

# IS-LM Model

The IS-LM model, which stands for "investment-savings" (IS) and "liquidity preference-money supply" (LM) is a Keynesian [macroeconomic](#) model that shows how the market for economic goods (IS) interacts with the loanable funds market (LM) or [money market](#). It is represented as a graph in which the IS and LM curves intersect to show the short-run equilibrium between interest rates and output.

## KEY TAKEAWAYS

- The IS-LM model describes how aggregate markets for real goods and financial markets interact to balance the rate of interest and total output in the macroeconomy.
- IS-LM was devised as a formal graphic representation of Keynesian economic theory.
- IS-LM can be used to describe how changes in market preferences alter the equilibrium levels of GDP and market interest rates, but the model lacks the precision and realism to be a useful prescription tool for economic policy.

## Understanding IS-LM Model

British economist [John Hicks](#) first introduced the IS-LM model in 1937, just one year after fellow British economist [John Maynard Keynes](#) published *The General Theory of Employment, Interest, and Money*. Hicks's model served as a formalized graphical representation of Keynes's theories, though it is used mainly as a heuristic device today.

The three critical exogenous – i.e. external – variables in the IS-LM model are [liquidity](#), investment, and consumption. According to the theory, liquidity is determined by the size and velocity of the money supply. The levels of [investing](#) and consumption are determined by the marginal decisions of individual actors.

The IS-LM graph examines the relationship between output, or GDP, and interest rates. The entire economy is boiled down to just two markets, output and money, and their respective [supply and demand](#) characteristics push the economy towards an [equilibrium](#) point.

## Characteristics of the IS-LM Graph

The IS-LM graph consists of two curves, IS and LM. [Gross domestic product \(GDP\)](#), or (Y), is placed on the horizontal axis, increasing to the right. The interest rate, or (i or R), makes up the vertical axis. The IS curve depicts the set of all levels of [interest rates](#) and output (GDP) at which total investment (I) equals total saving (S). At lower interest rates investment is higher, which translates into more total output (GDP) so the IS curve slopes downward and to the right. The LM curve depicts the set of all levels of income (GDP) and interest rates at which money supply equals money (liquidity) demand. The LM curve slopes upward because higher levels of income (GDP) induce increased demand to hold money balances for transactions, which requires a higher interest rate to keep money supply and liquidity demand in equilibrium.

The intersection of the IS and LM curves shows the equilibrium point of interest rates and output when money markets and the real economy are in balance. Multiple scenarios or points in time may be represented by adding additional IS and LM curves. In some versions of the graph, curves display limited convexity or concavity. Shifts in the position and shape of the IS and LM curves, representing changing preferences for liquidity, investment, and consumption, alter the equilibrium levels of income and interest rates.

#### Limitations of the IS-LM Model

Many economists, including many Keynesians, object to the IS-LM model for its simplistic and unrealistic assumptions about the macroeconomy. In fact, [Hicks later admitted model's flaws](#) were fatal, and it was probably best used as "a classroom gadget, to be superseded, later on, by something better." Subsequent revisions have taken place for so-called "new" or "optimized" IS-LM frameworks.

The model is a limited policy tool, as it cannot explain how tax or spending policies should be formulated with any specificity. This significantly limits its functional appeal. It has very little to say about inflation, rational expectations, or international markets, although later models do attempt to incorporate these ideas. The model also ignores the formation of capital and [labor productivity](#).

# Inflation

Inflation and unemployment are the two most talked-about words in the contemporary society.

These two are the big problems that plague all the economies.

Almost everyone is sure that he knows what inflation exactly is, but it remains a source of great deal of confusion because it is difficult to define it unambiguously.

## 1. Meaning of Inflation:

Inflation is often defined in terms of its supposed causes. Inflation exists when money supply exceeds available goods and services. Or inflation is attributed to budget deficit financing. A deficit budget may be financed by the additional money creation. But the situation of monetary expansion or budget deficit may not cause price level to rise. Hence the difficulty of defining 'inflation'.

### ADVERTISEMENTS:

Inflation may be defined as 'a sustained upward trend in the general level of prices' and not the price of only one or two goods. G. Ackley defined inflation as 'a persistent and appreciable rise in the general level or average of prices'. In other words, inflation is a state of rising prices, but not high prices.

It is not high prices but rising price level that constitute inflation. It constitutes, thus, an overall increase in price level. It can, thus, be viewed as the devaluing of the worth of money. In other words, inflation reduces the purchasing power of money. A unit of money now buys less. Inflation can also be seen as a recurring phenomenon.

While measuring inflation, we take into account a large number of goods and services used by the people of a country and then calculate average increase in the prices of those goods and services over a period of time. A small rise in prices or a sudden rise in prices is not inflation since they may reflect the short term workings of the market.

### ADVERTISEMENTS:

It is to be pointed out here that inflation is a state of disequilibrium when there occurs a sustained rise in price level. It is inflation if the prices of most goods go up. Such rate of increases in prices may be both slow and rapid. However, it is difficult to detect whether there is an upward trend in prices and whether this trend is sustained. That is why inflation is difficult to define in an unambiguous sense.

Let's measure inflation rate. Suppose, in December 2007, the consumer price index was 193.6 and, in December 2008, it was 223.8. Thus, the inflation rate during the last one year was

223.8- 193.6/ 193.6 x 100 = 15.6

As inflation is a state of rising prices, deflation may be defined as a state of falling prices but not fall in prices. Deflation is, thus, the opposite of inflation, i.e., a rise in the value of money or purchasing power of money. Disinflation is a slowing down of the rate of inflation.

## **2. Types of Inflation:**

As the nature of inflation is not uniform in an economy for all the time, it is wise to distinguish between different types of inflation. Such analysis is useful to study the distributional and other effects of inflation as well as to recommend anti-inflationary policies. Inflation may be caused by a variety of factors. Its intensity or pace may be different at different times. It may also be classified in accordance with the reactions of the government toward inflation.

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**Thus, one may observe different types of inflation in the contemporary society:**

### **A. On the Basis of Causes:**

#### **(i) Currency inflation:**

This type of inflation is caused by the printing of currency notes.

#### **(ii) Credit inflation:**

Being profit-making institutions, commercial banks sanction more loans and advances to the public than what the economy needs. Such credit expansion leads to a rise in price level.

