention as the overall outcome is a very clear indicator of the state of the economy. In the budget statement, the Finance Minister, or Chancellor of the Exchequer as the person is known in the UK, outlines the government's spending and taxation plans for the year ahead. The direction taken in the budget should give a clear indication of the government's macroeconomic priorities.

In principle, there are three types of budget:

- **Budget deficit** In this situation, projected government spending exceeds projected revenue from the many forms of taxation. This is where the government sees the need to reflate the economy by increasing aggregate demand. Normally this is in response to a situation where there is a need to expand the economy in order to create more jobs and income to get the economy moving out of recession.
- **Budget surplus** In contrast, this describes a budget where government revenue from taxation exceeds the government's projected expenditure on social protection, health care, education, transport and so on. Here the government has identified a need to deflate the economy by cutting back aggregate demand. This is normally in response to a situation where the rate of inflation in the economy is higher than the government feels to be appropriate. It could also be in response to a deteriorating deficit on the balance of trade.
- **Balanced budget** As its name suggests, this is a neutral situation where projected revenue and government spending are equal. Within the budget though there is likely to be some re-allocation of taxation and expenditure.

Within the budget, governments may use **discretionary fiscal policies** to make changes to government spending and taxation. These policies are discretionary in the sense that it is the government's decision as to whether the changes should be made. As will be explained later, the government can boost demand by cutting taxes or increasing its own expenditure.

In contrast, **automatic stabilisers** are incorporated into the budget. These stabilisers are the revenue received from certain types of taxes and the expenditure on certain forms of government spending. Both change automatically with fluctuations in real GDP. For example, if real GDP increases, the government will automatically receive increased tax revenue from income tax and indirect taxes due to the rise in incomes. It is also likely to experience a fall in spending due to an increase in the number of people in employment. Alternatively, a fall in real GDP will result in less tax revenue for the government and the need for additional expenditure to support those who have been thrown out of work.

If the government is using a deficit budget to promote an expansion in real GDP, this is likely to mean that more borrowing has to take place. In turn, the **national debt** will increase unless the deficit can be funded from accumulated surpluses from previous years. For many economies this is highly unlikely. With the increase in real GDP, an expansionary budget should lead to a rise in real incomes and hence, tax revenue. This will in part offset some of the projected borrowing requirement.

Where economies have experienced strong economic growth, tax revenue has invariably grown and resulted in governments being able to repay debt. In the UK, for example, the so-called 'Golden Rule' has been applied since 1999. In simple terms, this works on the principle that over the medium term the government should only borrow to invest, not to fund current spending. So, debt accumulation in the long run will be accompanied by higher output and tax revenue without needing a change in tax rates. The challenge that is facing the UK government is to stick to this principle. This seems virtually impossible

SELF-ASSESSMENT TASK 5.12

Read the feature below and then answer the questions that follow.

China's budget deficit to jump nine-fold in 2009

China's budget deficit is expected to reach 950 billion yuan this year, nine times higher than that of last year. The additional deficit included the anticipated issuance of 200-billion-yuan worth of bonds for supporting local government projects. The draft budget deficit would be deliberated during the country's top legislative conference scheduled for early March.

Meanwhile, the National People's Congress Financial and Economic Affairs Committee had already held in-depth discussions on expanding fiscal spending and upping state debt. Opinions were divided, the Economic Observer (EO) learned.

A source close to the matter told the EO that, during the discussions, some committee members claimed that a massive deficit was necessary in order to maintain 8% economic growth and safeguard employment.

Others pointed out that the deficit's proportion of China's gross domestic product (GDP) was expected to be under 3% – the internationally accepted level, according to the source. However, another camp argued that the massive deficit would likely incur more risks, especially if the local governments failed to pay off the bond's principal interests and issuance costs on time, said the source.

Over the past two years, China has kept its fiscal deficit under 1% of its GDP – 0.8% and 0.4% for 2007 and 2008 respectively. The EO learned that such massive deficits were far beyond market expectations.

Last December, Chinese officials had projected a budget deficit of 500 billion yuan for 2009, but the figure was upped to 650 billion yuan a month later. Then again in late January, the Chinese central government announced a plan to issue 200-billion-yuan in bonds on behalf of the local governments to support local-level public investment. The move would skirt existing laws that prohibited local governments from running a budget deficit, thus also barring local authorities from raising funds through issuing bonds.

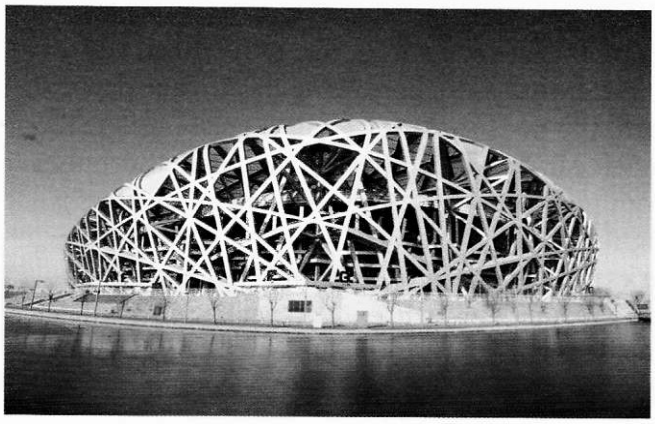
As of the latest information the EO obtained, the Ministry of Finance has put forward a deficit budget of 950 billion yuan.

The multiple reviews of budget deficits in such a short span of time puzzled Lin Shangxi, Vice

Director of the Research Institute of Fiscal Science which is part of the Ministry of Finance. Liu said given the widening gap between this year's fiscal revenues and expenditures, such frequent reviews could add more pressure for imbalance.

In January, State fiscal revenues had seen a decline of 126.5 billion yuan, or 17.1% down from a year earlier. Meanwhile, China's state spending had increased – it invested some 700 million yuan in battling the recent drought that struck 15 northern provinces, and it also spent some 300 billion yuan on its ongoing medical care reform this year.

Source: Xi Si, Economic Observer (EO) News, *23 February 2009*



The 'Birds Nest' Stadium is an example of a public investment project in China

1 Explain why China has found it necessary to increase its budget deficit in 2009.

2 What are the consequences of successive budget deficits for an economy?

due to the vast sums it has borrowed to avoid the collapse of some of the country's banks. Increased taxes are inevitable.

The circular flow of income

When governments spend more than they raise in taxation, they add to the **circular flow of income**. This process is shown in Figure 5.17 for a **closed economy**. The inner circle shows the real flow of products and factor services and the outer circle the money flow of spending and incomes. This figure is a simplified diagram; it assumes that all income is spent and that households and firms are the only sectors involved in economic activity. In practice, there are **leakages** – some income is saved, some is taxed and some is spent on imports. Some expenditure is also additional to the spending which comes from the incomes generated by domestic output. These extra items of spending are investment, government spending and spending by foreigners on a country's exports. A diagram can be drawn showing how some income and some expenditure 'leaks' out of

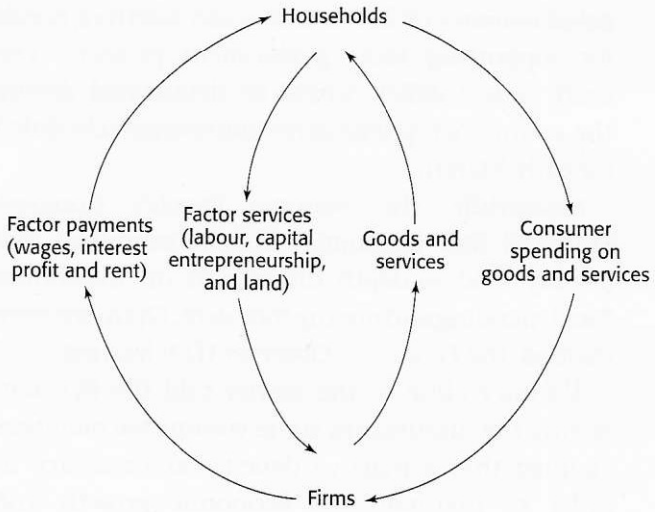


Figure 5.17 *The circular flow of income in a closed economy*

the circular flow in the form of saving, taxation and imports whilst other spending is 'injected' into the circular flow in the form of investment, government spending and exports. The circular flow of income for an **open economy** is shown in Figure 5.18.

