Theme-5
The Price Level & Inflation

Keynesian theory essentially looked at depression and recessions as a problem of insufficient aggregate demand. On the other hand, classical economists with their grounding in Say's Law (supply creates its own demand) focused their study entirely on the supply side, i.e. labour markets, wages and employment.

The basic Keynesian aggregate demand model assumes that price level as constant. This is essentially because it is a theory of recession and excess capacity is available to firms, which can increase output without increases in price level. However, inflation is a problem of concern in most economies and extending the basic macroeconomic model which can explain the simultaneous determination of both, output and price level, is of theoretical and policy importance. This can be done by deriving the aggregate demand and aggregate supply curves.

The **aggregate demand (AD) curve** is derived from the aggregate expenditure (E) curve and the equilibrium condition that Y = E. This is illustrated in Figure 1. With price level P_0, aggregate demand is E_0 and equilibrium output is Y_0. This corresponds to point D_0 in the lower quadrant. What happens when the price level increases from P_0 to P_1. It would lead to a shift in the E curve, moving it to E_1 and equilibrium output to Y_1. In the lower quadrant this is corresponds to point D_1. The set of all equilibrium points (E =Y) corresponding to different price levels gives us the AD curve.

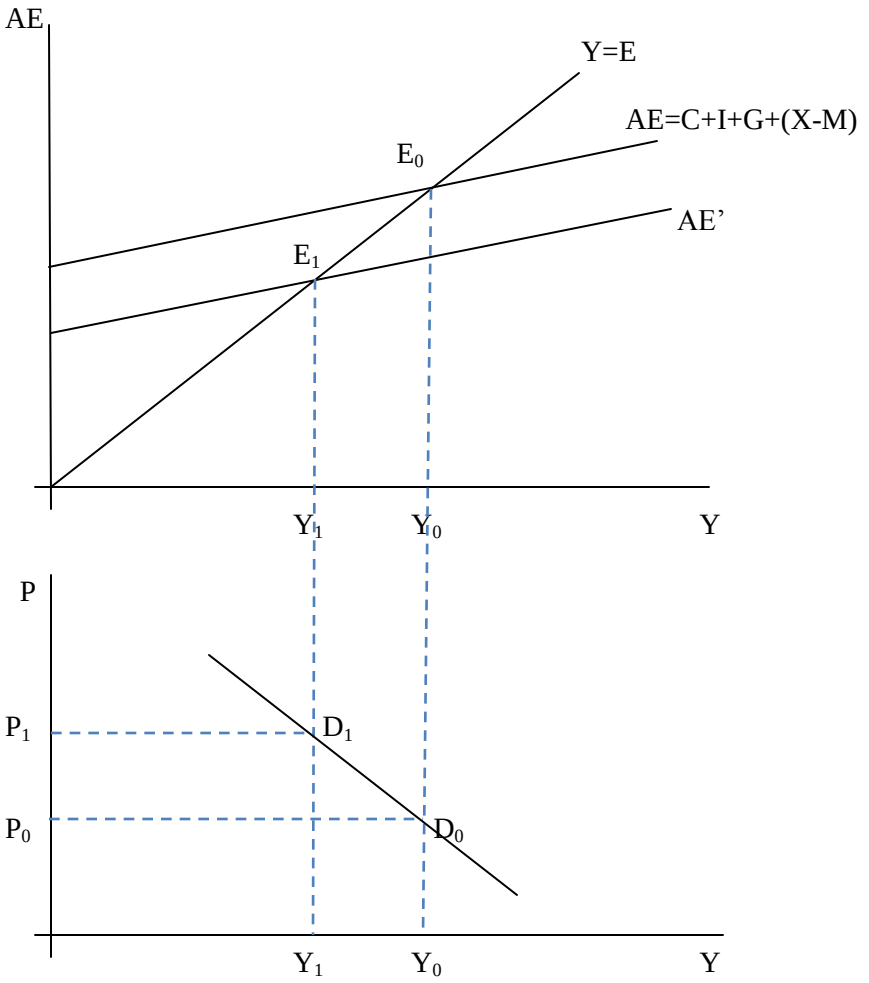

Figure 1

Why does the aggregate expenditure curve shift from E_0 to E_1 when price level increases from P_0 to P_1? Three possible reasons are:-