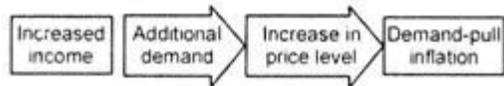
#### **(iii) Deficit-induced inflation:**

The budget of the government reflects a deficit when expenditure exceeds revenue. To meet this gap, the government may ask the central bank to print additional money. Since pumping of additional money is required to meet the budget deficit, any price rise may be called the deficit-induced inflation.

#### **(iv) Demand-pull inflation:**

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An increase in aggregate demand over the available output leads to a rise in the price level. Such inflation is called demand-pull inflation (henceforth DPI). But why does aggregate demand rise? Classical economists attribute this rise in aggregate demand to money supply. If the supply of money in an economy exceeds the available goods and services, DPI appears. It has been described by Coulborn as a situation of “too much money chasing too few goods.”



Keynesians hold a different argument. They argue that there can be an autonomous increase in aggregate demand or spending, such as a rise in consumption demand or investment or government spending or a tax cut or a net increase in exports (i.e.,  $C + I + G + X - M$ ) with no increase in money supply. This would prompt upward adjustment in price. Thus, DPI is caused by monetary factors (classical adjustment) and non-monetary factors (Keynesian argument).

DPI can be explained in terms of Fig. 4.2, where we measure output on the horizontal axis and price level on the vertical axis. In Range 1, total spending is too short of full employment output,  $Y_F$ . There is little or no rise in the price level. As demand now rises, output will rise. The economy enters Range 2, where output approaches towards full employment situation. Note that in this region price level begins to rise. Ultimately, the economy reaches full employment situation, i.e., Range 3, where output does not rise but price level is pulled upward. This is demand-pull inflation. The essence of this type of inflation is that “too much spending chasing too few goods”

## **Inflation: Meaning, Types, Causes, Effects and Remedies**

### **What is Inflation? – Meaning**

**Inflation** refers to a situation when there is an overall increase in the prices of goods leading to a general decline in the value of money.

Inflation is phenomena marked by an excess of money supply over the demand for it, that is to say, an excess of the supply of currency and credit over the actual requirements of trade, commerce and industry.

We have inflation when there is an increase in the value of total money supply multiplied by its velocity of circulation without a corresponding increase in goods and services.

Inflation is characterized by a fall in the purchasing power of money and an extraordinary rise in the cost of living. As a result of increased money supply in the hands of people and the consequent competition for purchasing goods which are in scarcity, there is a general increase in the price indices.

### **Types**

We will discuss the two major types of inflation:

**1. Demand Pull Inflation:** Inflation arises when there is an increase in the supply of money but there is no corresponding increase in the supply of goods useful to the community.

Accumulation of more money than before raises the purchasing power of people and stimulates the demand for goods but the supply of the latter being limited, the necessary consequence will be the inflation of the price level. Demand Pull Inflation thus means, in plain words, too much money chasing too few goods.

**2. Cost Push Inflation:** When the prices of goods increases because of an increase in the cost of production, it is known as cost push inflation.

### **What causes Inflation?**

Additional money put in the hands of people naturally creates in them a desire to spend more on goods. The sellers these commodities get more money and they too feel an urge to add something to what they already possess, and the new purchases made with additional money will correspondingly benefit other producers and sellers too in an ever-widening circle. In this way, the demand for various commodities and services will go on rising in a spiral order in times of inflation.

The activities of speculators, hoarders, and profiteers also contribute much to the upward trend of prices.

The selling prices of good also increases if there is an overall increase in manufacturing cost.

If the production of industrial and agricultural goods did not multiply in proportion to the increase in demand, the prices of commodities increases by leaps and bounds resulting into steep inflation.

The underdeveloped countries, in particular, in trying to industrialize themselves and advance materially, resort to deficit financing when other monetary resources have been completely tapped. There will be a tremendous increase in money supply and its velocity of circulation due to greater public borrowing and printing of more currency notes, and as it is not accompanied by a corresponding increase in agricultural and industrial production and services there is every possibility of an inflationary trend setting in the economy.

### **What are the effects of Inflation?**

It is not always true that additional purchasing power in the hands of people will develop inflationary tendencies. If the resources of a country are in an undeveloped condition, an addition to the purchasing power may stimulate investment leading to an increased supply of commodities. Money will be available at lower rates of interest and it will be a powerful factor in increasing the production of goods through larger investments of capital.

Unemployed labor will get wider opportunities for gainful occupations and the standard of living for all classes of people will necessarily go higher.

However, the evil effects of inflation are particularly noticeable in those highly industrialized countries where there is hardly any surplus or unemployed labor. Any increase in the supply of money cannot further widen the scope for employment or raise the productive capacity of the nation. The limits of productive capacity having been reached already, any increase in the supply of money can only result in pushing up the level of prices.

The value of money fell rapidly and its depreciation affected particularly the interests of people with fixed incomes and investing classes.

Inflation does incalculable harm to planning also. Once the prices are allowed to raise their ugly heads, all the calculations of the Government fail. If there is an increase in the general price level and it has its being on the projects, undertaken. Consequently, the Government needs more money to fulfill the targets. The Government must either resort to further deficit financing or must cut down the objectives as originally planned.

The bright side of the picture is that an increase in the supply of money often creates opportunities for employment largely and considerably relieves the burden of unemployment.

The resources of the country are more fully exploited and production is stepped up in all spheres of industrial activities.

Thus, it is seen that inflation does some positive good to a backward country whose resources are undeveloped and where a large section of people remain idle for want of employment.

### **Remedial Measures:**

However, the harmful tendencies of inflation should be minimized. In countries where inflation prevails, the Government must take effective steps to keep it under check.

- Inflation can be combated by reducing the purchasing power of the people through imposition of additional taxes. The Governments sought to minimize the evil of inflation by resorting to taxation, controls, bans on speculation and encouragement to savings. Income tax, tobacco tax, entertainment tax and excess profit tax are all meant to withdraw currency from the money-market. A high rate of taxation may, however, prove annoying and take away the initiative for enterprise.
- The Government sometimes raises public loans, which also effectively restricts the purchasing power of people.
- It may also be necessary to impose a system of control on production and distribution of many goods. Rationing systems are introduced and prices of consumer goods are controlled.

- Governments encourage people to invest in bank deposits, and government securities, thus withdrawing the currency in excess.

