

By the end of this chapter, you should be able to:

- explain the concepts of inflation, disinflation, and deflation
- explain how inflation is measured
- HL** calculate the rate of inflation using data
- discuss the problems in measuring inflation
- discuss the costs of inflation and deflation
- explain the causes of inflation
- explain and illustrate how government and central bank policies may be used to reduced inflation
- HL** explain and illustrate the short-run Philips curve
- HL** explain and illustrate the long-run Phillips curve
- HL** explain the concept of the natural rate of unemployment
- HL** evaluate the extent to which there might be a trade-off between inflation and unemployment.

## Inflation

In Chapter 13 you learned that one of a government's macroeconomic goals is price stability. Another way to express this is to say that governments desire a low and stable rate of inflation. Inflation is defined as a persistent increase in the average price level in the economy, usually measured through the calculation of a consumer price index (CPI). The word "persistent" is of great importance in your understanding of the concept. A single increase in prices is not called inflation. When inflation occurs there is a sustained increase in the price level. It is also very important not to confuse inflation with an increase in the price of a particular good or service.

## Costs of inflation

The reason that governments wish to have a low rate of inflation is because there are a significant number of negative consequences associated with high levels of inflation.

- *Loss of purchasing power:* If the rate of inflation is 2%, then this means that the average price of all goods and services in the economy has risen by 2%. If your income remains constant then you will not be able to buy as many goods and services as you could before the increase in the average price level. We say that there is a fall in real income, which means that there is a decrease in the purchasing power of income. If your income is linked to the inflation rate, so that you automatically get a 2% "cost-of-living" increase, then you will not face a fall in your real income. This is the case for many jobs, particularly where there are strong unions. However, many people have jobs that don't offer the security of inflation-linked incomes. This may



be because they are on fixed incomes or because they have weak bargaining power or because they are self-employed. Thus inflation reduces the purchasing power of their incomes, and will reduce their living standards. It is important to realize that expectations about inflation are important. Even when people's incomes are linked to inflation, they can be negatively affected if the actual rate of inflation turns out to be higher than the expected rate. For example, if the expected rate of inflation is 1.5% and wages are therefore increased by 1.5%, then workers will lose purchasing power if inflation turns out to be 2.5%.

- *Effect on saving:* If you save \$1,000 in the bank at 4% annual interest, then in one year's time you will have \$1,040. If the inflation rate is 6% then the real rate of interest (the interest rate adjusted for inflation) will be negative and your savings will not be able to buy as much as they could have in the previous year. You would have been better off spending the money rather than saving it, because it will have lost some of its purchasing power. Therefore, we say that inflation discourages saving. If people do want to save money, rather than spend on consumption, then they may choose to buy fixed assets, such as houses or art. This means that there are fewer savings available in the economy for investment purposes and this has negative implications for economic growth.
- *Effect on interest rates:* Commercial banks make their money from charging interest to people who borrow money from them. If there is a high rate of inflation then banks raise their *nominal* interest rates in order to keep the real rate that they earn positive.
- *Effect on international competitiveness:* If a country has a higher rate of inflation than that of its trading partners then this will make its exports less competitive and will make imports from lower-inflation trading partners more attractive. This may lead to fewer export revenues and greater expenditure on imports, thus worsening the trade balance. It might lead to unemployment in export industries and in industries that compete with imports.
- *Uncertainty:* Not only might there be reduced investment due to a fall in the availability of savings and higher nominal interest rates, but firms may be discouraged from investing due to the uncertainty associated with inflation. Again, this has negative implications for economic growth.
- *Labour unrest:* This may occur if workers do not feel that their wages and salaries are keeping up with inflation. It may lead to disputes between unions and management.



## DID YOU KNOW?

The most famous case of inflation in the twentieth century was the hyperinflation in Germany in 1923. The following list of the price of a single loaf of bread gives you an idea of how quickly prices rose.

Date	Price of a loaf of bread in Marks
June 1922	3.50
May 1923	1,200
July 1923	100 000
September 1923	2 million
October 1923	670 million
1 November 1923	3 billion
15 November 1923	80 billion

In May 1923 it became necessary for people to use suitcases (or even wheelbarrows!) rather than wallets for their money. This is not surprising given the fact that it cost 50 billion Marks to buy a glass of beer!

**Source:** [www.joelscoins.com](http://www.joelscoins.com)

## Deflation

Deflation is defined as a persistent fall in the average level of prices in the economy. There are two broad explanations for a fall in the price level and economists have used these to categorize “good deflation” and “bad deflation”.

The first type of deflation, “good” deflation, comes about from improvements in the supply side of the economy and/or increased productivity. A simple aggregate demand/aggregate supply diagram will illustrate that an increase in the long-run aggregate supply curve can result in an increase in real output and a fall in the price level. If the level of real output increases then we can assume that there is a lower level of unemployment as more workers will be needed to produce the higher level of output.

The second type of deflation, “bad” deflation, finds its source in the demand side of the economy. Another simple aggregate demand/aggregate supply diagram will illustrate that a fall in aggregate demand will result in a decrease in the price level and a decrease in real output. If real output decreases then it is assumed that the level of unemployment will rise, as firms will need fewer workers if there is less demand.

Both causes of deflation result in a fall in the price level, but we might say that the first is positive because it results in an increase in real output and a fall in unemployment, while the second is negative because it results in a fall in real output and a rise in unemployment.

It is very important that you do not confuse deflation with a falling rate of inflation, which is referred to as disinflation. Consider Figure 18.1 which shows the inflation rate for a country for the years 1999 to 2005.



### Student workpoint 18.1

#### Be a thinker

Draw and accurately label two aggregate demand/aggregate supply diagrams, one to illustrate “good” deflation and one to illustrate “bad” deflation.

From 1999 to 2000 the inflation rate rose from 1.2% to 1.6%. From 2000 to 2001 the inflation rate fell from 1.6% to 1.3%. This means that the average level of prices rose, but at a lower rate than in the previous year. This is disinflation. In the next two years, the inflation rate continued to fall. Prices were still rising, but by a smaller and smaller amount. Moving into 2004, the country experienced deflation, where the average level of prices actually fell by 0.5%. From 2004 to 2005 the country was still in a period of deflation, where average prices fell by 0.3%.

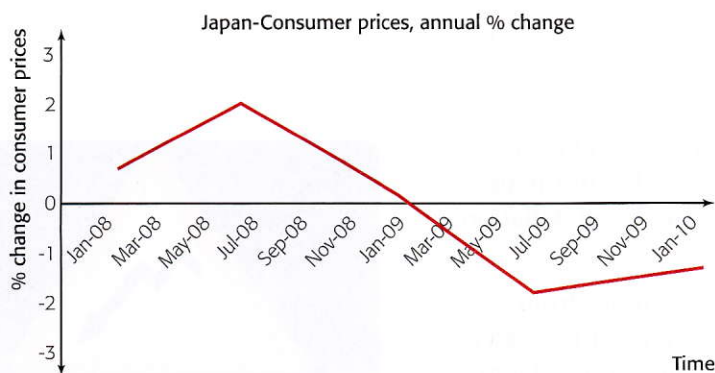
### Student workpoint 18.2

#### Be a thinker—explain the following

Consider the data for Japan in the accompanying graph and answer the following question.