1. Pigou's wealth effect: nominal value of money is fixed, but the real value is dependent upon the price level. This is because for a given amount of money, a lower price level provides more purchasing power per unit of currency. When the price level falls, consumers are wealthier, a condition which induces more consumer spending. Thus, a drop in the price level induces consumers to spend more, thereby increasing the aggregate demand.
2. International effect: when domestic price level falls, exports increase (because home goods become relatively cheaper to foreign goods, i.e. increased injection) and imports fall (because consumer will substitute foreign goods with home goods, i.e. less leakage). This increases shifts E and consequently we arrive at point E_1 from E_0 when price level rises.
3. Real money supply: When prices fall, real money supply increases, interest rates fall. This shifts the LM curve (M_s/P decreases) leftwards. Interest rates fall. This induces greater investment and consumer spending thereby causing E to shift upwards (say from E_1 to E_0).

In Figure 2 we show how change in autonomous spending leads to a shift in the AD curve. For instance a change in government expenditure from G_0 to G_1, leads to a shift in the AD curve from AD_0 to AD_1. Note also the multiplier effect of a change in government spending.

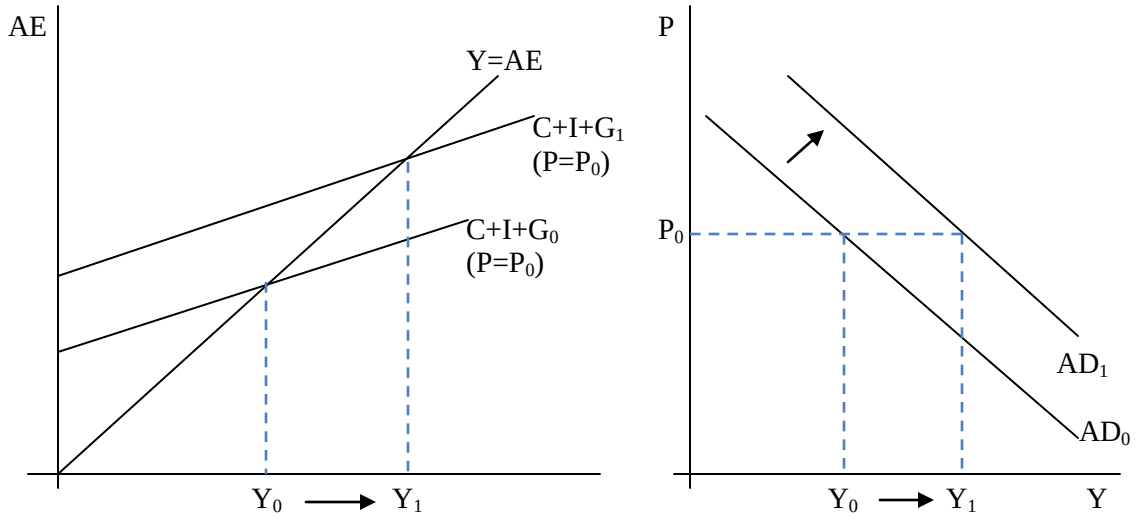

Figure 2

The **aggregate supply curve** (AS) depicts the quantity of real GDP that is supplied by the economy at different price levels. The reasoning used to construct the aggregate supply curve differs from the reasoning used to construct the supply curves for individual goods and services. The supply curve for an individual good is drawn under the assumption that input prices remain constant. As the price of good X rises, sellers' per unit costs of providing good X do not change, and so sellers are willing to supply more of good X-hence, the upward slope of the supply curve for good X. The aggregate supply curve, however, is

defined in terms of the *price level*. Increases in the price level will increase the price that producers can get for their products and thus induce more output. But an increase in the price will also have a second effect; it will eventually lead to increases in input prices as well, which, *ceteris paribus,* will cause producers to cut back. So, there is some uncertainty as to whether the economy will supply more real GDP as the price level rises. In order to address this issue, it has become customary to distinguish between two types of aggregate supply curves, the **short-run aggregate supply curve** and the **long-run aggregate supply curve**.

The **short-run aggregate supply (SAS) curve** is considered a valid description of the supply schedule of the economy *only* in the short-run. The **short-run** is the period that begins immediately after an increase in the price level and that ends when *input prices* have increased in the *same proportion* to the increase in the price level.