However, these measures, we must remember, can gain only a limited measure of success. They can check further rise in prices but cannot effectively bring them down.

### **Conclusion**

While controls and the monetary measures enumerated above, have gone a long way to check inflation they alone are not sufficient. Inflationary tendency have to be fought on the production front. Although deficit financing increases the risks of inflation in economy for the time being, it would tend to check inflation in the long run when the investment would begin to yield results. While on one side money in circulation would be withdrawn by higher taxation and in the form of savings, greater production in agriculture and industrial spheres would place more commodities in the market to be purchased for the same amount of money.

## **What is Balance of Payments Theory of Rate of Exchange**

The balance of payments theory of exchange rate holds that the price of foreign money in terms of domestic money is determined by the free forces of demand and supply on the foreign exchange market.

It follows that the external value of a country's currency will depend upon the demand for and supply of the currency. The theory states that the forces of demand and supply are determined by various items in the balance of payments of a country.

According to the theory, a deficit in the balance of payments leads to fall or depreciation in the rate of exchange, while a surplus in the balance of payments strengthens the foreign exchange reserves, causing an appreciation in the price of home currency in terms of foreign currency. A deficit balance of payments of a country implies that demand for foreign exchange is exceeding its supply.

As a result, the price of foreign money in terms of domestic currency must rise, i.e., the exchange rate of domestic currency must fall. On the other hand, a surplus in the balance of payments of the country implies a greater demand for home currency in a foreign country than the available supply. As a result, the price of home currency in terms of foreign money rises, i.e., the rate of exchange improves.

In short, the balance of payments theory simply holds that the exchange rates are determined by the balance of payments connoting demand and supply positions of foreign exchange in the country concerned. As such, the theory is also designated as “Demand-Supply Theory.”

The theory asserts that, the rate of exchange is the function of the supply of and demand for foreign money and not exclusively the function of prices obtaining between two countries as asserted by the Purchasing Power Parity Theory which does not take into account invisible items.

According to the balance of payments theory, the demand for foreign exchange arises from the “debit” items in the balance of payments, whereas, the supply of foreign exchange arises from the “credit” items. Since the theory assumes that the demand for and supply of foreign currency are determined by the position of the balance of payments, it implies that supply and demand are determined mainly by factors that are independent of variations in the rate of exchange or the monetary policy.

According to the theory, given demand-supply schedules, their intersection determines the equilibrium exchange rate of a currency. It should be noted that the lower the price of a currency, the greater will be the demand for it, and therefore, the demand curve slopes downward. On the other hand, the supply curve slopes upward from left to right indicating that a lowering of the value of price of the currency tends to contract its supply.

DD and SS are the demand and supply curves of a given country’s currency. These two curves intersect at a Point P determining PM or OR as the exchange rate where the quantities demanded and supplied are equal (OM).

It is the equilibrium rate. When OR is the rate exchange (high), supply exceeds demand, hence it will be lowered by the excessive supply fore. When the rate is lowered, supply will contract and the demand will expand. This process will continue till both are in equilibrium at the point of intersection. The reverse will happen when the exchange rate is lower than the equilibrium rate.

It goes without saying that changes in demand or supply or both will accordingly influence equilibrium rate of exchange. This is how the theory brings the determination of the exchanger within the purview of the general theory of value (or equilibrium analysis).

### **Merits of the Theory**

The main merit of the theory is that it brings the determination of exchange rate problem within the purview of the general equilibrium analysis.

Secondly, the theory stresses the fact that, there are many predominant forces besides merchandise items (exports and imports of goods) included in the balance of payments which influence the supply of and demand for foreign exchange which in turn determine the rate of exchange. Thus, the theory is more realistic in that the domestic price of a foreign money is seen as a function of many significant variables, not just purchasing power expressing general price levels.

Furthermore, the greatest practical significance of the theory is that, it shows that disequilibrium in the balance of payments position can be corrected by marginal adjustments in the exchange rate by devaluation or revaluation rather than through internal price inflation or deflation as implied by the mint parity theory.