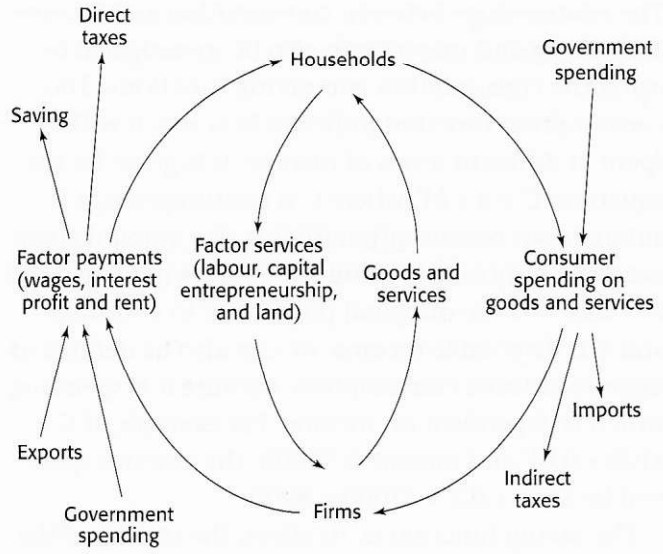


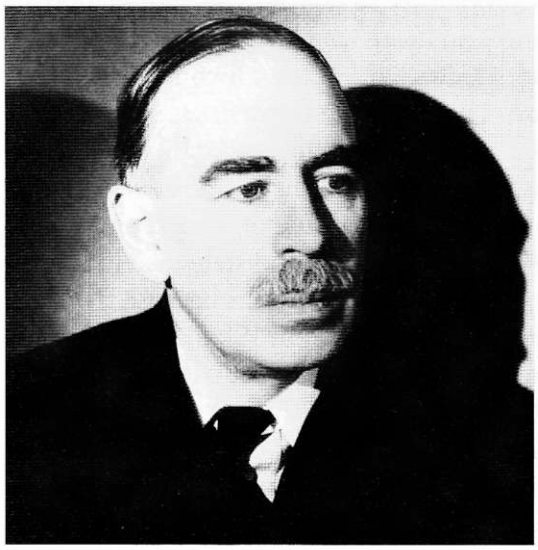
Figure 5.18 *The circular flow of income in an open economy*

Keynesians and monetarists

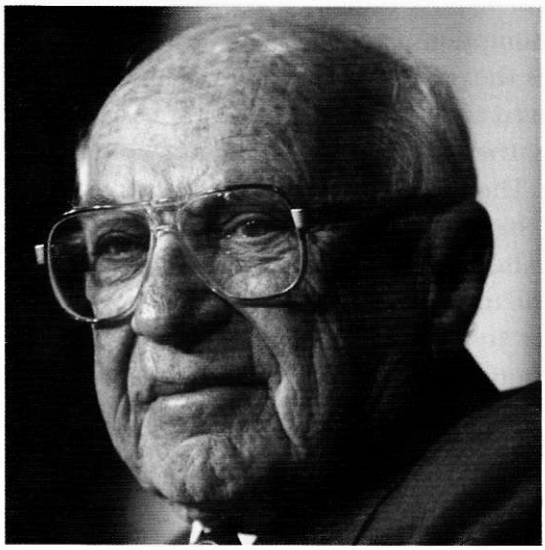
Keynesians are economists whose ideas and approach are based on the work of the British economist John Maynard Keynes (1883–1946). They believe that if left to market forces there is no guarantee that the economy will achieve a full employment level of GDP. Indeed, they think that the level of GDP can deviate from the full employment level by a large amount and for long periods. In such cases they favour government intervention to influence the level of economic activity. If there is high unemployment they argue that the government should use a deficit budget to raise the level of spending in the economy. They believe that a government can assess the appropriate amount of extra spending to inject into the economy in such a situation. For most Keynesians, the avoidance of unemployment is a key priority.

In contrast, for monetarists, the control of inflation is seen as the top priority for a government. This group of economists, the best-known of whom is the American economist Milton Friedman (1912–2006), argue that inflation is the result of an excessive growth of the money supply, so they believe that the main role of a government is to control the money supply. They also maintain that attempts to reduce unemployment by increasing government spending will only succeed in raising inflation in the long run. They think that the economy is inherently stable unless disturbed by erratic changes in the growth of the money supply.

One of the interesting consequences of the global recession from 2008 has been an upsurge of application by governments of Keynsian principles. In the US and UK, for example, massive government borrowing has been necessary in order to avoid the collapse of some financial institutions. This has meant that government debt has had to increase, leaving a legacy that will take many years to pay off.



John M. Keynes



Milton Friedman

Aggregate expenditure is the total amount which will be spent at different levels of income in a given time period. It is made up of consumption (C), investment (I), government spending (G) and net exports, that is exports minus imports ($X - M$).

Consumption

Consumption or consumer spending is spending by households on goods and services to satisfy current wants, for example, spending on food, clothes, travel and entertainment. The main influence on consumption is the level of disposable income (income minus direct taxes plus state benefits). When income rises, total spending also usually rises. Rich people spend more than the poor.

However, whilst total spending rises with income, the proportion of disposable income which is spent tends to fall. Economists refer to this proportion as the **average propensity to consume** (apc).

$$\text{apc} = \frac{\text{consumption}}{\text{income}} = \frac{C}{Y}$$

When a person, or country, is poor most if not all disposable income has to be spent to meet current needs. Indeed, consumption may exceed income with people or countries drawing on past savings or borrowing. This situation can be referred to as **dissaving**. However, when income rises some of it can be saved. **Saving** is defined as disposable income minus consumption. The **average propensity to save** (aps) is the proportion of disposable income which is saved and is equivalent to 1 minus apc. As saving rises, the actual amount saved and aps tend to increase. The rich tend to have a lower apc and a higher aps than the poor.

The rich also have a lower **marginal propensity to consume** (mpc) and a higher **marginal propensity to save** (mps) than the poor. The mpc is the proportion of extra income which is spent:

$$\text{mpc} = \frac{\text{change in consumption}}{\text{change in income}} = \frac{\Delta C}{\Delta Y}$$

1 – mpc gives mps which can also be calculated by:

$$\frac{\text{change in saving}}{\text{change in income}} = \frac{\Delta S}{\Delta Y}$$

The relationships between consumption and income and saving and income can also be investigated by using the consumption and saving functions. The consumption function indicates how much will be spent at different levels of income. It is given by the equation: $C = a + bY$, where C is consumption, a is autonomous consumption (that is, the amount spent even when income is 0 and which does not vary with income), b is the marginal propensity to consume and Y is disposable income. bY can also be defined as income-induced consumption, because it is spending which is dependent on income. For example, if $C = \$100 + 0.8Y$ and income is \$1000, the amount spent will be $\$100 + 0.8 \times \$1000 = \$900$.

The saving function is, in effect, the reverse of the consumption function and is given by the equation: $S = -a + sY$, where S is saving, s is the marginal propensity to save, Y is income and a is autonomous dissaving (i.e. how much of their savings people will draw on when their income is 0; this amount does not change as income changes). The figure sY is induced saving, that is saving which is determined by the level of income. The saving function can be used to work out how much and what proportion households will save at different income levels. For example, if $S = -\$200 + 0.2Y$ and income is \$4000, then:

$$S = -\$200 + 0.2 \times \$4000 = \$600.$$

The average propensity to save will be \$600/\$4000 = 0.15. This will also mean that apc is 1 – 0.15 = 0.85.

A number of factors, other than income, influence consumption. These include the distribution of income, the rate of interest, the availability of credit, expectations and wealth. If income becomes more evenly distributed because of, for example, an increase in direct tax rates and state benefits, consumption is likely to rise. This is because the rich have a lower mpc than the poor. When rich people lose income they are unlikely to cut back on their spending significantly, whilst the poor who gain more income will spend most of the extra.

Households will also usually spend more when interest rates are low. This is because the return from saving will be reduced, buying goods on credit will be cheaper and households who have borrowed before to buy a house, for example, will

have more money to spend. If it becomes easier to obtain loans it is likely that total spending will increase. However, people are unlikely to borrow and to increase their spending if they are pessimistic about the future. Indeed, expectations about future economic prospects are thought to be a significant influence on consumption. When people become more optimistic that their future jobs are secure and that their incomes will rise, they are likely to increase their spending. An increase in wealth, which may result, for example, from a rise in the value of houses or the price of shares, will also probably increase consumption.