Using definitions and actual values in your answer, identify the period of time in which Japan experienced:

- Inflation
- Disinflation
- Deflation



### Costs of deflation

Although, as consumers, we might be pleased to face falling prices, a significant number of problems can be associated with a fall in the price level. In fact, economists might argue that the costs of deflation are greater than the costs of inflation.

- Unemployment:** The biggest problem associated with deflation is unemployment. If aggregate demand is low then businesses are likely to lay off workers. This may then lead to a deflationary spiral. If prices are falling, consumers will put off the purchase of any durable goods as they will want to wait until the prices drop even further. This may be referred to as deferred consumption. This will further reduce aggregate demand. If households become pessimistic about the economic future then consumer confidence will fall. Low consumer confidence is likely to further depress aggregate demand. Thus, a deflationary spiral may occur.
- Effect on investment:** When there is deflation, businesses make less profit, or make losses. This may lead them to lay off workers. Furthermore, business confidence is likely to be low and this

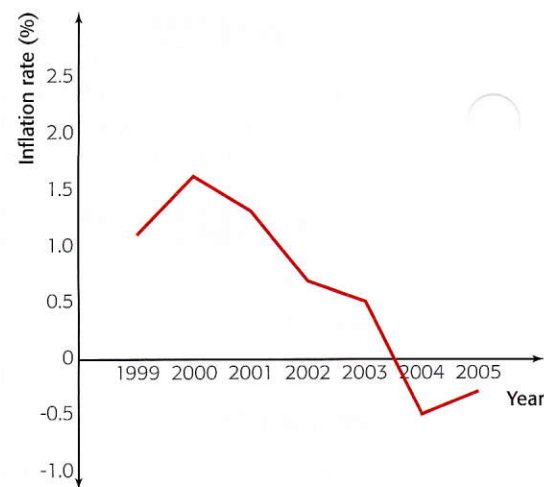


Figure 18.1 Changing rates of inflation and deflation

is likely to result in reduced investment. This has negative implications for future economic growth.

- *Costs to debtors:* Anyone who has taken a loan (this includes all homeowners who have taken a mortgage to buy their home) suffers as a result of deflation because the value of their debt rises as a result of deflation. If profits are low, this may make it too difficult for businesses to pay back their loans and there may be many bankruptcies. This will further worsen business confidence.

### Student workpoint 18.3

Read the following article about deflation in Japan. Note the problems associated with deflation.

## Deflation “main threat” to Japan economy



Stubborn deflation and low demand from an ageing population prone to very careful spending indicate a difficult future for Japan's economy, the government warned in an annual report.

Falling prices have been at the core of the weak performance of the world's number two economy over the past two decades, said the Cabinet Office in its Annual Report on the Japanese Economy and Public Finances.

Japan has been hit by repeated bouts of deflation since an asset price collapse in the early 1990s that ended the country's economic boom, later compounded by the 2008–2009 global financial crisis.

The report said Japan was now alone among leading industrialized economies in suffering from notable deflation, which slows the economy and worsens as consumers put off purchases in anticipation of future price falls.

While Japan's economy has gradually been recovering from a bruising recession since last spring, thanks to improved exports and government stimulus, the rebound is still hampered by deflation, the report said.

Japan's heavy reliance on growth through exports has also aggravated deflation as companies

facing tough competition have increasingly had to move production overseas, where labour and other costs are lower, the report said.

The report urged the government to boost domestic demand and jobs through promoting potential high-growth sectors such as health care and green technology, echoing the strategy of Prime Minister Naoto Kan. However, this will only worsen Japan's mountain of public debt, which is nearing 200% of gross domestic product.

Weak demand worsened the country's jobless rate by about 2% in 2009, pushing it to 5.1%, according to the Cabinet Office estimate.

**Source:** Adapted from AFP, July 23, 2010

### How is inflation measured?

It is necessary to have some kind of an accurate measure of the increase in the price level. The most widely used statistic to measure inflation is known as the consumer price index (CPI). In some countries this is referred to as the retail price index (RPI).

Not all prices change by the same amount over a given period of time for example, the price of chocolate might increase by 5% in a year, while the price of petrol might increase by 10%. Neither of these is an appropriate measure of the change in the average price level. Statisticians in different countries around the world have slightly different ways of measuring the rate of inflation, but the central idea is the same. Simply put, they choose what is known as a representative “basket” of consumer goods and services and

measure how the price of this basket changes over time. When the price of the basket increases then this means that the average price level has risen.

What is meant by a “representative basket of consumer goods and services”? It would be impossible to devise a measure of inflation that includes all goods and services bought by consumers. In each country the agency in charge of the compilation of economic data creates a list of the typical goods and services consumed by the average household. These items are grouped into a number of different categories. The prices of these items are measured each month to calculate the change in the price of the “basket”. The change in the price of the basket is reflected in the measure called the consumer price index. It is important to point out that some of the goods and services consumed are far more important than others, because they take up a larger share of consumers’ income. Thus, the categories are given a weight in the index to reflect their importance in the average consumer’s income. The weights for the different categories for the UK CPI along with some examples of the items that are included are shown in Table 18.1.

Category	CPI weight (%)
<b>Food and non-alcoholic beverages</b> (breads and cereals; meat; oils and fats; milk, cheese, and eggs; fruit; vegetables; sugar, jam, honey, chocolate, and confectionary sugar; coffee, tea, and cocoa; mineral waters, soft drink, and juices)	10.8
<b>Alcohol and tobacco</b> (spirits; wine; beer; cigarettes and cigars)	4.0
<b>Clothing and footwear</b> (women’s, men’s, and children’s clothing; accessories; cleaning and repair of clothing; shoes and boots)	5.6
<b>Housing and household goods</b> (rents; maintenance; water supply; electricity, gas, and other fuels)	12.9
<b>Furniture and household goods</b> (furniture and furnishings; carpets and other floor coverings; household textiles; household appliances; glassware and tableware; goods and services for household maintenance)	6.4
<b>Health</b> (medical products, appliances, and equipment; out-patient services; hospital services)	2.2
<b>Transport</b> (new and second-hand cars; motorcycles and bicycles; spare parts and accessories; fuels and lubricants; vehicle maintenance and repairs; passenger transport by railway, road, and air)	16.4
<b>Communication</b> (postal services; telephone and telefax equipment; mobile phone charges; internet subscriptions)	2.5
<b>Recreation and culture</b> (audio-visual equipment and related products; data processing equipment; recording media; repair of audio-visual equipment and related products; major durables for recreation and culture; games, toys, and hobbies; equipment for sport and outdoor recreation; gardens, plants, and flowers; pets, related products, and services; recreational and cultural services; books, newspapers, magazines, and stationery; package holidays)	15.0
<b>Education</b> (private school fees, evening classes, university tuition fees)	1.5