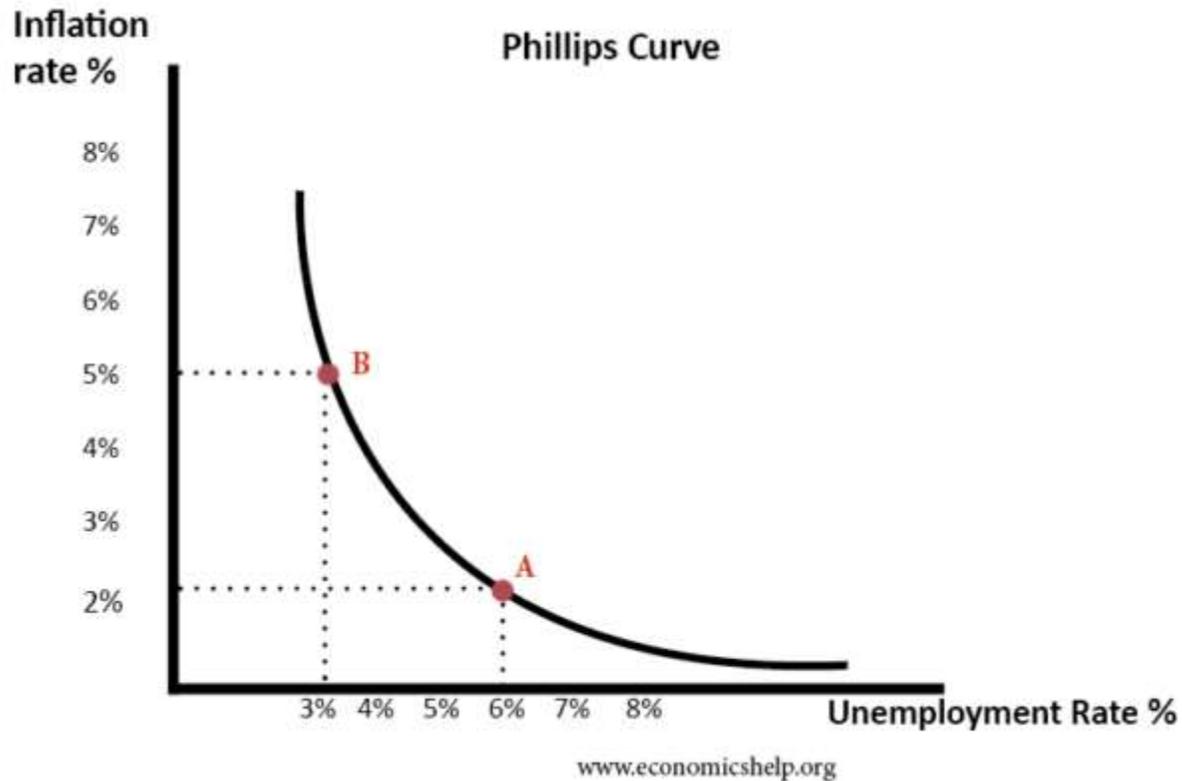
### **Criticisms**

1. The fundamental defect of the theory is that it assumes perfect competition, including no interference with the movement of money from one country to another. This is very unrealistic.
2. According to the theory, there is no causal connection between the rate of exchange and the internal price level. But, in fact, there should be some such connection, as the balance of payments position may be influenced by the price-cost structure of the country.
3. The theory advocates that the rate of exchange is the function of the balance of payments. But, in practice it has also been found that the balance of payments position of a country is very much affected by the changes in the rate of exchange. Thus, it is equally true that the balance of payments is the function for the rate of exchange. In this sense, the theory is indeterminate as it confuses as to what determines what.
4. According to the theory, the optimum value of a currency is the gold content embodied in it. This is not true for a fiat paper standard. Thus, the demand-supply theory fails to explain the basic value incorporated in currencies.<sup>14</sup>
5. In fact, the balance of payments theory of exchange rate is merely a truism – a self-evident fact without any causal explanatory significance. Critics argue that if payments must necessarily balance, there can be no meaning to a decline in the exchange rate during an unfavourable trade balance; an uncovered balance simply does not exist.

## **Phillips Curve**

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The Phillips curve suggests there is an inverse relationship between inflation and unemployment.



This suggests policymakers have a choice between prioritising inflation or unemployment. During the 1950s and 1960s, Phillips curve analysis suggested there was a trade-off, and policymakers could use demand management (fiscal and monetary policy) to try and influence the rate of economic growth and inflation. For example, if unemployment was high and inflation low, policymakers could stimulate aggregate demand. This would help to reduce unemployment, but cause a higher rate of inflation.

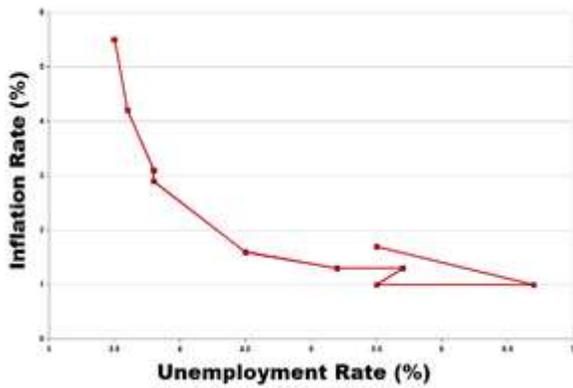
In the 1970s, there seemed to be a breakdown in the Phillips curve as we experienced [stagflation](#) (higher unemployment and higher inflation). The Phillips Curve was criticised by monetarist economists who argued there was no trade-off between unemployment and inflation in the long run.

However, some feel that the Phillips Curve has still some relevance and policymakers still need to consider the potential trade-off between unemployment and inflation.

### Origins of the Phillips Curve

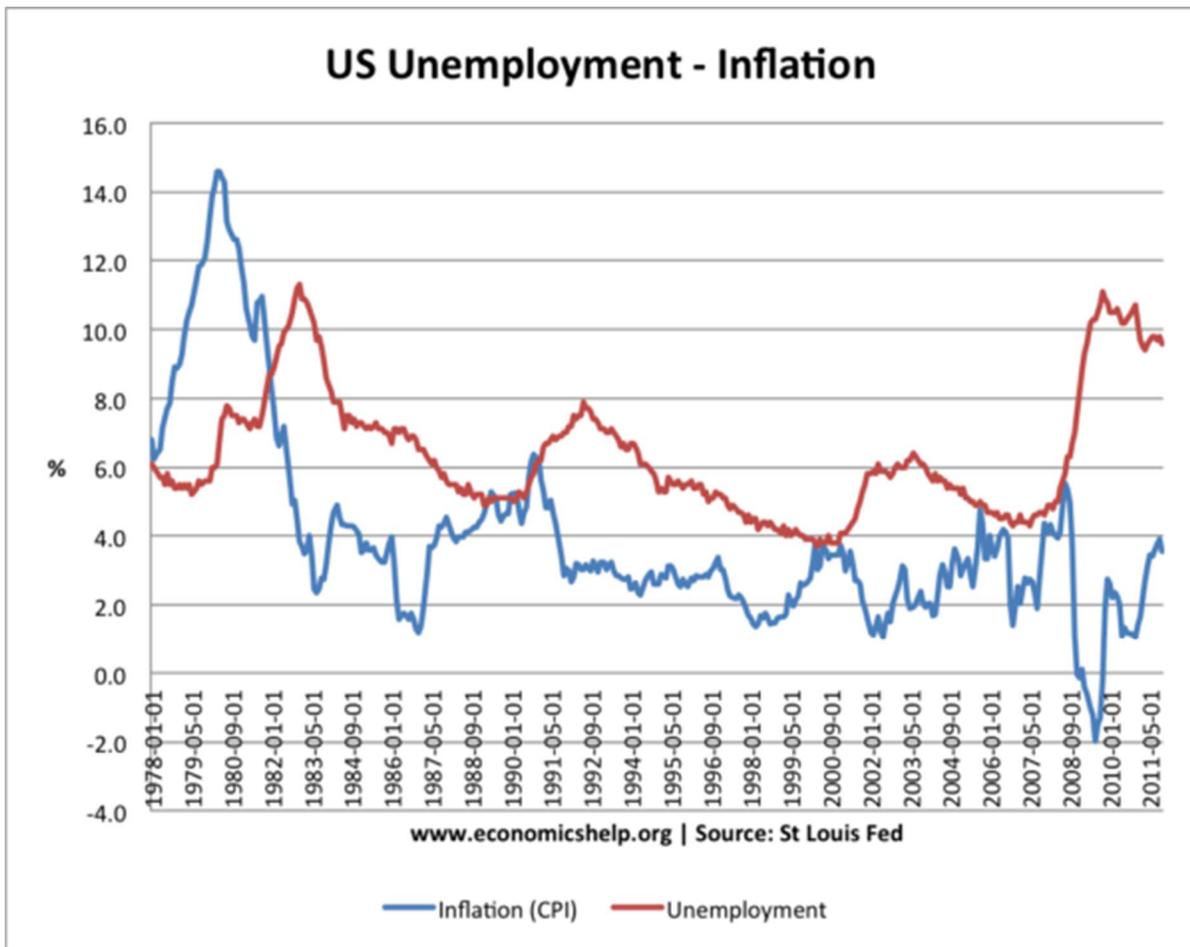
The Phillips curve originated out of analysis comparing money wage growth with unemployment. The findings of A.W. Phillips in *The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom 1861–1957* suggested there was an inverse correlation between the rate of change in money wages and unemployment. For example, a rise in unemployment was associated with declining wage growth and vice versa.