Investment

Investment is spending by firms on capital goods, such as factories, offices, machinery and delivery vehicles. The amount of investment undertaken is influenced by changes in consumer demand, the rate of interest, changes in technology, the cost of capital goods, expectations and government policy.

If consumer demand rises, firms are likely to want to buy more capital equipment to expand their capacity. Similarly, a fall in the rate of interest is likely to stimulate a rise in investment. This is for two key reasons. One is that the cost of investment will fall. Firms which borrow to buy capital goods will find it cheaper and firms which use retained profits will find that the opportunity cost of investment will fall. The second reason is that a lower interest rate is likely to raise consumer demand.

Advances in technology will raise the productivity of capital goods and so will probably stimulate more investment. Similarly, a fall in the price of capital equipment and/or cost of installation of capital goods is likely to raise investment.

As with consumption, expectations can play a key role in determining investment. When firms are optimistic that economic conditions are improving and demand for their products will rise, they will be encouraged to raise their investment. Governments can also seek to increase private sector investment by cutting corporation tax (the tax on company profits) and by providing investment subsidies.

Government spending

This covers spending on items such as the wages of teachers in state schools, medicines used in state hospitals and government investment in new roads and new hospitals. The amount of government spending which is undertaken in any period is influenced by government policy, tax revenue and other factors, including demographic changes. If a government wants to raise economic activity it may decide to raise its spending. Higher government tax revenues will enable a government to spend more, without resorting to borrowing. Pressure for a rise in government spending may come from an increase in the number of children (education) and/or an increase in the number of elderly people (health care and state pensions).

Net exports

The level of net exports is influenced by the country's GDP, other countries' GDP, the relative price and quality competitiveness of the country's products and its exchange rate. When a country's GDP rises, demand for imports usually increases. Whereas when incomes rise abroad, demand for the country's exports is likely to increase. A rise in exports may also result from an improvement in the competitiveness of the country's products, due for example to a rise in productivity or improved marketing.

The level of the exchange rate can be a key influence on net exports. If the exchange rate falls in value, the country's exports will become cheaper and imports will become more expensive. If demand for exports and imports is elastic, export revenue will rise whilst import expenditure will fall, causing net exports to fall (see Chapter 7 Core).

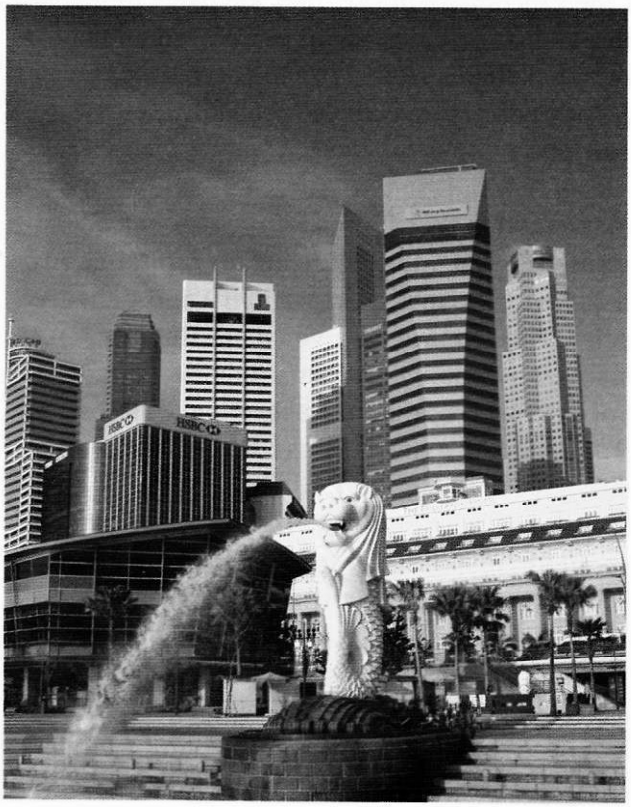
SELF-ASSESSMENT TASK 5.13

Read the feature below and then answer the questions that follow.

The Merlion fights back – Singapore's recent economic growth

Singapore is a particularly good example of a successful open economy. The basis of its progress since the split with Malaysia over 50 years ago is sometimes referred to as the Singapore Model. Lacking natural resources and heavily dependent on immigrant workers, Singapore's growth has been due largely to the performance of its electronics, chemicals, port and financial business services industries.

Up to 1999, real growth typically averaged 8% per year. In 2000 it was 9.9%. However, economic downturn in the US, EU and Japan saw a slump in the global demand for electronics products. In 2001, for the first time ever, real growth was negative at minus 2%. Recovery was slow, not helped by the SARS outbreak in 2003. By 2005, there was a return to normality when real growth was 6.4% and in 2006 it increased to 7.9%. Once again growth was export-led, from manufactured goods and financial business services. With global recession, it is though inevitable that this high growth performance will once again be affected by events that are outside of the control of the Singapore government.



Singapore's financial district

1 How and why is Singapore an open economy?

2 Explain how Singapore's real growth rate is susceptible to external events in the global economy.

3 Discuss two factors which could increase another component of Singapore's aggregate expenditure.

Income determination

The level of income in an economy is determined where aggregate expenditure is equal to output. If aggregate expenditure exceeds current output, firms will seek to produce more. They will employ more factors of production and so will cause GDP to rise. Whereas if aggregate expenditure is below current output, firms will reduce production. So output will change until it matches aggregate expenditure, as shown in Figure 5.19.

This diagram is often referred to as a Keynesian 45° diagram. It measures money GDP on the horizontal axis and aggregate expenditure on the vertical axis. The 45° line shows the points at which aggregate expenditure equals national income (GDP). Output is determined where the $C + I + G + (X - M)$ line cuts this 45° line.

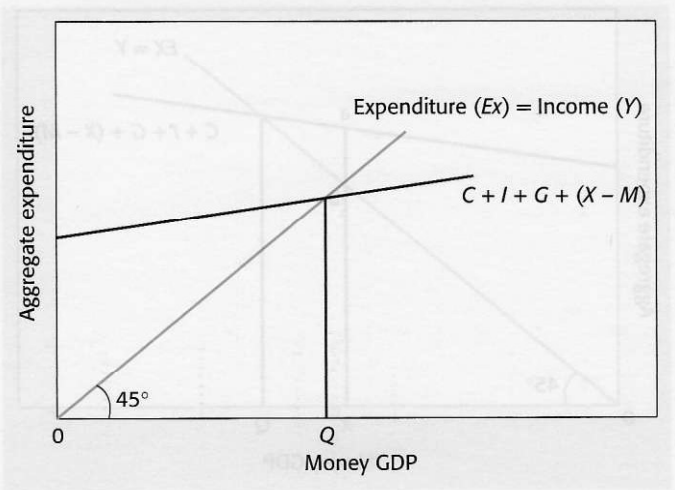


Figure 5.19 *The Keynsian 45° diagram*

If, for example, consumption and investment increase because consumers and entrepreneurs become more optimistic about the future, aggregate expenditure will rise and output will increase from Q to Q_1. Figure 5.20 shows this increase in GDP.

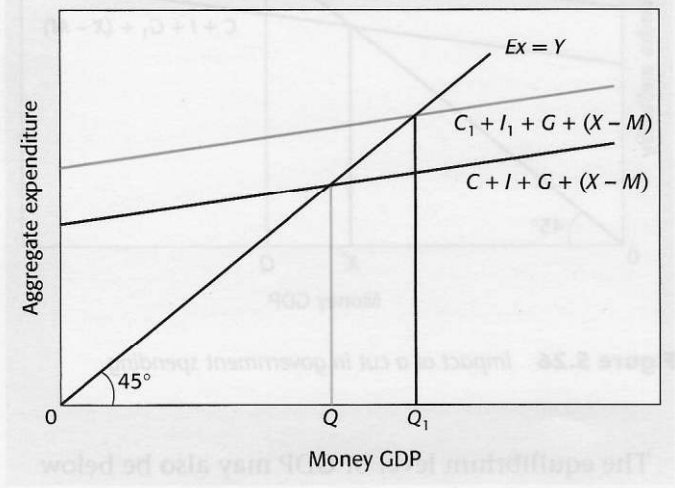


Figure 5.20 *Impact of a rise in aggregate expenditure*

Withdrawals and injections

For income to be in equilibrium it is also necessary for **injections** of extra spending into the circular flow of income to equal **withdrawals** (also called leakages) from the circular flow. As noted earlier, possible injections into the circular flow are investment, government spending and exports, whilst the possible withdrawals are saving, taxation and imports. Figure 5.21 shows equilibrium income in a two-sector economy (households and firms).