<b>Restaurants and hotels</b> (restaurants, take-aways, and food delivery; bar charges; catering; canteens)	12.6
<b>Miscellaneous goods and services</b> (jewellery, clocks, and watches; social protection; insurance; flower delivery; self-storage fees; funeral charges)	9.7

**Source:** Consumer Prices Index and Retail Prices Index: The 2010 Basket of Goods and Services, Philip Gooding, Office for National Statistics

Table 18.1 UK CPI: categories and their weights

From the data we can conclude that spending on food and non-alcoholic beverages makes up 10.8% of the spending of the “typical” or average household. Thus, changes in the prices of the food and beverage products in the basket will be given a weight of 10.8% in the calculation of the index. The components and the weighting of the basket are determined by surveys of household spending habits and will change according to changes in consumption habits (see Table 18.2 for some examples of recent changes to the UK “basket”). The price of the basket is measured regularly by collecting prices from shopping outlets throughout the country and a national average price is determined. This is the measure of the national consumer price index and changes in the index represent the “headline” inflation rate. This is the rate of inflation most commonly used and the one that we are most familiar with for judging the overall state of the country’s economy.

### Case study

#### The UK Consumer Price Index

Currently, around 180 000 separate price quotations are used every month covering 650 representative consumer goods and services for which prices are collected in around 150 areas in the UK. The categories and their weightings, along with the representative item, are revised each year to take into account changing consumption patterns by households. To give one example, there

has been an increasing tendency for consumers to spend more on the category of household expenditure and so the weight of this component has risen in the last 20 years. Items which have been added to the category to reflect this include spending on internet subscriptions, playgroup charges, and fees for nannies. Table 18.2 gives examples of changes to the basket in 2010.

#### The UK Consumer Price Index (continued)

CPI Sub-Category	Change	Comment
Bread and cereals	Added – cereal bars	Introduced to represent a type of snack which is attracting gradually increasing expenditure and not previously covered in the basket.
Mineral waters, soft drinks, and Juices	Added – still mineral water, small bottle	New item. The basket already includes a larger bottle of mineral water. The new item has been added to represent water in the “on the go” drinks market and reflects increased spending on bottled water overall over a period of years.



CPI Sub-Category	Change	Comment
Appliances and products for personal care	Added – electrical hair straighteners/tongs	New item. Introduced as they represent a greater share of the electrical haircare market than the hairdryer they replace.
Appliances and products for personal care	Added – liquid soap	Replaces individual bars of toilet soap.
Photographic, cinematographic, and optical equipment	Removed – disposable camera	Removed due to decreasing expenditure as digital compact cameras and mobile phone photography become increasingly popular.
Appliances and products for personal care	Removed – lipstick	Replaced by lip gloss reflecting a trend towards gloss.
Medical services and paramedical services	Removed – eyesight test charge	Removed as it was in a part of the basket which is over-represented and there has been a decrease in expenditure as eyesight tests are free in some areas.

**Table 18.2** Changes to the CPI basket of goods in the UK in 2010

**Source:** Consumer Prices Index and Retail Prices Index: The 2010 Basket of Goods and Services, Philip Gooding, Office for National Statistics

### Theory of Knowledge

In carrying out research or investigations, physical and social scientists have to deliberately choose to include or analyse certain data from a wide range of data, and their choices inevitably affect the outcomes. For example, when economists propose that one representative item be replaced with another representative item in the CPI basket they will use data concerning household spending, but there will necessarily be some judgment involved. To what extent do you think that this could affect the reliability of the statistic?

If the CPI basket is used to generate the inflation rate on which wage increases are based, how will this truly reflect the spending patterns of different groups of people?

### Student workpoint 18.4

#### Be an inquirer

Research the most recent changes to the CPI basket of goods in the UK. If you were researching cultural change in the UK, what could the changes to the CPI basket over the years tell you?

### Issues involved in the measurement of inflation

- Measuring inflation using the consumer price index has one main limitation. The basket used in any country represents the purchasing habits of a “typical” household, but this will not be applicable to all people. The purchasing habits of different people will clearly vary greatly. For example, the “basket” of a family with children will be very different from that of an elderly couple or a single person with no children. There may be variations in regional rates of inflation within a country. Although regional figures are published, the national figure is the more widely-used measure and this may not be an accurate reflection for a particular area. If the national average is used as the basis for wage negotiations or pension changes then these might not accurately



reflect the price changes for a particular group. This will be harmful if the group has a higher cost of living than suggested by the national average and beneficial for those whose spending costs are less than the average.

- There may be errors in the collection of data that limit the accuracy of the final results. Because it would be utterly impossible to collect the prices of all items bought by all households in all possible locations, it is necessary to take sample items in a sample of selected cities and a sample of selected outlets. The layers of sampling are likely to lead to some degree of inaccuracy. The larger the sample, the more accurate will be the results, but this is time-consuming and very costly.
- As Table 18.2 shows, statisticians try to take into account changes in consumption habits by making changes to the basket. Items are removed or added to be more representative of the typical household's demand. However, this takes a good deal of time. Moreover, if the items in the basket are changed, then this limits the ability of analysts to make comparisons from one time period to another. This is complicated by the fact that the quality of goods changes over time. For example, when a computer company upgrades a computer to include more built-in memory, then the quality of the product improves. The price of the computer may rise to reflect the improvement. If the computer is in the typical basket, then this will feed into a higher rate of inflation, yet the product isn't really the same product.
- Countries measure their rate of inflation in different ways and include different components. This can make it problematic to make international comparisons.
- Prices may change for a variety of reasons that are not sustained. For example, seasonal variations in the prices of food and volatile oil prices may lead to unusual movements in the inflation rate and can be misleading. Statisticians make some effort to reduce such distorting effects by identifying a "core" rate of inflation that uses the information of the consumer price index but excludes food and energy prices.
- The CPI (or RPI) measures changes in consumer prices and is a very important indicator of an economy's health. However, there are other price changes which are important in judging the economic health and prospects of a country. For this reason economists also measure changes in the prices of the factors of production needed by the economy's firms. One way of doing this is through a commodity price index, which tracks changes in raw material prices. There are different types of a commodity price indices. One measures changes in a weighted basket of a large number of different traded commodities. Others track a particular category of commodity, such as food commodities (e.g. sugar or coffee) or industrial commodities, which is further divided into metals (e.g. tin, copper) and non-food agricultural commodities (e.g. wool). Upward movements in commodity prices are signals of cost-push pressures and may be a leading indicators (indicators which predict that a change will occur in the future) of inflation.

Another index used is a producer price index, which tracks the price of goods as they leave the factories and before distributors, wholesalers, or retailers (stores) add their profit margins.

## Causes of inflation

We can divide the causes of inflation into three main types: demand-pull inflation, cost-push inflation, and inflation due to excess monetary growth.