### Original Phillips Curve Diagram



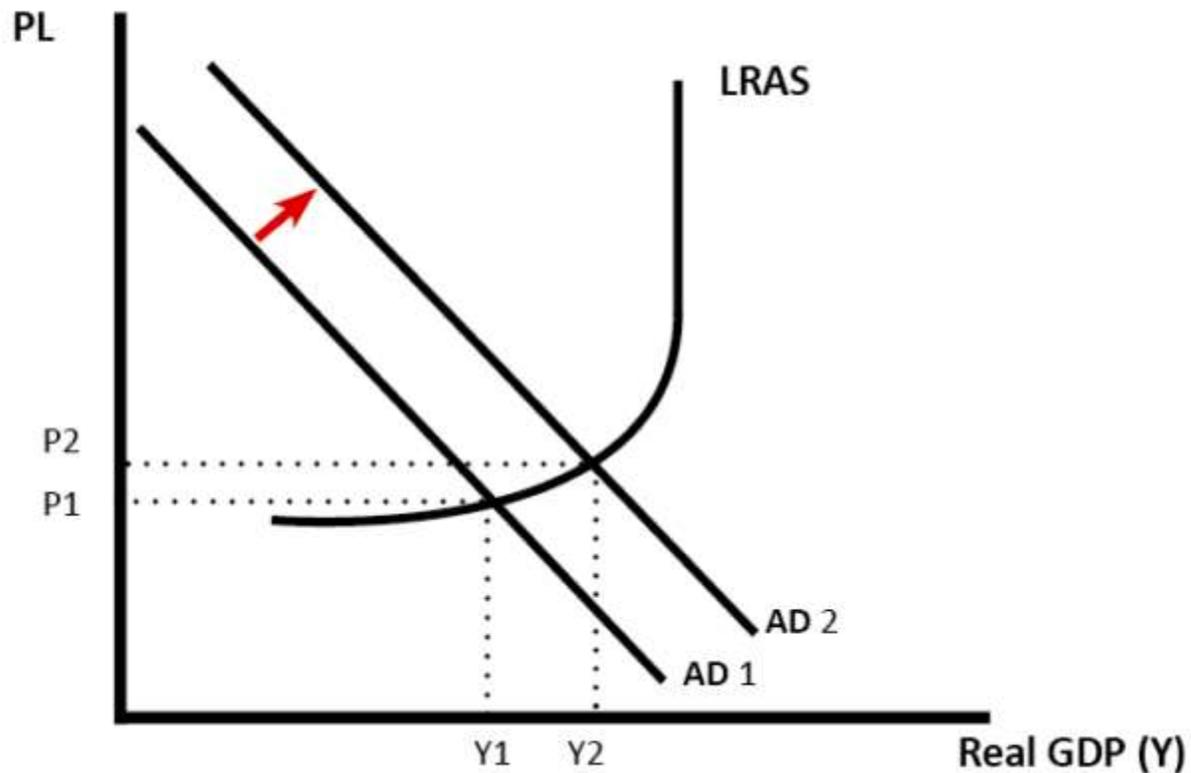
This analysis was later extended to look at the relationship between inflation and unemployment. Again the 1950s and 1960s showed there was evidence of this inverse trade-off between unemployment and inflation.

### *US Unemployment and Inflation*

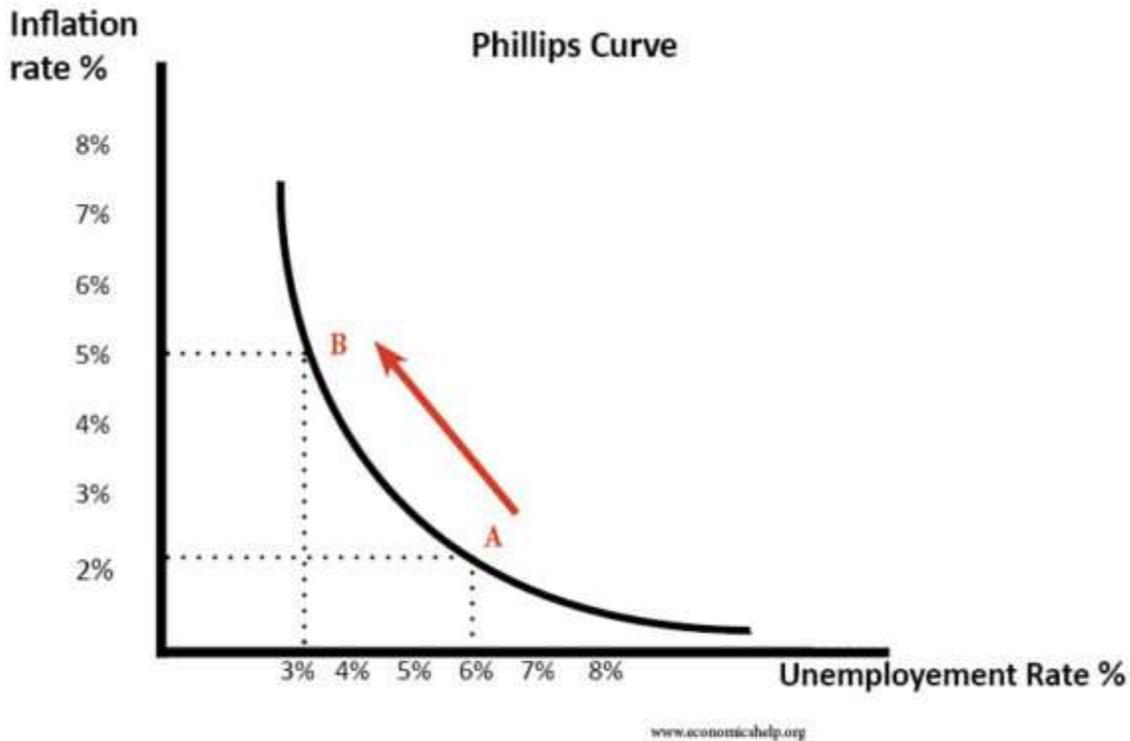


There are occasions when you can see a trade-off between unemployment and inflation. For example, between 1979 and 1983, inflation (CPI) fell from 15% to 2.5%. During this period, we see a rise in unemployment from 5% to 11%. In 2008, the recession caused a sharp rise in unemployment and inflation became negative.