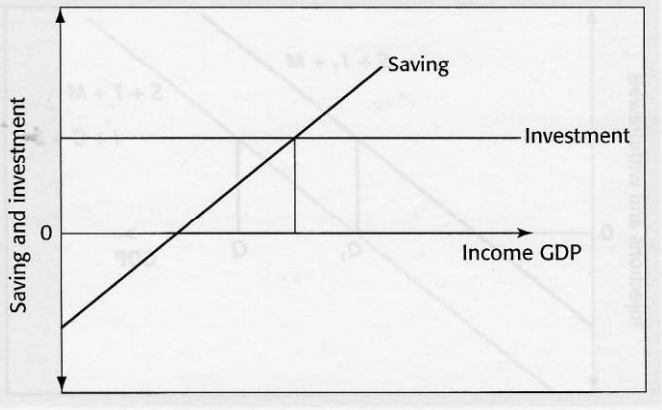


Figure 5.21 *Equilibrium income in a simple economy*

A rise in investment would in turn cause a rise in GDP. This is shown in Figure 5.22.

A fall in saving would have a similar effect. Figure 5.23 shows equilibrium income where $I + G + X = S + T + M$ in a four-sector economy (households, firms, the government and the foreign trade sector).

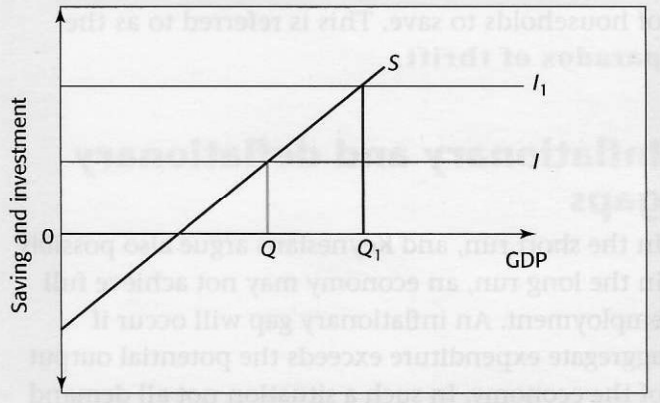


Figure 5.22 *A rise in investment in a simple economy*

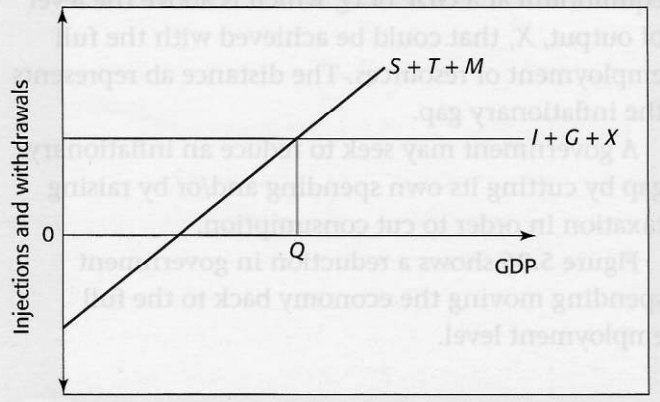


Figure 5.23 *Equilibrium income in an open economy*

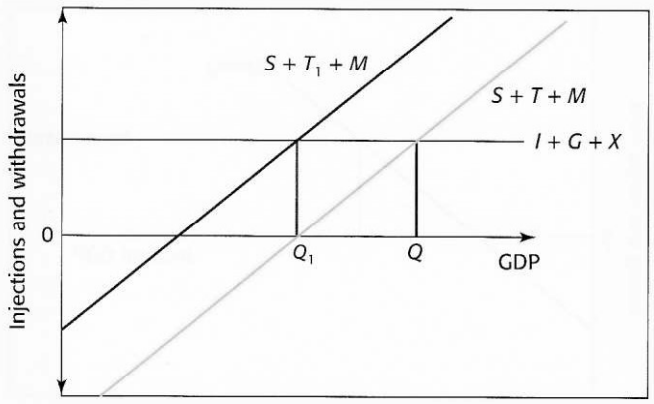


Figure 5.24 *Impact of a rise in taxation on equilibrium income*

If, for example, tax rates should rise without any change in government spending, GDP will fall, as shown in Figure 5.24.

A rise in saving will also cause GDP to fall. Indeed, a decision by households to save more can result in them saving less. This is because higher saving can reduce income and hence the ability of households to save. This is referred to as the **paradox of thrift**.

Inflationary and deflationary gaps

In the short run, and Keynesians argue also possibly in the long run, an economy may not achieve full employment. An inflationary gap will occur if aggregate expenditure exceeds the potential output of the economy. In such a situation not all demand can be met, as there are not enough resources to do so. As a result the excess demand drives up the price level. Figure 5.25 shows that the economy is in equilibrium at a GDP of Q, which is above the level of output, X, that could be achieved with the full employment of resources. The distance ab represents the inflationary gap.

A government may seek to reduce an inflationary gap by cutting its own spending and/or by raising taxation in order to cut consumption.

Figure 5.26 shows a reduction in government spending moving the economy back to the full employment level.

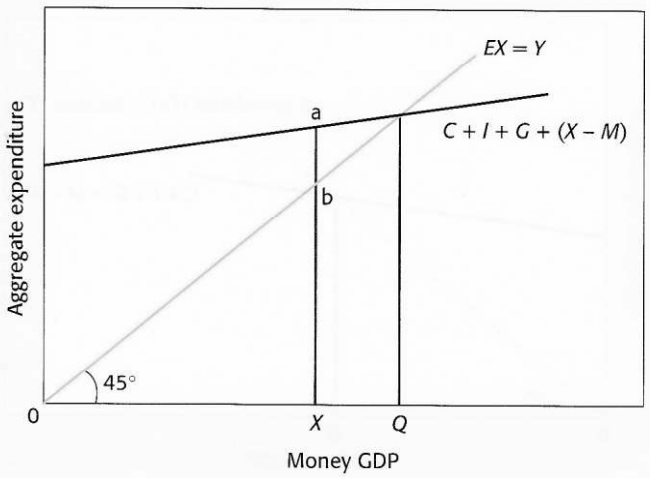


Figure 5.25 *An inflationary gap*

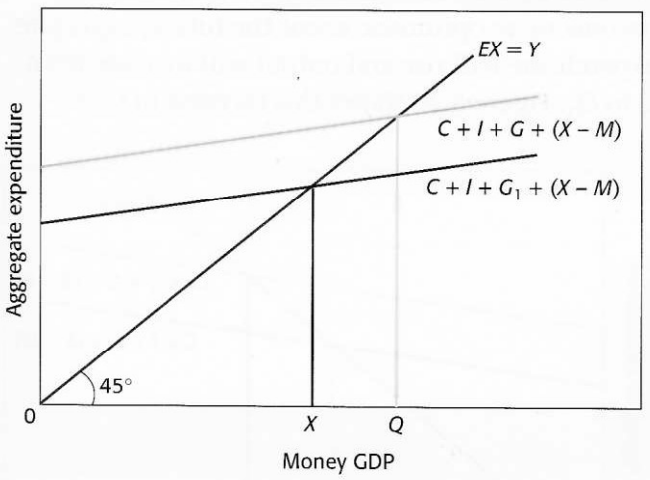


Figure 5.26 *Impact of a cut in government spending*

The equilibrium level of GDP may also be below the full employment level. In this case there is said to be a **deflationary gap**. Figure 5.27 shows that the lack of aggregate expenditure results in an equilibrium level at a GDP of Q, below the full employment level of X. There is a deflationary gap of vw.

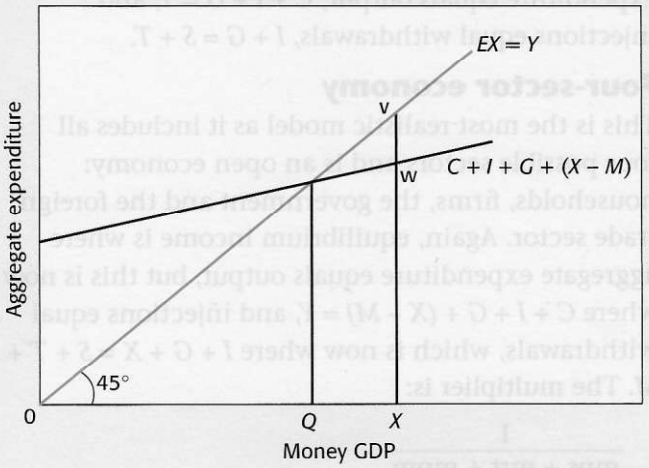


Figure 5.27 *A deflationary gap*

The Keynesian solution to a deflationary gap is increased government spending financed by borrowing. Figure 5.28 shows an increase in government spending eliminating the deflationary gap. As explained earlier, this in theory is the approach that many governments have implemented to get out of recession.