### Demand-pull inflation

As the name suggests, demand-pull inflation occurs as a result of increasing aggregate demand in the economy. This can be seen in Figure 18.2. The increase in aggregate demand from  $AD_1$  to  $AD_2$  “pulls up” the average price level from  $P_1$  to  $P_2$ .

The reasons for the increase in aggregate demand could be due to changes in any of the components of aggregate demand. For example, there could be a high level of consumer confidence, causing consumers to increase consumption. There could be a high level of demand for a country’s exports due to rising foreign incomes. The increase might be due to an increase in government spending.

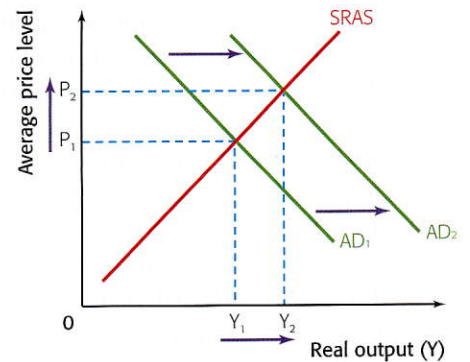


Figure 18.2 Demand-pull inflation

### Cost-push inflation

Cost-push inflation occurs as a result of an increase in the costs of production. As you know, an increase in costs results in a fall in short-run aggregate supply from  $SRAS_1$  to  $SRAS_2$ . This results in an increase in the average price level and a fall in the level of real output. Cost-push inflation is illustrated in Figure 18.3

The causes of increases in costs are discussed in Chapter 15. Increases in the price level due to increases in the costs of labour may be referred to as wage-push inflation. Changes in the costs of domestic raw materials will increase firms’ costs of production, creating cost-push pressures. Increases in the costs of imported capital, components, or raw materials also increase costs of production to firms, causing import-push inflation. It is worth noting that a fall in the value of a country’s currency can cause import-push inflation. This is because a lower exchange rate makes imported capital, components, and raw materials more expensive, thereby increasing the costs of production to the country’s firms.

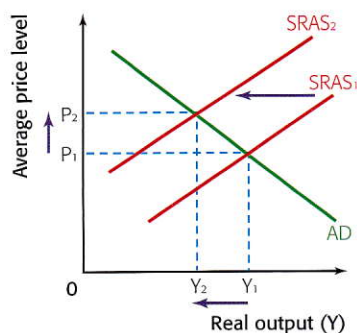


Figure 18.3 Cost-push inflation

### Student workpoint 18.5

#### Be a thinker

Consider the following data from *The Economist* magazine and answer the question that follows.

#### The Economist commodity-price index

2000 = 100

	Jul 13th	Jul 20th*	% change on	
			one month	one year
<b>Dollar Index</b>				
All items	208.0	207.2	+1.6	+13.1
Food	206.1	207.4	+4.8	+5.4
<b>Industrials</b>				
All	210.3	206.9	-2.2	+25.1
Non-food†	200.2	194.3	-8.0	+42.0
Metals	215.9	213.8	+0.9	+18.1
<b>Sterling index</b>				
All items	207.9	206.2	-1.4	+22.2
<b>Euro index</b>				
All items	151.8	148.7	-3.1	+24.9
<b>Gold</b>				
\$ per oz	1 196.80	1 180.85	-4.2	+24.4
<b>West Texas Intermediate</b>				
\$ per barrel	77.31	77.38	+0.4	+19.5

\*Provisional

†Non-food agriculturals.

Source: The Economist, July 22, 2010

Using information from the table and an appropriate diagram, explain the concept of cost-push inflation.

### Demand-pull and cost-push inflation together

Regardless of the source of the increase in the average price level, one of the problems associated with inflation is its tendency to perpetuate itself. For example, consider what happens if there is an increase in aggregate demand due to increased wealth in the economy (perhaps due to rising house prices). Let's look at the effects in the short run as shown in Figure 18.4.

If we assume that the economy is near full employment then the increase in aggregate demand results in an increase in demand-pull inflation as the price level rises from  $P_1$  to  $P_2$ , as shown in movement (1) in Figure 18.5. The diagram shows what may happen next. The higher price level means that costs of production rise. Also, because the price level increases, workers will negotiate for higher wages and this further increases the costs of production. Thus, there will be a

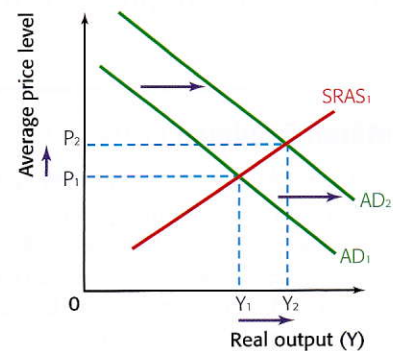


Figure 18.4 Demand-pull inflation

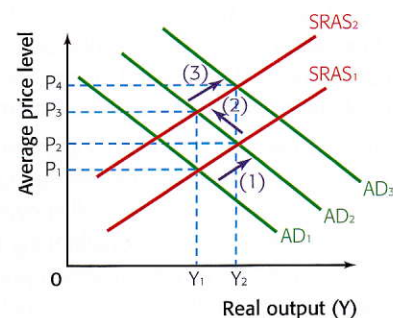


Figure 18.5 An inflationary spiral

shift in the short-run aggregate supply curve from  $SRAS_1$  to  $SRAS_2$  as a result of cost-push pressures. This is the movement (2) in the diagram. The cycle will not necessarily stop there. Higher wages may give households the illusion that they have more spending power and this might encourage further increases in consumption, shown as another increase in aggregate demand to  $AD_3$  and the movement (3) in the diagram. This may be referred to as an inflationary spiral.

### Inflation due to excess monetary growth

A group of economists known as monetarists identified a third cause of inflation. This view gained popularity in the 1970s. One proponent of this view was Milton Friedman whose famous quotation is:

“Inflation is always and everywhere a monetary phenomenon.”

Monetarists argue that excessive increases in the money supply by government are the cause of inflation. As noted in Chapter 14, the level of money supply in the economy is an advanced topic not covered in the IB Diploma Programme syllabus. However, you can rely on your common sense to recognize that if there is more money in the economy, then there will be more spending, thus higher aggregate demand. Monetarism is a “branch” of new classical economics and so we use the new classical long-run aggregate supply curve to show this type of inflation. This is shown in Figure 18.6.

Monetarists say that increases in the money supply result in higher aggregate demand from  $AD_1$  to  $AD_2$ . Because the economy rests at the full employment level of output in the long run, such increases in aggregate demand due to increases in the money supply are purely inflationary, with the price level rising from  $P_1$  to  $P_2$ .