**Why is there a trade-off between unemployment and inflation?**



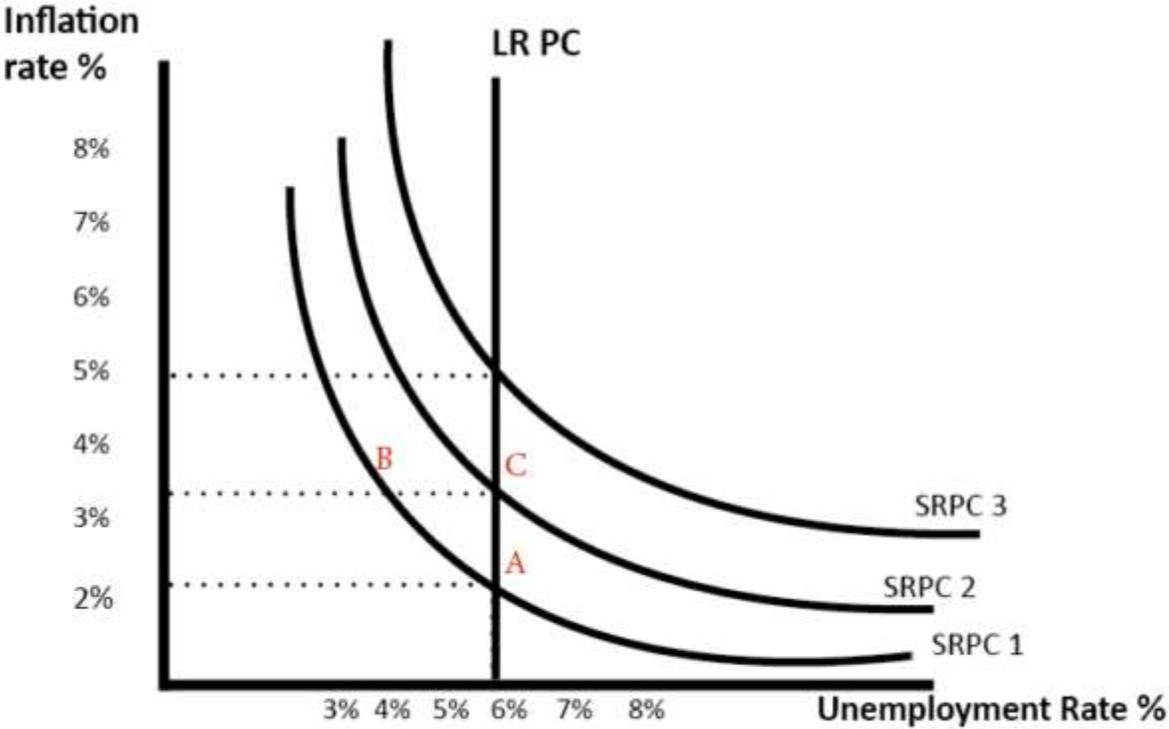
- An increase in aggregate demand (AD to AD2) causes higher real GDP (Y1 to Y2). Therefore firms employ more workers and unemployment falls.
- However, as the economy gets closer to full capacity, we see an increase in inflationary pressures. With lower unemployment, workers can demand higher money wages, which causes wage inflation. Also, firms can put up prices due to rising demand.
- Therefore, in this situation, we see falling unemployment, but higher inflation.