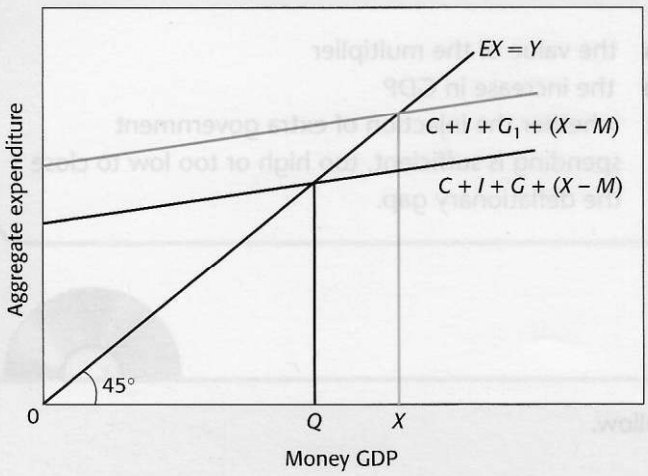


Figure 5.28 *Impact of an increase in government spending*

The multiplier

Figures 5.27 and 5.28 show that a change in government spending results in a change in GDP of greater magnitude. This tendency for a change in aggregate expenditure to result in a greater rise in GDP is known as the **multiplier** effect. This effect occurs because a rise in expenditure will create incomes, some of which will, in turn, be spent and thereby create more incomes. For example, if people spend 80% of any extra income, an increase of government spending of $200 million will cause a final rise in GDP of $1000 million. This is because the initial $200 million spent will create higher incomes. People will spend $160 million of these incomes thereby generating a further rise in incomes. Of the $160 million, $128 million will be spent. This process will continue until incomes increase to $1000 million and the change in injections is matched by a change in withdrawals.

In the example above, GDP rises until the $200 million of extra government spending is matched by an extra $200 million of saving. The value of the multiplier is calculated by using the formula:

$$\frac{\text{change in income}}{\text{change in injection}} = \frac{\Delta Y}{\Delta J}$$

In the example above, the multiplier is:

$$\frac{\$1000\,\text{million}}{\$200\,\text{million}} = 5$$

The multiplier can also be estimated in advance of the change by using the formula:

$$\frac{1}{\text{marginal propensity to withdraw}}$$

The multiplier and equilibrium income in two-, three- and four-sector economic models

As we saw with the circular flow, economists often seek to explain their analysis first in a simplified form and then go on to include more variables. This is also the case with the multiplier where economists start with a simple model of the economy which only includes two sectors and then move on to a model which includes three sectors and then finally one which includes all four sectors.

Two-sector economy

In a two-sector economy (households and firms) there is only one withdrawal, one saving and one

injection investment. In such an economy the multiplier can be found by using the formula:

$$\frac{1}{\text{mps}}$$

where mps is the marginal propensity to save. Because in this model income is either spent or saved, it can also be calculated by using the formula:

$$\frac{1}{1-\text{mpc}}$$

Equilibrium income will occur where aggregate expenditure equals output, which in this case is where $C + I = Y$ and injections equal withdrawals, $I = S$.

A two-sector economy is sometimes referred to as a closed economy (that is one which does not engage in international trade) without a government sector.

Three-sector economy

The additional sector is the government sector. The model is still based on a closed economy but there is now an additional sector, the government, and so an extra injection, G, and an extra withdrawal, T (taxation). The multiplier is now:

$$\frac{1}{\text{mps}+\text{mrt}}$$

where mrt is the marginal rate of taxation (the proportion of extra income which is taxed). Equilibrium income is achieved where aggregate expenditure equals output, $C + I + G = Y$, and injections equal withdrawals, $I + G = S + T$.

Four-sector economy

This is the most realistic model as it includes all four possible sectors and is an open economy: households, firms, the government and the foreign trade sector. Again, equilibrium income is where aggregate expenditure equals output, but this is now where $C + I + G + (X - M) = Y$, and injections equal withdrawals, which is now where $I + G + X = S + T + M$. The multiplier is:

$$\frac{1}{\text{mps} + \text{mrt} + \text{mpm}}$$

where mpm is the marginal propensity to import (the proportion of extra income which is spent on imports).

SELF-ASSESSMENT TASK 5.14

In an economy, mps is 0.1, mrt is 0.1 and mpm is 0.2. GDP is $300 billion. The government raises its spending by $6 billion in a bid to close a deflationary gap of $20 billion. Calculate:

a the value of the multiplier
b the increase in GDP
c whether the injection of extra government spending is sufficient, too high or too low to close the deflationary gap.

SELF-ASSESSMENT TASK 5.15

Read the feature below and then answer the questions that follow.

International tourism – a mixed blessing

International tourism is arguably the biggest single item in world trade. The development of international tourism has been central to the economic development strategies of many developing economies, particularly those in the Caribbean area, southern and South East Asia and East and South Africa. The attraction of hoards of wealthy tourists descending on countries that are struggling to advance is obvious... or is it?

International tourism creates jobs in the tertiary sector. It also leads to jobs being created in agriculture and certain areas of manufacturing in order to meet the needs of tourists for food, drink, souvenirs and other products. This is the so-called 'tourism multiplier effect'. Figure 5.29 is a representation of this process within the context of a new hotel development.

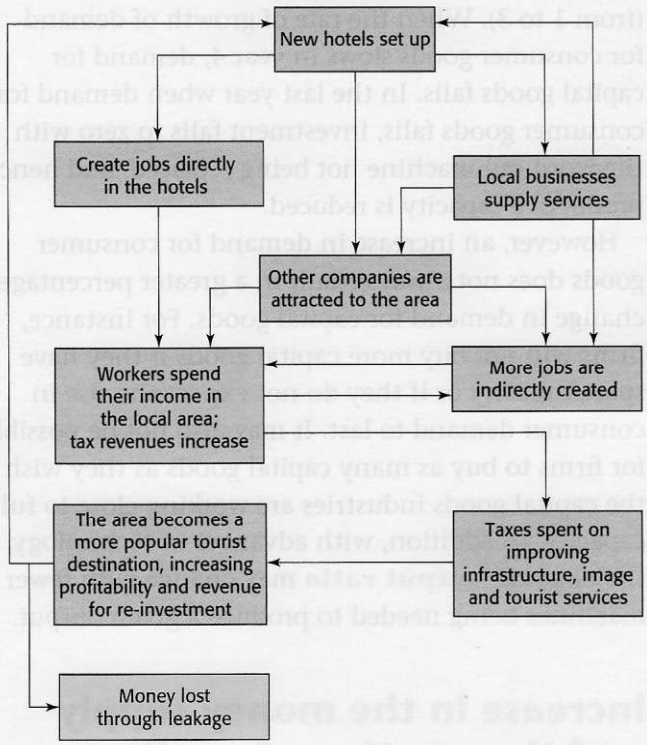
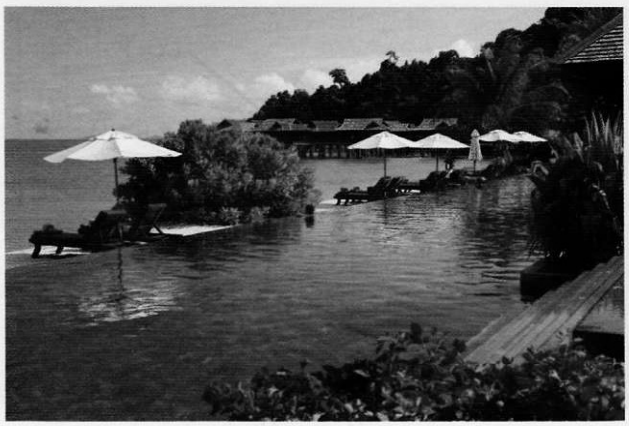


Figure 5.29 *Tourism multiplier effect*

The extent to which international tourism really benefits a local economy is heavily dependent on the leakages that take place. These take the form of payments for imported goods demanded by tourists, payments to foreign airlines and tour operators and in many cases, repatriated profits generated by multinational corporations who own hotels and resorts in tourist areas. A recent study has claimed that the multiplier effects of international tourism are often exaggerated. In parts of the Caribbean, for example, as much as 80% of all money spent by international tourists is lost through leakages; in Thailand, the figure is 70% yet in India it is only 40%. By way of contrast, in New York, it has been estimated that every dollar spent by tourists generates a massive $7 for the state's economy.