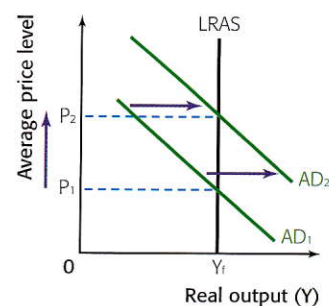


Figure 18.6 Inflation due to excess monetary growth

#### Milton Friedman (1912–2006)

Milton Friedman was born in New York City. His parents were working class immigrants from what is now Ukraine. He studied at Rutgers University, achieving his Bachelor's degree when he was twenty years old. He then went on to earn a Masters degree at the University of Chicago in 1933 and a PhD from Columbia University in 1946. He won a prestigious award honouring economists under the age of forty in 1952, and in 1976 he was awarded the Nobel Prize for Economics for “his achievements in the fields of consumption analysis, monetary history and theory, and for his demonstration of the complexity of stabilization policy” (<http://nobelprize.org>). He published a vast number of books and articles, including a number of publications with his wife, Rose Friedman.

Friedman was a passionate supporter of the free market and in this sense might be referred to as a *new classical* economist. Yet he is most well-known for his work as a monetarist economist. Challenging the Keynesian paradigm in the 1950s, Friedman presented a modern application of an old economic equation called the quantity theory of money to justify his claim that the price level in an economy is dependent on the money

supply. Although Keynesian economic theories maintained their prominence through much of the sixties, the work of Friedman and his fellow monetarists became increasingly more attractive towards the end of the sixties and the seventies. During this time, the combined economic problems of high rates of inflation and high levels of unemployment (known as stagflation) could not be solved through the application of Keynesian demand management policies. One famous quotation of Friedman is, “inflation is always and everywhere a monetary phenomenon”, meaning essentially that inflation is always caused by increases in the money supply. The monetarist argument made famous by Friedman rests on a conviction that strict control of the money supply is necessary to control inflation. In his commitment to the value of free markets, he was also a strong advocate of the importance of a limited role of the government in the economy.



## Reducing inflation

The appropriate policies to reduce inflation depend on the type of inflation. Given that demand-pull inflation is due to excess aggregate demand, then an appropriate policy would be to reduce aggregate demand. Thus the government could use deflationary fiscal policy (increase taxes and lower government spending) and/or deflationary monetary policy (raise interest rates and reduce the money supply).



There are problems associated with such contractionary policies. First of all, from a political standpoint, such policies are highly unpopular. Looking first at fiscal policy, a voting population is unlikely to be happy to accept higher taxes as it reduces disposable income and the level of consumption. A reduction in government spending will inevitably impact upon a variety of groups in the economy and this may result in less support for the government. It takes a long time for a government to bring about a change in its fiscal policy. Budgets are developed over a long period and changes need to go through lengthy legislative procedures where there may be great opposition to any budget cuts. Therefore, there would be a long time lag involved in using contractionary policy to bring about a decrease in aggregate demand. As far as monetary policy is concerned, higher interest rates will also harm some people in the economy, most obviously anybody who has taken a loan or mortgage. Higher interest rates mean higher loan and mortgage repayments and will therefore be unpopular. A government that is concerned about being re-elected will be reluctant to use these methods to fight inflation.

However, as noted in Chapter 14, monetary policy is carried out by central banks, and in most industrialized countries the central bank is an independent body whose main goal is the maintenance of a low and stable rate of inflation. In some countries, including Poland, South Korea, Canada, England, Australia, and New Zealand, the central bank sets an explicit target rate of inflation. The quotation in Did you know? stating the policy of the National Bank of Poland (NBP), shows that this central bank uses changes in interest rates (e.g. base rates, reserves rates, or discount rates) to keep the inflation rate within the targeted range of 2.5% plus or minus 1%. Other central banks, such as the Federal Reserve in the US, have an implicit target rate of inflation. That means that there is an informal target rate that these central banks choose, rather than an officially stated one.

The movement towards independence for central banks started in many countries in the 1980s and was partially due to the tendency of governments to use monetary policy to pursue short-term political objectives. Such tendencies often resulted in unacceptably high levels of inflation as governments, keen to be popular, were reluctant to adopt any policies such as higher interest rates in order to fight inflation. As a result of the greater independence for central banks and inflation targeting, many countries have successfully prevented high inflation from occurring.

### Student workpoint 18.6

#### Be a thinker

Referring back to the explanation of automatic stabilizers in the last chapter, explain how fiscal policy automatically works to reduce inflation. Draw a diagram to illustrate this.

DID YOU **KNOW?****Case study: the policy of the central bank of Poland**

"Since 1999 the direct inflation target strategy has been utilized in the implementation of monetary policy. Within the framework of this strategy, the Monetary Policy Council defines the inflation target and then adjusts the NBP basic interest rates in order to maximize the probability of achieving the target. Since the beginning of 2004, the National Bank of Poland has pursued a continuous inflation target at the level of 2.5% with a permissible fluctuation band of  $\pm 1$  percentage point. The NBP maintains interest rates at a level consistent with the adopted inflation target by influencing the level of nominal short-term interest rates on the money market. Money market rates affect loan and deposit rates at commercial banks and thus the size of loans, the demand within the economy, and the inflation rate."

**Source:** [www.nbp.pl](http://www.nbp.pl)

Targeting inflation, whether explicitly or implicitly, is said to be beneficial as it results in a reduction in inflationary expectations. The target acts as an anchor, holding down inflationary pressure. That is, as long as people have faith in the central bank's ability to contain inflation, then they will not expect higher rates of inflation. If they do not expect higher inflation then they will not make demands for increases in wages any higher than the expected rate of inflation and this will keep the costs of labour from rising excessively. This suppresses cost-push inflationary pressure.

It is fair to say that the more independent the central bank, the more likely that price stability will be maintained. If inflation is rising or inflationary pressures are building up, then a way to bring these down would be to raise interest rates. Central banks keep very close watch on signs of inflation and are ready to raise interest rates to reduce inflationary pressure. While a government would be reluctant to do this, the central bank can make the politically unpopular decision because it does not have to worry about being re-elected!



Nowadays, monetary policy is considered to be the most effective way of managing aggregate demand in the economy and changes in interest rates are considered the best weapon in the fight against inflation. Fiscal policy is not seen to be as effective as monetary policy in battling inflation. It would be very difficult for governments to reduce their spending because of their commitments to the public. Moreover, even if governments could reduce their spending, it would take a long time for the cuts to have any effect on the price level.

If inflation is of a cost-push nature, then deflationary demand-side policies may bring down the price level, but they will result in lower national output and are likely to cause unemployment to rise. Thus, demand-side policies are ineffective and supply-side policies such as the policies described in Chapter 17 are the appropriate policies to deal with cost-push inflation. However, as you might predict, when inflation does occur, it is difficult to distinguish the demand-pull from the cost-push factors and so policy-makers are likely to use a mix of solutions.

**Student workpoint 18.7****Be an inquirer—conduct an investigation**

Investigate the role of the central bank and inflation in your OECD country. Write a brief report to include an explanation of its recent inflation history along with a discussion of the way in which its central bank attempts to maintain price stability. Does this central bank target a specific rate of inflation?