Input prices are the prices paid to the providers of input goods and services. These input prices include the wages paid to workers, the interest paid to the providers of capital, the rent paid to landowners, and the prices paid to suppliers of intermediate goods. When the price level of final goods rises, the cost of living increases for those who provide input goods and services. Once these input providers realize that the cost of living has increased, they will increase the prices that they charge for their input goods and services in proportion to the increase in the price level for final goods.

The presumption underlying the SAS curve is that input providers *do not* or *cannot* take account of the increase in the general price level right away so that it takes some time–referred to as the short-run–for input prices to fully reflect changes in the price level for final goods. For example, workers often negotiate multi-year contracts with their employers. These contracts usually include a certain allowance for an increase in the price level, called a **cost of living adjustment (COLA)**. The COLA, however, is based on expectations of the future price level that may turn out to be wrong. Suppose, for example, that workers *underestimate* the increase in the price level that occurs during the multi-year contract. Depending on the terms of the contract, the workers may not have the opportunity to correct their mistaken estimates of inflation until the contract expires. In this case, their wage increases will lag behind the increases in the price level for some time.

During the short-run, *sellers of final goods* are receiving higher prices for their products, without a proportional increase in the cost of their inputs. The higher the price level, the more these sellers will be willing to supply. The *SAS* curve—depicted in Figure 3 (a)—is therefore upward sloping, reflecting the positive relationship that exists between the price level and the quantity of goods supplied in the short-run.

The long-run aggregate supply (LAS) curve (or sometimes referred to as the medium term) describes the economy's supply schedule in the long-run. The **long-run** is defined as the period when input prices have completely adjusted to changes in the price level of final goods. In the long-run, the increase in prices that sellers receive for their final goods is completely offset by the proportional increase in the prices that sellers pay for inputs. The result is that the quantity of real GDP supplied by all sellers in the economy is independent of changes in the price level. The LAS curve—depicted in Figure 3 (b)—is a vertical line, reflecting the fact that long-run aggregate supply is not affected by changes in the price

level. Note that the *LAS* curve is vertical at the point labeled as the **natural level of real GDP**. The natural level of real GDP (Y_n) is defined as the level of real GDP that arises when the economy is *fully employing all* of its available input resources.

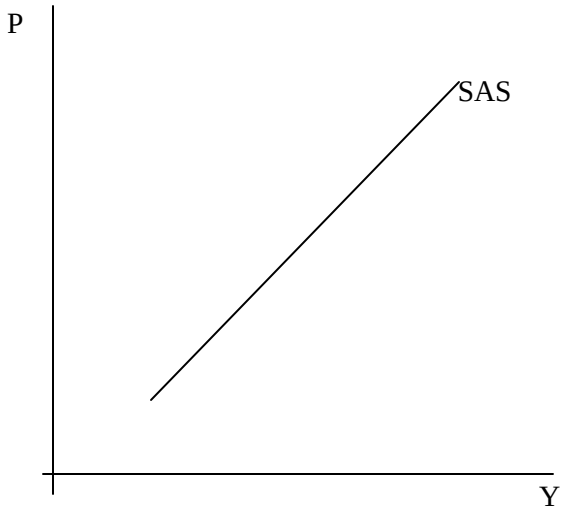

Figure 3(a)

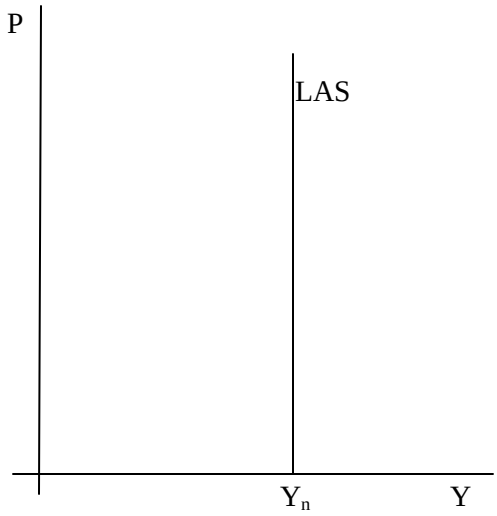

Figure 3(b)

Changes in aggregate supply are represented by shifts of the aggregate supply curve. An illustration of the ways in which the *SAS* and *LAS* curves can shift is provided in Figures 4(a) and 4(b). A shift to the *right* of the *SAS* curve from SAS_1 to SAS_2 or of the *LAS* curve from LAS_1 to LAS_2 means that at the same price levels the quantity supplied of real GDP has *increased*. A shift to the *left* of the *SAS* curve from SAS_1 to SAS_3 or of the *LAS* curve from LAS_1 to LAS_3 means that at the same price levels the quantity supplied of real GDP has *decreased*.