Luxury resort in West Malaysia

1 Calculate the value of the tourism multiplier for the Caribbean, Thailand and India.
2 Explain the likely reasons for the differences in the values you have calculated.
3 Discuss how governments in developing economies might introduce policies to make international tourism more beneficial than seems to be the case.

Autonomous and induced investment

Investment can rise or fall by significant amounts and it interacts with changes in income to cause significant changes in economic activity.

Investment which is undertaken independently of changes in income is known as **autonomous investment**. For example, a firm may buy more capital goods because it is more optimistic about the future or because the rate of interest has fallen. In this case, the aggregate expenditure line will shift upwards, as shown in Figure 5.30 (page 214). As a result of an increase in investment from I to I_1, GDP rises by a multiple amount, from Q to Q_1.

In contrast to autonomous investment, **induced investment** is illustrated by a movement along the expenditure line. This is because induced investment is investment which is influenced by changes in income. If income and hence demand increases, firms will be likely to buy more capital equipment. However, they will only continue to add to their capital stock if GDP continues to rise.

The accelerator

The **accelerator** theory focuses on induced investment and emphasises the volatility of investment. It states that investment depends on the rate of change in income (and hence consumer demand), and that a

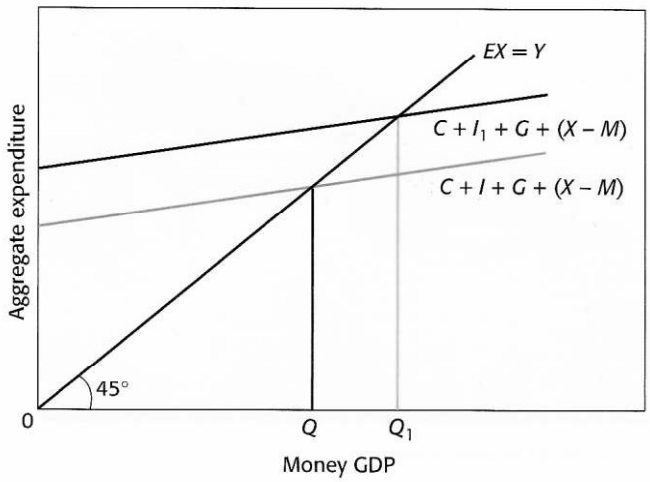


Figure 5.30 *An increase in autonomous investment*

change in income will cause a greater proportionate change in investment. If a £1 million increase in GDP causes induced investment to rise by £3 million, the accelerator co-efficient is said to be 3.

If GDP is rising but at a constant rate, induced investment will not change. This is because firms can continue to buy the same number of machines each year to expand capacity. However, a change in the rate of growth of income can have a very significant influence on investment. An example may help to show this.

In Table 5.9 it is assumed that the firm starts the period with eight machines, that one machine wears out each year and that each machine can produce 100 units of output per year.

The table shows that when demand for consumer goods rises by 25% (from 800 to 1000) in the second year, demand for capital goods rises by 200% (from 1 to 3). When the rate of growth of demand for consumer goods slows in year 4, demand for capital goods falls. In the last year when demand for consumer goods falls, investment falls to zero with the worn out machine not being replaced, and hence productive capacity is reduced.

However, an increase in demand for consumer goods does not always result in a greater percentage change in demand for capital goods. For instance, firms will not buy more capital goods if they have spare capacity or if they do not expect the rise in consumer demand to last. It may also not be possible for firms to buy as many capital goods as they wish if the capital goods industries are working close to full capacity. In addition, with advances in technology, the **capital-output ratio** may change with fewer machines being needed to produce a given output.

Increase in the money supply and the creation of credit

As noted above, one of the causes of an increase in aggregate demand is an increase in the money supply. There are three main causes of an increase in the money supply:

- an increase in commercial bank lending
- an increase in government spending financed by borrowing from the banking sector
- more money entering than leaving the country.

Credit creation

Commercial banks, also called high street and retail banks, make most of their profits by lending to

Year	Consumer demand	Machines at start of period	Number of machines required	Replacement investment	Induced investment	Total investment
1	800	8	8	1	0	1
2	1000	8	10	1	2	3
3	1600	10	16	1	6	7
4	1800	16	18	1	2	3
5	1800	18	18	1	0	1
6	1700	18	17	0	0	0

Table 5.9 *Changes in investment*

customers, and when they lend they create money. This is because when a bank gives a loan (also called an advance by bankers), the borrower's account is credited with the amount borrowed. So every loan creates a deposit. Banks are in a powerful position to create money because they can create more deposits than they have cash and other liquid assets (that is items which can be quickly converted into cash).

From experience, banks have found that only a small proportion of deposits are cashed. When people make payments, especially large payments, they tend to make use of cheques, credit cards, electronic transfers and direct debits. These means of payments involve a transfer of money using entries in the records that banks keep of their customers' deposits rather than by paying out cash. So, banks can create more deposits than they have liquid assets.

Nevertheless, they have to be careful when calculating what liquidity ratio (the proportion of liquid assets to total liabilities) to keep. The lower they keep the ratio, the more they can lend. However, they have to be able to meet their customers' demands for cash. If they miscalculate and keep too low a ratio or if people suddenly start to cash more of their deposits, there is a risk of a run on the banking system. This was evidenced in 2008 when there were fears over the liquidity of some US and UK banks, the result being enforced government involvement. Indeed, banking is based on confidence. Customers have to believe there is enough cash and liquid assets to pay out all their deposits even though, in practice, this is not going to be the case.

The credit multiplier

By estimating what liquidity ratio to keep, a bank will be able to calculate its credit multiplier. This is also referred to as a bank or credit creation multiplier, and shows by how much additional liquid assets will enable banks to increase their liabilities. It is given by the formula:

$$\frac{\text{total value of new deposits created}}{\text{value of change in liquid assets}}$$

For example, if total deposits rise by £600 million as a result of a new cash deposit of £100 million, the credit multiplier is £600 million/£100 million = 6. It is also possible to calculate the credit multiplier by using the formula:

$$\frac{100}{\text{liquidity ratio}}$$

If a bank keeps a liquidity ratio of 10%, the credit multiplier will be 100/10 = 10. Knowing this enables a bank to calculate how much it can lend. It first works out the possible increase in its total liabilities. This is found by multiplying the change in liquid assets by the credit multiplier. So, if the credit multiplier is 10 and liquid assets rise by £40 million, total deposits will rise by £40 million × 10 = £400 million.

To work out the change in loans (advances), the change in liquid assets is deducted from the change in liabilities. This is because the change in liabilities will include deposits given to those putting in the liquid assets. In the example the change in loans will be £400 million – £40 million = £360 million.

In practice, however, a bank may not lend as much as the credit multiplier implies it can. This is because there may be a lack of households and firms wanting to borrow or a lack of credit-worthy borrowers. If banks persist in lending to borrowers with poor credit ratings, as was the case in the US sub-prime market, the risk of default is high and can have serious consequences on a bank's liquidity.

A bank may also change its liquidity ratio if people alter the proportion of their deposits they require as cash, if other banks alter their lending policies or if the country's central bank requires banks to keep a set liquidity ratio.

A central bank may seek to influence commercial banks' ability to lend. For example it may engage in open market operations. These involve the central bank buying or selling government securities to change bank lending. If the central bank wants to reduce bank loans it will sell government securities. The purchasers will pay by drawing on their deposits in commercial banks and so cause the commercial banks' liquid assets to fall.

SELF-ASSESSMENT TASK 5.16

A bank keeps a liquidity ratio of 5%. It receives additional cash deposits of $20 000. Calculate:

a the credit multiplier
b the potential increase in total liabilities (deposits)
c the potential increase in bank lending.