For monetarists who believe that inflation is caused by excessive growth of the money supply, then the solution is plain. The money supply should only increase by the same amount as the real increase in national output. That is, if national output is growing by 3%, then the money supply should also grow by 3%. If money supply increases by more than 3%, then the economy will face a situation where “there is too much money chasing too few goods” and so prices will rise to ration the output. Practically speaking, although central banks can influence the level of spending in the economy through monetary policy and the changes in interest rates, it is actually very difficult for governments and/or central banks to control the actual money supply in the economy. It is not within the scope of the IB syllabus to discuss how this is managed.

A significant problem facing governments is the possible trade-off between their different policy objectives. They may want to fight inflation by bringing about a decrease in aggregate demand, but this might result in a higher level of unemployment. If they try to fight unemployment and increase economic output (achieve economic growth) by increasing aggregate demand, it might create inflationary pressure.

It is generally felt that elected governments may not have the long term interests of the economy at heart and might make fiscally irresponsible decisions to maintain popularity. Therefore, responsibility for managing aggregate demand might be best left with the automatic stabilizers of fiscal policy and the careful changes in monetary policy carried out by an independent central bank.

### Student workpoint 18.8

## Australia Raises Rates for Second Straight Month



Australia's central bank raised its benchmark interest rate for the second month in a row on Tuesday and suggested a gradual withdrawal of stimulus measures. This comes as a result of mounting evidence that the Australian economy is rapidly picking up speed. The increase in its key cash rate, by a quarter-percentage point to 3.5%, makes Australia the only

country in the world to have implemented two successive rate increases this year.

Elsewhere, including in the United States, Japan, and Europe, rate increases remain a more distant prospect as the recovery still remains fragile and far less pronounced. But policymakers in those countries, too, have begun to signal a gradual exit from some of the other extraordinary stimulus measures they introduced to cope with the financial crisis and global economic slump.

Australia's more rapid rebound has given its central bank more freedom to gradually return to normal interest rate levels. The two consecutive rate increases

reverse some of a series of aggressive rate cuts, totalling 4.25 percentage points, announced by the Reserve Bank of Australia (RBA) during the financial crisis.

Australia's recovery has been aided by the country's official stimulus measures, improvements in the labour market, and by its location near to the fast-growing economies of Asia, notably China, whose demand for Australia's raw materials has supported the overall economy.

The RBA said it raised borrowing costs as inflationary pressures increased after economic growth accelerated. It is estimated that growth is now nearly at the



long-run trend rate and the fear is that, without some cooling of the economy, inflation will occur. Policy makers said interest rates are still below normal and further adjustments in monetary policy might be needed to keep inflation within the target range.

“Economic conditions in Australia have been stronger than expected and measures of confidence have recovered,” said

the governor of the Reserve Bank of Australia. “The expansion is generally expected to be modest in the major countries, due to the continuing legacy of the financial crisis. Prospects for Australia’s Asian trading partners appear to be noticeably better. Growth in China has been very strong, which is having a significant impact on other economies in the region and on commodity markets.”

The central bank also said that now that the risk of serious economic contraction in Australia has passed, it would be sensible to gradually lessen the degree of monetary stimulus measures that were put in place when the outlook was bleaker.

**Source:** Adapted from the *New York Times*, November 2, 2009

- 1 Using a diagram, explain which phase of the business cycle the Australian economy seems to be in.
- 2 Using a diagram, explain a possible reason why the Australian economy has emerged from the slow down earlier than the US or Europe.
- 3 Using a diagram, explain why the Reserve Bank has taken the action of increasing the interest rate.

## HL: Calculating inflation

We already know that there are different types of price indices used to measure inflation, such as commodity price indices and consumer price indices. A weighted price index takes a “basket” of products and the products are then given a different weight (or importance), based upon the relative amounts that people spend on them.

Let us use a simple consumer price index to explain how this works. The table below shows a hypothetical, simplified basket of goods which might be bought by typical consumers in an economy and the price indices for two years:

Category	Index for year X	Index for year (X + 1)
Housing	120	130
Foodstuffs	105	105
Travel	120	125
Clothing	120	110
Entertainment	125	130
<b>Average index</b>	<b>190/5 = 118</b>	<b>605/5 = 121</b>

Table 18.3 Unweighted price index information for year X and year (X + 1)

In table 18.3 consumer expenditure has been split into five categories. The average price level for each year is shown by taking the price indices for each category of expenditure, totalling them, and then dividing by the number of categories. We see that over



the two years the average index increases from 118 to 121. This means that we can work out the inflation rate by using the following equation:

$$\text{Inflation rate} = \frac{\text{Index for } (X + 1) - \text{Index for } X}{\text{Index for } X} \times 100$$

$$\text{In our case, this gives } \frac{121 - 118}{118} \times 100 = \frac{3}{118} \times 100 = 2.54\%$$

However, this is a very simplistic and inaccurate measure since it gives all of the categories an equal weighting, so a fall in the price of clothing has an equal and opposite effect to the increase in the price of housing. This is obviously not accurate, since it is highly likely that an increase in the cost of housing would have a greater impact on people's incomes than the fall in price of clothing, as people spend much more on housing per month than they do on clothing.

This is why weights are used to calculate price indices. They stress the relative importance of each category of goods. In the case of consumer price indices the weighting is based upon the relative expenditure on each category. A set of weighted figures are shown below in table 18.4.

Category	Index for year X	Weight	Index for year X times weight	Index for year (X + 1)	Weight	Index for year (X + 1) times weight
Housing	120	0.4	48	130	0.4	52
Foodstuffs	105	0.2	11	105	0.2	11
Travel	120	0.2	24	125	0.2	25
Clothing	120	0.1	12	110	0.1	11
Entertainment	125	0.1	12.5	130	0.1	13
Totals		1.0	107.5		1.0	112

Table 18.4 Weighted price index information for year X and year (X + 1)

In table 18.4 we have the same price index figures as in our earlier example, but now there are weights to represent relative expenditure. Consumers spend 40% of their income on housing and so it is given a weight of 0.4. In the same way, they only spend 10% of their income on clothing and so the weight (importance) of clothing in the weighted consumer price index is only a quarter of the weight of housing expenditure. The total of all the weights is 1.0.

The index for year X is calculated by multiplying the index for each category by its weight and then adding the individual totals, thus giving 107.5. The index for year (X + 1) is calculated in the same way, with an outcome of 112.

We can then work out the inflation rate by using the same equation as earlier:

$$\text{Inflation rate} = \frac{\text{Index for } (X + 1) - \text{Index for } X}{\text{Index for } X} \times 100$$

$$\text{This now gives us } \frac{112 - 107.5}{107.5} \times 100 = \frac{4.5}{107.5} \times 100 = 4.19\%$$

As we can see, the weighted inflation rate is significantly larger than the unweighted rate—4.19% as opposed to 2.54%. This is because the increase in the price of housing, the most important expenditure, is given its proper importance and is not cancelled out by the fall in the price of less important expenditures.