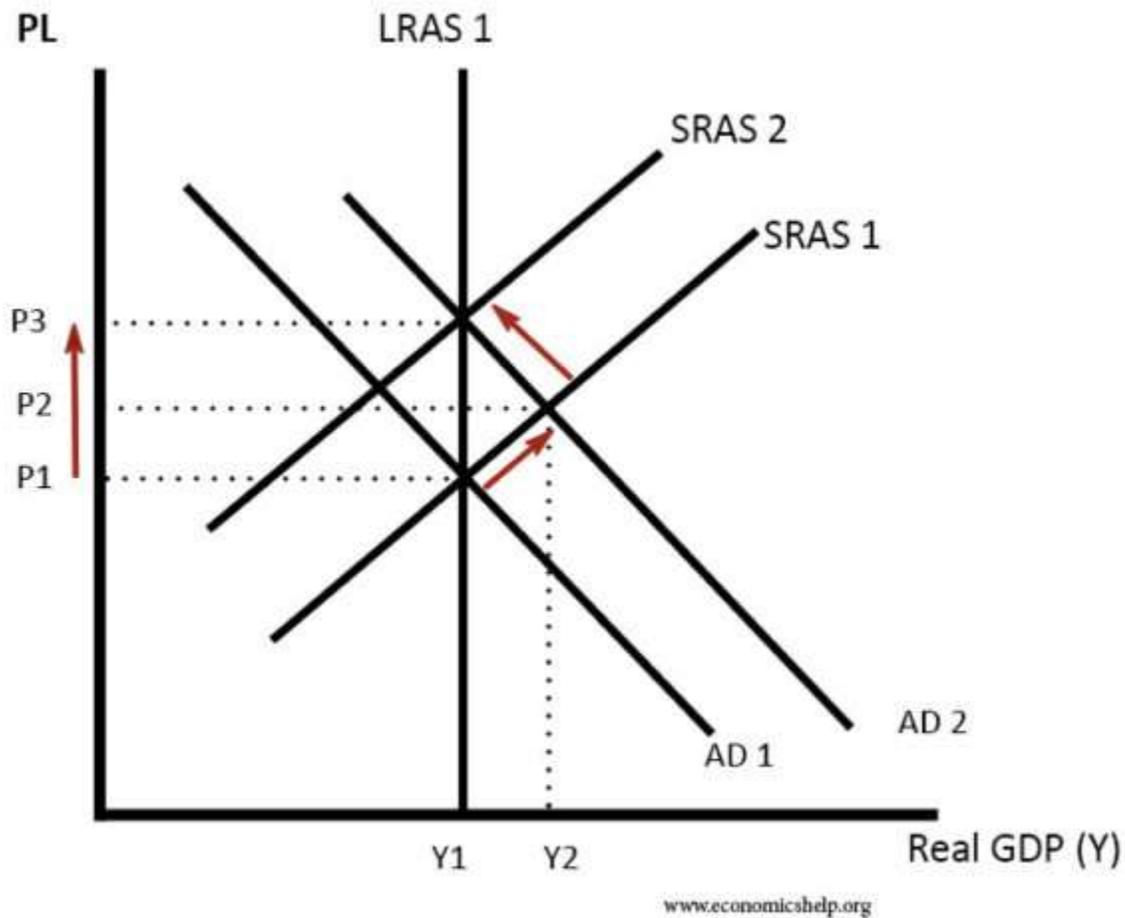
### Monetarist View of Phillips Curve

However, Monetarists have always been critical of this Phillips curve trade-off. They argue that in the long run there is no trade-off as Long Run AS is inelastic. Monetarists argue that if there is an increase in aggregate demand, then workers demand higher nominal wages. When they receive higher nominal wages, they work longer hours because they feel real wages have increased. (their price expectations are based on last year)

However, this increase in AD causes inflation, and therefore, real wages stay the same. When they realise real wages are the same as last year, they change their price expectations, and no longer supply extra labour and the real output returns to its original level. Therefore, unemployment remains unchanged, but we have a higher inflation rate. The short-run Phillips curve shifts upwards to SRPC 2



### Monetarist view of AD / AS



The increase in AD only causes a temporary increase in real output to  $Y_1$ . After inflation expectations increase, SRAS shifts to left (SRAS2), and we end up with higher inflation ( $P_3$ ) and output of  $Y_1$ . This AD/AS model explains why we only get a temporary fall in unemployment.

- Adaptive expectation monetarists argue there is only a short-term trade-off between unemployment and inflation.
- Rational expectation monetarists argue there is no trade-off, even in the short term. The rational expectation model suggests that workers see an increase in AD as inflationary and so predict real wages will stay the same.

### Summary of Monetarist v Keynesian view

A monetarist would argue unemployment is a supply side phenomena. Monetarists argue using demand-side policies can only temporarily reduce unemployment by an ever-accelerating inflation rate. Monetarists argue that unemployment is determined by the [natural rate of unemployment](#)

Keynesians argue there can be [demand deficient unemployment](#), and during a recession, demand-side policies can reduce unemployment in the long term (with perhaps some inflation)

### The Phillips Curve Breakdown

Evidence from the 1970s suggested the trade-off between unemployment and inflation had broken down. The [1970s](#) witnessed a rise in stagflation – rising unemployment and inflation. Monetarists argued that increasing the money supply just led to a wage inflation spiral and did not help to reduce unemployment. They advocated reducing the money supply and achieving low inflation – any unemployment would just prove temporary.

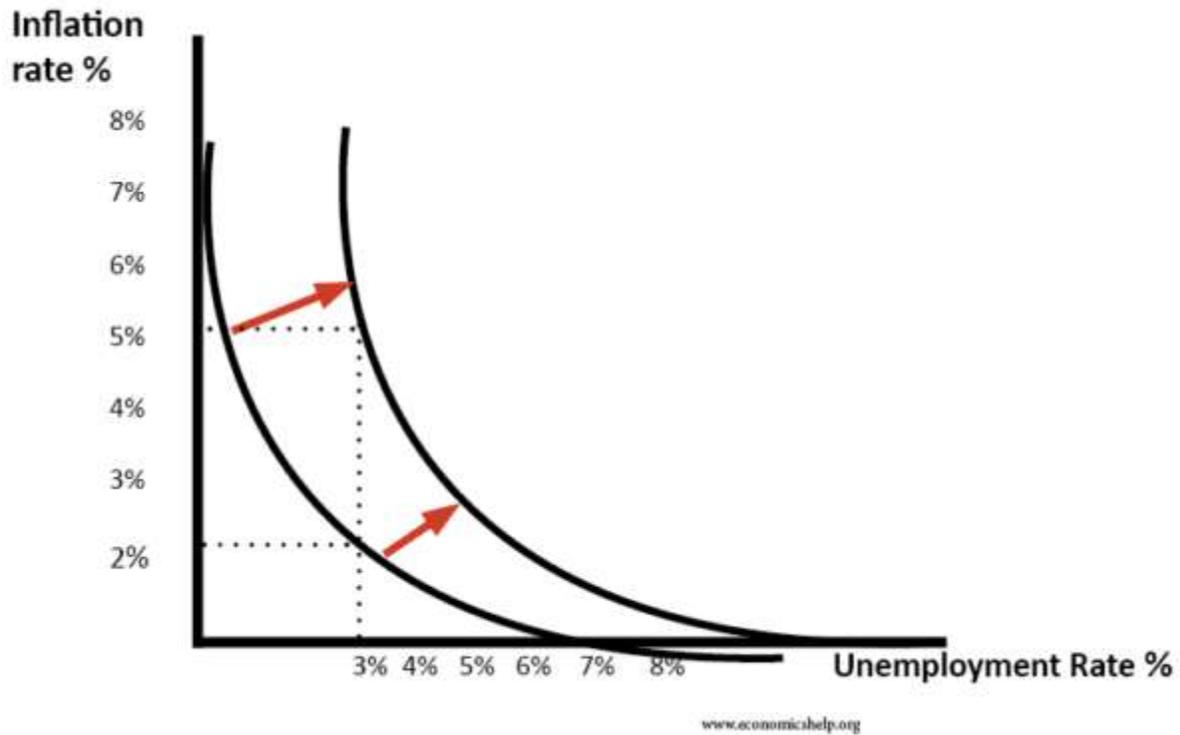
### Chart 5: The Phillips Curve Shifts, 1970-79