Deficit financing

As seen earlier in this section, if the government spends more than it raises in taxation it will have to borrow. If it borrows by selling government securities, including National Savings certificates, to the non-bank private sector (non-bank firms and the general public) it will be using existing money. The purchasers will be likely to draw money out of their bank deposits. So the rise in liquid assets resulting from increased government spending will be matched by an equal fall in liquid assets as money is withdrawn.

However, if a budget deficit is financed by borrowing from commercial banks or the central bank, the money supply will increase. When a government borrows from its central bank it spends cheques drawn on the bank. This spending increases commercial banks' liquid assets, which will increase their ability to lend. Commercial banks will also be able to lend more if the government borrows from them by selling them short-term government securities. This is because these securities count as liquid assets and so can be used as the basis for loans.

Total currency flow

The **total currency flow** of the balance of payments refers to the total outflow or inflow of money resulting from international transactions as recorded in the current account, financial account, capital account and balancing item (see Chapter 4). If there is net inflow of money into, for example, Malaysia the excess surplus currency will be converted into ringgits, thereby adding to Malaysia's money supply.

Relationship between the money supply, price level and output

As we saw earlier in this chapter, monetarists believe that changes in the money supply can have a significant effect on the price level and output in an economy. This relationship will be analysed in Chapter 6 Core when the Quantity Theory of Money is explained. Monetarists are very clear that a change in the money supply will cause an equal proportionate change in the price level. This is disputed by Keynsians who believe that the relationship is by no means as clear and simple as monetarists would have us believe. In other words, although the change in the money supply has some relevance, there are other factors that must be taken into account when explaining a change in the price level.

Interest rate determination and the demand for money

Monetarists and Keynesians also disagree over how the rate of interest is determined. Most monetarists support the **loanable funds theory**. This states that the rate of interest is determined by the demand and supply of loanable funds, as shown in Figure 5.31.

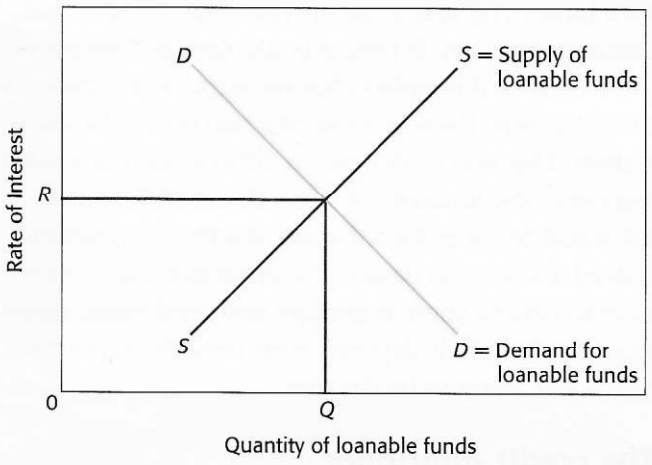


Figure 5.31 *Interest rate determination*

The demand for loanable funds comes from firms wanting to invest, households wanting to (say) buy a car on credit and from the government seeking to fund a budget deficit. Government demand for loanable funds is not very sensitive to a change in the rate of interest but a rise in the rate of interest will lower firms' and households' demand so the demand for loanable funds curve slopes down from left to right. The supply of loanable funds comes from savings. A higher rate of interest will increase the return from savings and so the supply curve is upward sloping.

An increase in the supply of savings will lower the rate of interest and cause an extension in demand for loanable funds, as shown in Figure 5.32.

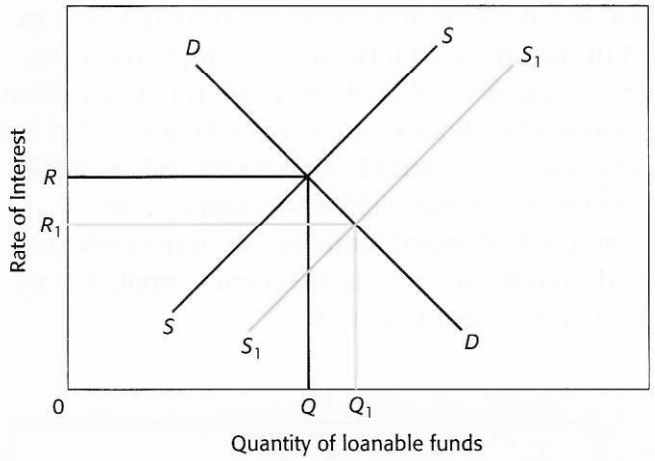


Figure 5.32 *The effect of an increase in savings on the rate of interest*

In contrast, Keynesians argue that the rate of interest is determined not by the demand and supply of loanable funds but by the demand and supply of money. It is assumed that the supply of money is determined by the monetary authorities and is fixed in the short run.

Keynes developed the liquidity preference theory to explain the demand for money. He identified three main motives why households and firms may decide to hold part of their wealth in a money form. The motive most people will be familiar with is the transactions motive. This is the desire to hold money to make everyday purchases and meet everyday payments. How much is held by a household or firm is influenced by the income received and the frequency of the income payments. Generally, the more income received and the more infrequently the payments are received, the higher the amount which will be held.

Firms and households also usually hold rather more of their wealth in a money form than they anticipate they will spend. This is so that they can meet unexpected expenses, and take advantage of unforeseen bargains. This is known as the precautionary motive. Money resources held for the transactions and precautionary motives are sometimes referred to as active balances as they are likely to be spent in the near future. They are relatively interest inelastic so that, for example, a rise in the rate of interest will not result in households and firms significantly cutting back on their holdings of money for transactions and precautionary reasons.

In contrast, the third motive for holding money balances, the speculative motive, is interest elastic. Households and firms will hold what are sometimes called idle balances when they believe that the returns from holding financial assets are low. One financial asset which firms and households may decide to hold is government bonds. These are government securities which represent loans to the government. The price of government bonds and the rate of interest (in percentage terms) move in opposite directions. For example, a government bond with a face value of £500 may carry a fixed interest rate of 5% of its issue price. If the price of the bond rises to £1000, the interest paid will now represent 2.5% of the price of the bond. Households and firms are likely to hold money when the price of bonds is high and expected to fall. This is because they will not be forgoing much interest and because they will be afraid of making a capital loss, whereas, the speculative demand for money will be low when the price of bonds is low and the rate of interest high. Figure 5.33 shows the combined transactions, precautionary and speculative motives for holding money in the form of liquidity preference (or demand) for money. The rate of interest is at *R* since this is where the liquidity preference curve intersects the supply of money curve.

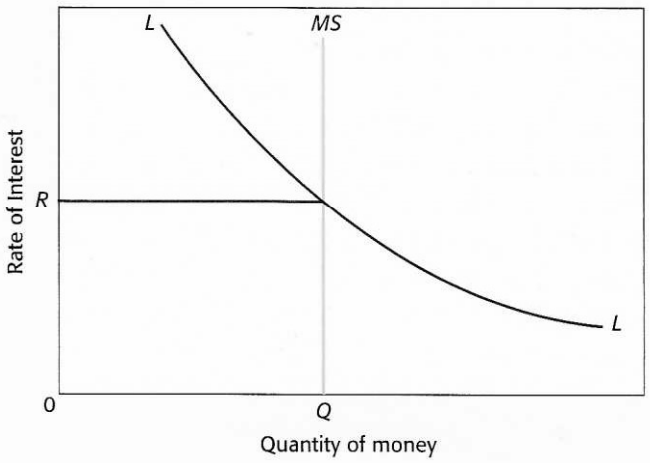


Figure 5.33 *The liquidity preference theory of interest rate determination*

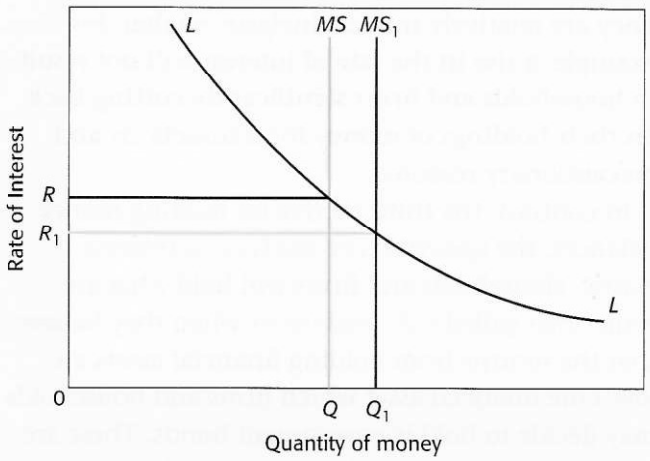


Figure 5.34 *An increase in the money supply and a fall in the rate of interest*

An increase in the money supply will cause a fall in the rate of interest, as illustrated in Figure 5.34. The rate of interest falls because the rise in the money supply will result in some households and firms having higher money balances than they want to hold. As a result they will use some to buy financial assets. A rise in demand for government bonds will cause the price of bonds to rise and so the rate of interest to fall.