### Student workpoint 18.9

The following gives the type of questions you might see in HL Paper 3.

The price index figures for country X for two years are shown below:

Category	2015	2016
Housing	110	120
Transport	106	110
Foodstuffs	120	120
Entertainment	110	100
Clothing	105	105

Base year = 2010

- 1 Calculate the average index for each year.
- 2 Calculate the unweighted inflation rate for 2015/2016.

The expenditure patterns of the population of the country are surveyed and it is discovered that the average household spends 35% of its income on housing, 25% on transport, 15% on foodstuffs, 15% on entertainment, and 10% on clothing.

- 3 Explain, with the help of the figures above, the importance of weighting.
- 4 Assuming that consumer expenditure patterns do not change over the period 2015/2016, construct a table showing the weighted indices for 2015 and 2016.
- 5 Calculate the weighted inflation rate for 2015/2016.
- 6 Explain the differences between the inflation rates that you have calculated in 2 and 5.

## The inflation–unemployment trade-off debate

Having looked at unemployment in the previous chapter, we now consider the relationship between the two macroeconomic problems of unemployment and inflation.

### The Phillips curve

In 1958, Alban Williams Phillips (the New Zealand-born economist working at the London School of Economics who created the Moniac machine mentioned in Chapter 13) published a significant work in which he presented his argument that there was an inverse relationship between the rate of change of money wages (i.e. wages *not* adjusted for inflation) in the economy and the rate of unemployment as shown on Figure 18.7. His observation was based on his study of UK data from 1861 to 1913.

The explanation for this was that, if there was a low level of unemployment, firms would have to pay higher wages to attract labour. If unemployment was high then unemployed workers would be competing with each other to obtain available jobs, so that wages offered could be relatively low. During an economic expansion, when more output is demanded and more workers are needed, wages rise more quickly than they would if there was a contraction in activity and lower levels of demand. The rate of change of money wages could actually become negative, i.e. wages could fall at high levels of unemployment because workers would be willing to accept the lower wages rather than remain unemployed.

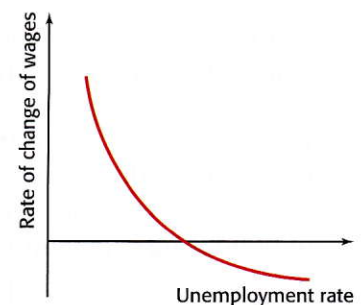


Figure 18.7 The original Phillips curve

Other economists adapted the relationship established by Phillips and applied it to data from other countries to establish the pattern that we now refer to as the Phillips curve. This shows the inverse relationship between the inflation rate (rather than the change in money wages) and the unemployment rate of an economy as shown in Figure 18.8. This is due to the fact that, since wages make up a large proportion of firms' costs, changes in wages feed directly through to changes in the price level.

Another way to express this relationship is to say that there is a "trade-off" between inflation and unemployment. For example, as shown in Figure 18.8, an unemployment rate of 5% might be accompanied by an inflation rate of 2%. If unemployment were to fall to 3%, then inflation would rise to 6%. As one variable decreases, the other increases. The implication of this trade-off for government objectives is clear. If the main objective of a government is to reduce the rate of unemployment this can be done, but at the expense of a higher rate of inflation. Similarly, if inflation is perceived to be too high then it can be lowered by allowing the unemployment rate to increase. The trade-off can also be explained using aggregate demand/aggregate supply analysis, as shown in Figure 18.9.

The economy is initially in equilibrium at  $Y_1$ , at a price level of  $P_1$ . If the government feels there is too much unemployment at this point, then it might use Keynesian demand management techniques to bring about an increase in AD, from  $AD_1$  to  $AD_2$ . This will result in an increase in output, which is produced by hiring more workers, so unemployment is assumed to fall. However, there is also a higher price level, that is, higher inflation. In agreement with the Phillips curve, a decrease in unemployment occurs at a cost of higher inflation. This would be like the movement from A to B in Figure 18.8.

This existence of a trade-off between inflation and unemployment was supported by data up to the 1970s. From this time on, however, evidence about inflation and unemployment began to suggest that the relationship shown by the Phillips curve was no longer valid, as both inflation and unemployment rose in many economies. The combination of high inflation and high levels of unemployment is known as stagflation. According to the Phillips curve, the two problems should not worsen simultaneously and so the model came under attack.

### Long-run Phillips curve

It was the monetarist economists led by Milton Friedman who were the biggest critics of the original Phillips curve. According to their analysis there is no trade-off between inflation and unemployment. This is consistent with the explanation of the new classical long-run aggregate supply provided in Chapter 15. Recall that according to the new classical economists, the economy will automatically tend towards its long-run equilibrium at the full employment level of output.

Figure 18.10 can be used to explain this adaptation of the Phillips curve model.

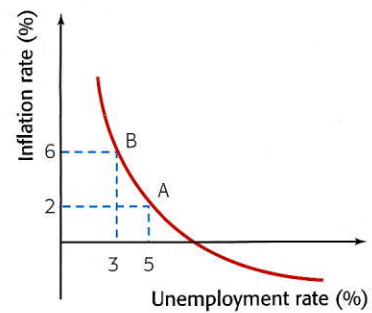


Figure 18.8 The Phillips curve as it is usually drawn

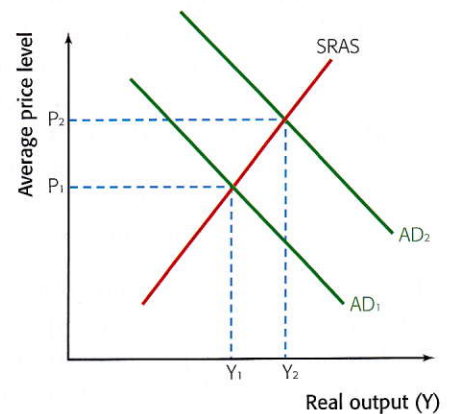


Figure 18.9 Phillips curve relationship through AD/AS analysis

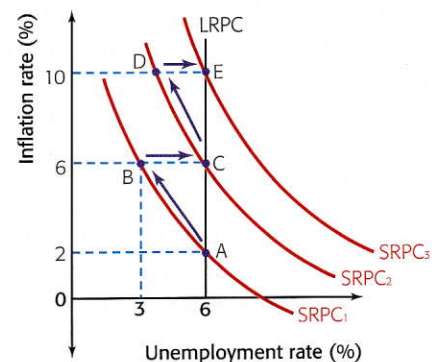


Figure 18.10 The long-run Phillips curve

Assume that the economy is in long-run equilibrium at point A on  $SRPC_1$ . The labour market is also in equilibrium so that the only unemployment that exists is the natural unemployment of 6%. The inflation rate is 2%. People *expect* inflation to be 2% and negotiate any pay increases based on this expected rate. Now, consider what would happen if the government decided that they wanted to reduce unemployment and so adopted an expansionary demand-side policy, for example increasing government expenditure. Aggregate demand would increase and this, in turn, would lead to an increase in the demand for labour and so an increase in wage levels. However, at the same time, there would be an increase in the inflation rate, in this case to 6%.