Source: U.S. Bureau of Labor Statistics

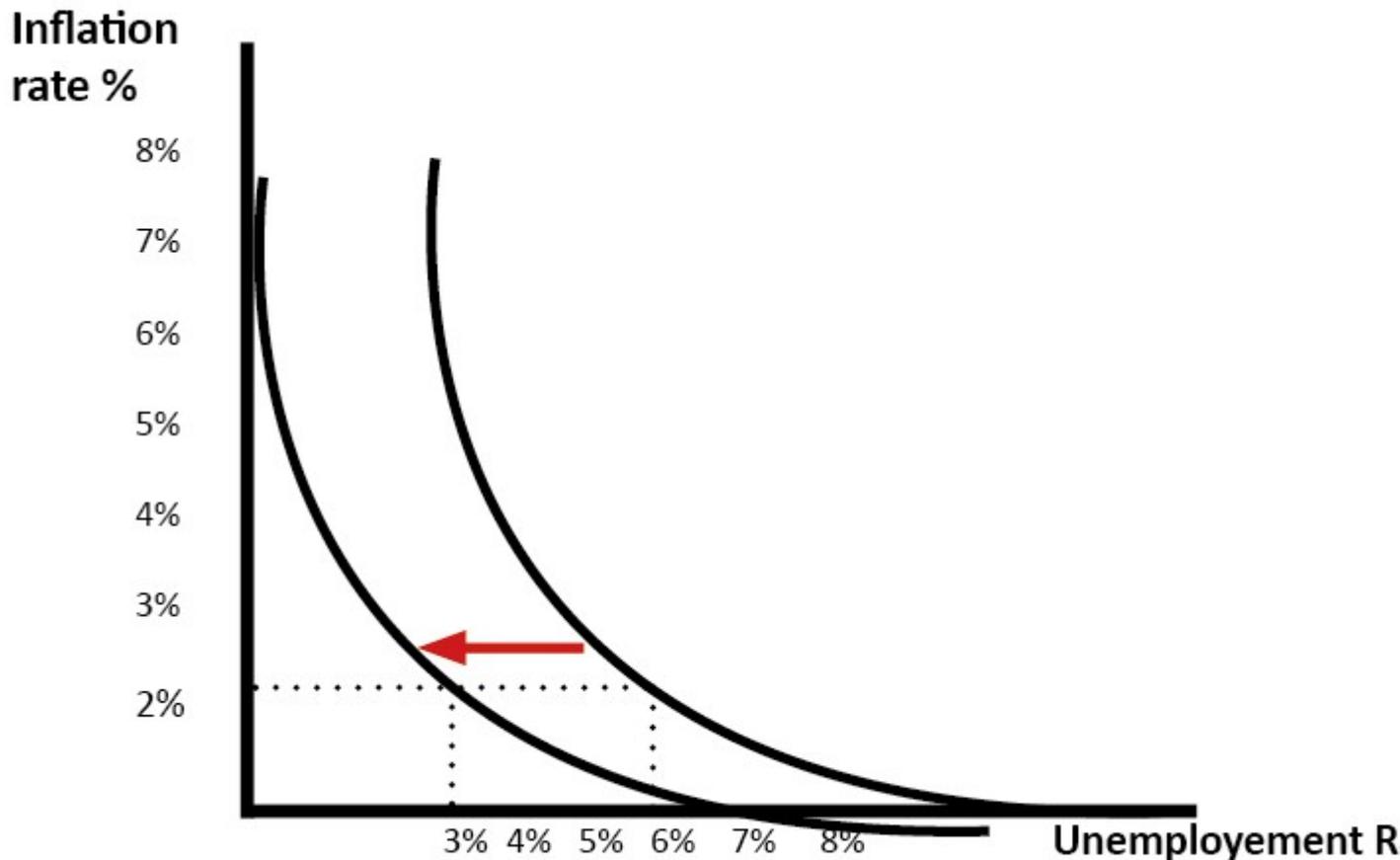
However, others argued there was still a trade-off – the Phillips curve had just shifted to the right giving a worse trade-off because of cost-push inflation.

*Shift in Phillips Curve to the right (the 1970s)*



In the early 2000s, the trade-off seemed to improve. Helped by low global inflation, unemployment in the UK fell without any rise in inflation. Some argued this period of stability had ended the boom and bust cycles with the classic trade-off between inflation and unemployment. See: [great moderation](#)

### *Shift in Phillips Curve to the left*



In late 2008 we saw a rise in the unemployment rate and a fall in inflation. This was due to the recession and falling oil prices.

However, in 2010-11, the UK experienced higher unemployment and higher inflation because of cost-push inflationary pressures. This was another period of stagflation

### **Conclusion on Phillips Curve**

If the economy is operating below full capacity, a significant increase in aggregate demand is likely to cause a reduction in unemployment and higher inflation. Most economists would agree that in the short term, there can be a trade-off between unemployment and inflation. However, there is a disagreement whether this policy is valid for the long-term.

Monetarists would tend to argue the trade-off will prove short-term, and we will just get inflation. Monetarists place greater stress on the supply side of the economy.

However, Keynesians argue that demand deficient unemployment could persist in the long-term. If there is a significant negative output gap, boosting AD could lead to lower unemployment and

a modest increase in inflation. In a deep recession, this fall in unemployment will not just be temporary because there will be no crowding out.

In an ideal world policymakers will aim for low inflation and low unemployment. To achieve this, we need economic growth that is sustainable (close to long-run trend rate) and supply-side policies to reduce cost-push inflation and structural unemployment. If these criteria are met then it becomes easier to achieve this goal of lower inflation and lower unemployment.

### **Relevance of Phillips Curve Today**

In the current economic climate, many Central Banks and policymakers are weighing up how much importance they should give to reducing unemployment and inflation. For example, the Federal Reserve is considering using monetary policy to achieve an unemployment target and a willingness to accept higher inflation.

During 2009-13, the Bank of England has been willing to tolerate inflation above the government's target of 2% because they feel to reduce inflation would have caused serious problems for unemployment and economic growth.

This willingness to consider a higher inflation rate, suggest policy makers feel that the trade off of higher inflation is worth the benefit of lower unemployment. However, not all economists agree we should be allowing the inflation target to increase. If we allow inflation to increase, inflationary pressures will become engrained, and monetary policy will lose credibility. The ECB would be unwilling to tolerate higher inflation – even as a measure to reduce unemployment in Europe.