The liquidity trap

Although it is expected that an increase in the money supply will cause the rate of interest to fall, Keynes described a situation where it would not be possible to drive down the rate of interest by increasing the money supply. He described this situation as the **liquidity trap** and thought it could occur when the rate of interest is very low and the price of bonds very high. In this case, he thought that speculators would expect the price of bonds to fall in the future, so if the money supply was to be increased they would hold all the extra money; they would not buy bonds for fear of making a capital loss and because the return from holding such securities would be low. Figure 5.35 shows that at a rate of interest of R, demand for money becomes perfectly elastic and the increase in the money supply has no effect on the rate of interest.

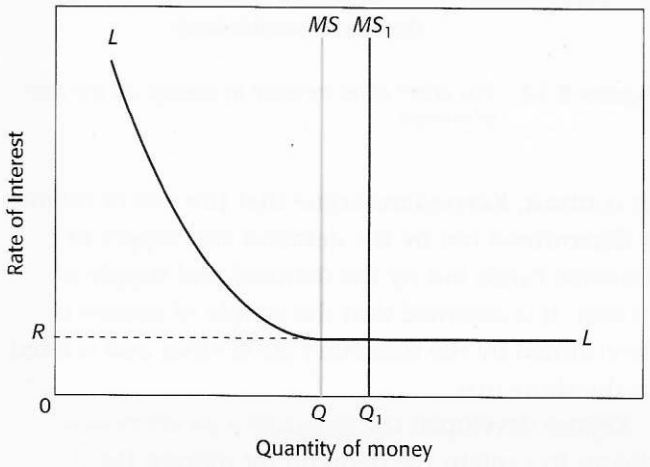


Figure 5.35 *The liquidity trap*

Read the article below and then answer the questions that follow.

Japan's gesture

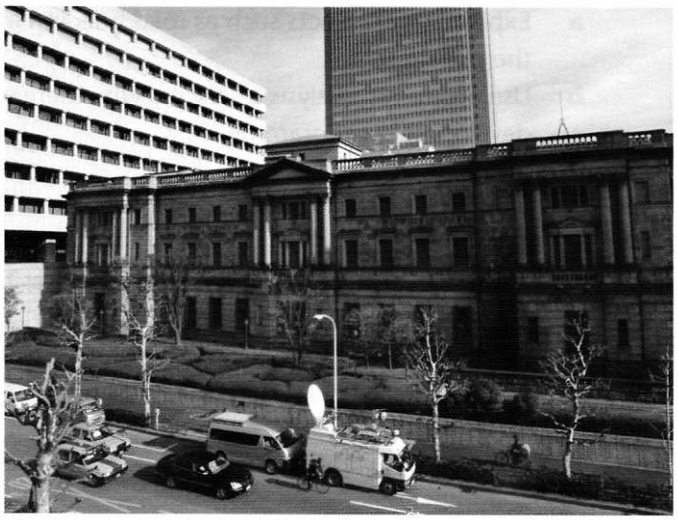
When Masaru Hayami was appointed governor of the newly independent Bank of Japan two years ago, he had a reputation for stubbornness. Now he has demonstrated that trait with a vengeance.

In recent weeks he has faced a barrage of calls for him to stick with the Bank's ultra-loose monetary policy which has kept overnight rates at about zero by flooding the markets with liquidity. But on Friday Mr Hayami persuaded the Bank's policy board to raise the overnight money rate to 0.25%. For the first time in 10 years, Japanese interest rates moved up rather than down.

The immediate economic effects of ending the zero interest rate policy instituted in February 1999 may be modest.

As Bank of Japan officials point out, Friday's decision in itself is hardly likely to tip Japan's economy into recession. A rise of 0.25% is small, and still leaves interest rates at remarkably low levels.

Nor will it necessarily translate into an immediate rise in borrowing costs for all companies. Corporate loans are pegged not only to overnight market rates but also to the official discount rate, which remains at 0.5%. Economists estimate that typical corporate lending rates might rise by just 0.1%.



Bank of Japan, Tokyo

Japan has for many years looked like John Maynard Keynes' description of an economic slump in which businesses become so fearful that there is nothing monetary policy can do to persuade them to spend. Cutting interest rates in those conditions is as useless as 'pushing on a string'. But if cutting rates in Japan had little impact, then raising them may turn out to be considerably more significant.

Source: Gillian Tett and Ed Crooks, Financial Times, *14 August 2000 (adapted)*

1 Define liquidity.

2 Explain why 'flooding the markets with liquidity' would be expected to keep interest rates low.

3 Discuss the possible effect that the rise in Japanese corporate lending rates may have on investment.

4 Explain why cutting interest rates can be 'as useless as "pushing on a string"'.

SPECIMEN EXAM QUESTIONS

The following questions have been set in recent CIE examination papers.

1 The World Bank has given a loan to support the Ugandan government's road development programme. Improved roads into economically productive rural areas will have a major impact on the country's economy.

a Explain why projects such as road building are often undertaken by the government rather than by the private sector. [10]

b Use economic analysis to discuss why there will be a major impact on the economy from the road development programme. [15]

[25 marks]

(October/November 2007)

2 **a** It is feared that if the government increases taxes the level of national income will fall. Explain whether this is necessarily true. [10]

b Discuss whether a fall in the level of national income is a good indicator that there has been a decline in the standard of living in the country [15]

[25 marks]

(May/June 2008)

SUMMARY

In this supplement section it has been shown that:

- Economic growth is an increase in real national output.
- GDP is measured by the output, income and expenditure methods.
- Real GDP is money (nominal) GDP adjusted for inflation.
- In measuring economic growth rates care has to be taken to ensure the quality of the information is good and that the size of the hidden economy and value of non-marketed goods and services are taken into account.
- Sustainable economic growth is economic growth which can be sustained over generations.
- An increase in real GDP per head is likely to mean higher living standards but may not do so if, for example, the size of the hidden economy falls, people have less enjoyment from the products produced, working conditions deteriorate, working hours rise and pollution increases.
- In using economic growth rates to compare living standards between countries, it is advisable to convert exchange rates using purchasing power parities.
- Other indicators of living standards and economic development include healthy life expectancy, the Human Development Index, the Human Poverty Index and Measurable Economic Welfare.
- Measures of the money supply include items which carry out the functions of money. Narrow money measures focus on items used as a medium of exchange, whereas broad money measures cover items used both as a medium of exchange and store of value.
- Budgets are statements of government spending and taxation plans for the next financial year.
- Deficit financing occurs when a government spends more than it raises in taxation.
- The circular flow of income shows the flow of money and resources around the economy.

- Keynesians believe that output and employment can deviate from the full employment level by substantial amounts and for long periods. In contrast, monetarists believe that the economy is inherently stable and that a government's key role is to ensure that the economy is not moved from the long run equilibrium by excessive increases in the money supply.
- Aggregate expenditure is total planned spending at different levels of income and is composed of consumption, investment, government spending and net exports.
- Equilibrium national income is achieved where aggregate expenditure equals output.
- An inflationary gap occurs if aggregate expenditure exceeds the full employment level of output, whereas a deflationary gap exists if aggregate expenditure is below the full employment level of output.
- Any change in injections and leakages will have a multiplier effect on GDP.
- Induced investment is undertaken due to increases in GDP, whereas autonomous investment occurs due to changes in other influences such as advances in technology, changes in the cost of capital equipment and changes in expectations.
- The accelerator theory states that investment depends on the rate of change of GDP and that changes in GDP create greater percentage changes in investment.
- The money supply can increase as a result of increases in bank lending, government borrowing and a net inflow of money into the country.
- Commercial banks create money because they lend more money than they have liquid assets.
- Monetarists believe that increases in the money supply cause proportionate increases in the price level. In contrast, Keynesians argue that there is no direct, proportionate relationship between changes in the money supply and the price level.
- The loanable funds theory states that the rate of interest is determined by the demand and supply of loanable funds. In the liquidity preference theory, it is the demand and supply of money which determines the rate of interest.