In the short run there would be a fall in unemployment as workers who had not been prepared to take jobs at existing wage levels before are now attracted by what they think are higher wages and the economy moves from A to B on the diagram. However, these are higher *nominal* wages and *real* wages have not risen. In this case, we would say that the workers have suffered from money illusion. When the workers realize that their real wages have not risen, they then leave the jobs and unemployment goes back to the natural rate, but now at an inflation rate of 6%.

The economy does not return to point A. Now that inflation is running at 6%, people will expect prices to continue to rise at 6% and negotiate an equivalent increase in wages, so the economy will be at point C on the diagram, on a new short-run Phillips curve,  $SRPC_2$ . Unemployment has returned to its natural rate at a higher rate of inflation. Any attempt to use demand management again to reduce the unemployment below this natural rate will only result in higher inflation (C to D to E) and a move to another short-run Phillips curve,  $SRPC_3$ .

The natural rate of unemployment is the unemployment rate that is consistent with a stable rate of inflation. As long as governments do not use expansionary policies, inflation will not accelerate at the natural rate of unemployment. However, if expansionary policies are used, then inflation will accelerate.

The long-run Phillips curve is vertical at the natural rate of unemployment (NRU). At any given point in time, there may be a short run trade-off between inflation and unemployment, but the economy will always return to unemployment at the natural rate. Governments cannot reduce this rate by using demand management policies. The natural rate of unemployment is the unemployment that occurs when the economy is at full employment and the labour market is in equilibrium.

Of course this is not to say that the long-run unemployment rate cannot be reduced at all! The key point here is that supply-side policies, not demand management policies, are the solution for reducing the natural rate of unemployment. Supply-side policies will reduce the natural rate of unemployment and shift the long-run Phillips curve to the left from  $LRPC_1$  to  $LRPC_2$  as shown in Figure 18.11. This would be the equivalent of a rightward shift in the long-run aggregate supply curve or an outwards shift in a country's production possibilities curve.

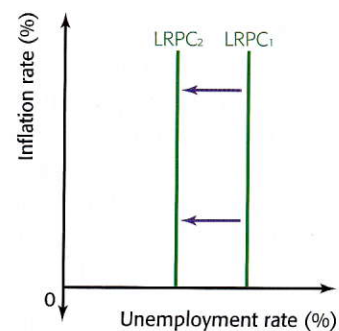


Figure 18.11 Supply-side policies can reduce the NRU



This confirms conclusions drawn about unemployment at the end of Chapter 17. Demand-side policies may be appropriate for reducing cyclical demand-deficient unemployment, but not for reducing the frictional, seasonal, and structural unemployment that make up the natural unemployment.

The OECD itself admits that the natural rate of unemployment “can only be estimated with uncertainty”. Nonetheless, estimates of the NRU are made. What is evident is that it varies considerably over time and between countries.

Differences between countries are due to a number of things including the availability of unemployment benefits, trade union power, the extent of labour market regulations, and wage-setting practices by firms. Countries with more benefits and considerable regulation of labour markets tend to have a higher NRU. When organizations like the OECD recommend that countries make labour market reforms to reduce unemployment, they are usually referring to measures that will reduce the natural rate.

## EXAMINATION QUESTIONS

### Paper 1, part (a) questions

- 1 With the help of a diagram, explain the concept of demand-pull inflation. [10 marks]
- 2 With the help of a diagram, explain the concept of cost-push inflation. [10 marks]
- 3 With the help of a diagram, explain the monetarist explanation of inflation. [10 marks]
- 4 Explain three consequences of inflation. [10 marks]
- 5 Explain three consequences of deflation. [10 marks]
- 6 Explain three problems involved in the measurement of inflation. [10 marks]
- 7 Using an appropriate diagram, explain why there might be a trade-off between unemployment and inflation in the short run. [10 marks]
- 8 Explain two policies that might be used to reduce the natural rate of unemployment. [10 marks]

### Paper 1, essay questions

- 1 **a** Explain the main consequences of inflation. [10 marks]  
**b** Evaluate the methods that might be used to reduce inflation. [15 marks]
- 2 **a** Explain the main causes of inflation. [10 marks]  
**b** Evaluate the extent to which demand-side policies are effective in reducing inflation. [15 marks]
- 3 **a** Explain the concept of the natural rate of unemployment. [10 marks]  
**b** Evaluate the methods available to a government that wishes to reduce the level of unemployment in an economy. [15 marks]

**Assessment advice: essay writing**

When the question asks you to use an “appropriate” diagram, then it is likely that there are at least two possibilities. In the first short response question given here, you could use an AD/AS diagram or a short-run Phillips curve diagram. The Phillips curve approach is a bit more sophisticated and may be more appropriate in a higher level exam.

You may observe that the essay question given here is similar to the one at the end of the last chapter. This is because we have extended the theory. The concepts of the natural rate of unemployment and the long-run Phillips curve where there is no trade-off between unemployment and inflation are a more theoretical explanation of the reasons why demand-side policies are not likely to reduce the natural rate of unemployment. The question can be answered without this extra theory, but the use of these concepts will result in a more sophisticated approach.

Don't forget to include information from your case study!

**Data response exercise**

Consider the following data and answer the questions.

Japan	2000	2001	2002	2003	2004	2005
Consumer price index (% change from previous year)	-0.8	-0.8	-0.9	-0.3	0.0	-0.3
Unemployment rate (% of labour force)	4.7	5.0	5.4	5.3	4.7	4.4

Mexico	2000	2001	2002	2003	2004	2005
Consumer price index (% change from previous year)	9.5	6.4	5.0	4.5	4.7	4.0
Unemployment rate (% of labour force)	2.2	2.1	2.4	2.5	3.0	3.5

United States*	2000	2001	2002	2003	2004	2005
Consumer price index (% change from previous year)	3.4	2.8	1.6	2.3	2.7	3.4
Unemployment rate (% of labour force)	4.0	4.8	5.8	6.0	5.5	5.1

Note: Labour market data are subject to differences in definitions across countries.

\* The methodology for calculating the Consumer Price Index has changed considerably over the past years, lowering measured inflation substantially.

**Source:** OECD, Economic Outlook 79 database



- 1 Define the following terms indicated in bold:
  - a consumer price index [2 Marks]
  - b unemployment rate. [2 Marks]
- 2 With reference to the data, explain why we can say that Japan experienced deflation in the period shown. [4 Marks]
- 3 With reference to the data, explain the trends in inflation and unemployment in Mexico and the United States. [4 Marks]
- 4 Using evidence from the text and your knowledge of economics, evaluate the validity of the Phillips curve relationship. [8 Marks]

### **Assessment advice: evaluation**

In terms of the different ways that you can evaluate, the best thing here would be to look at the time frame involved. You have enough data to make a possible conclusion for a short-run period, but is there enough information for the long run?