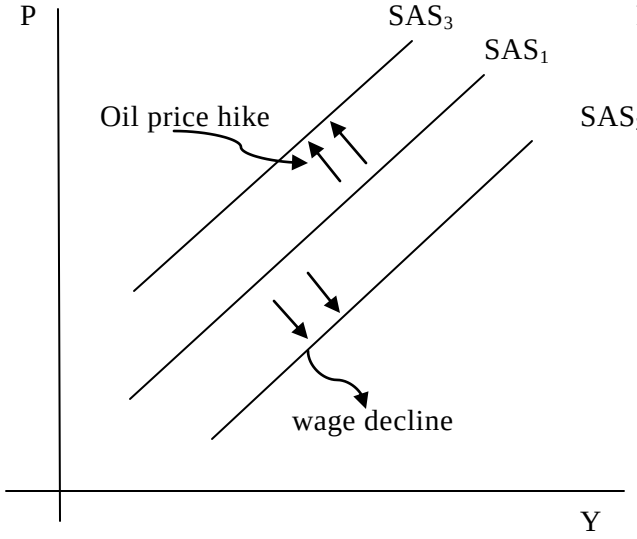

Figure 4(a)

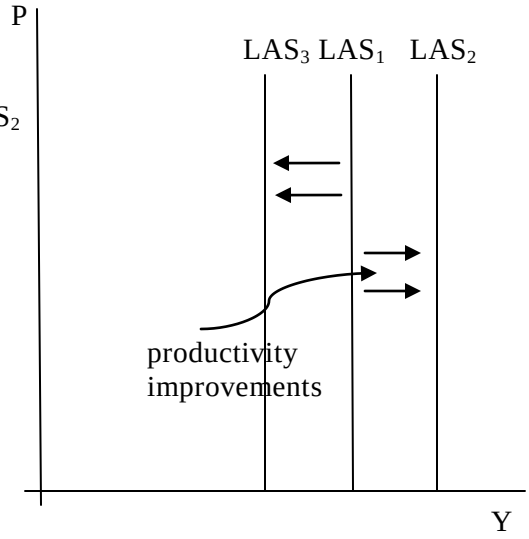

Figure 4(b)

Like changes in aggregate demand, changes in aggregate supply are *not* caused by changes in the price level. Instead, they are primarily caused by changes in *two* other factors. The first of these is a *change in input prices*. For example, the price of oil, an input good, increased dramatically in the 1970s due to efforts by oil-exporting countries to restrict the quantity of oil sold. Many final goods and services use oil or oil products as inputs. Suppliers of these final goods and services faced rising costs and had to reduce their supply at all price levels. The *decrease* in aggregate supply, caused by the increase in input prices, is represented by a shift to the *left* of the *SAS* curve because the *SAS* curve is drawn under the assumption that input prices remain constant. An *increase* in aggregate supply due to a decrease in input prices is represented by a shift to the *right* of the SAS curve.

A second factor that causes the aggregate supply curve to shift is *economic growth. Positive* economic growth results from an increase in productive resources, such as labor and capital. With more resources, it is possible to produce more final goods and services, and hence, the natural level of real GDP increases. Positive economic growth is therefore represented by a shift to the *right* of the *LAS* curve. Similarly, *negative economic growth decreases* the natural level of real GDP, causing the *LAS* curve to shift to the left.

Figure 6 also shows the SR and LR effects of a price level fall from P_0 to P_1. With the fall in price level, the real wage (w/P) increases from w'/P_0 to w'/P_1. Firms cut back employment from N_0 to N_1 and output falls to Y_1 from Y_0. Therefore we move along AS curve from point a_0 to a_1. However, in the LR, unemployment would mean that nominal wage would also adjust so that $w'/P_0 = w''/P_1$.

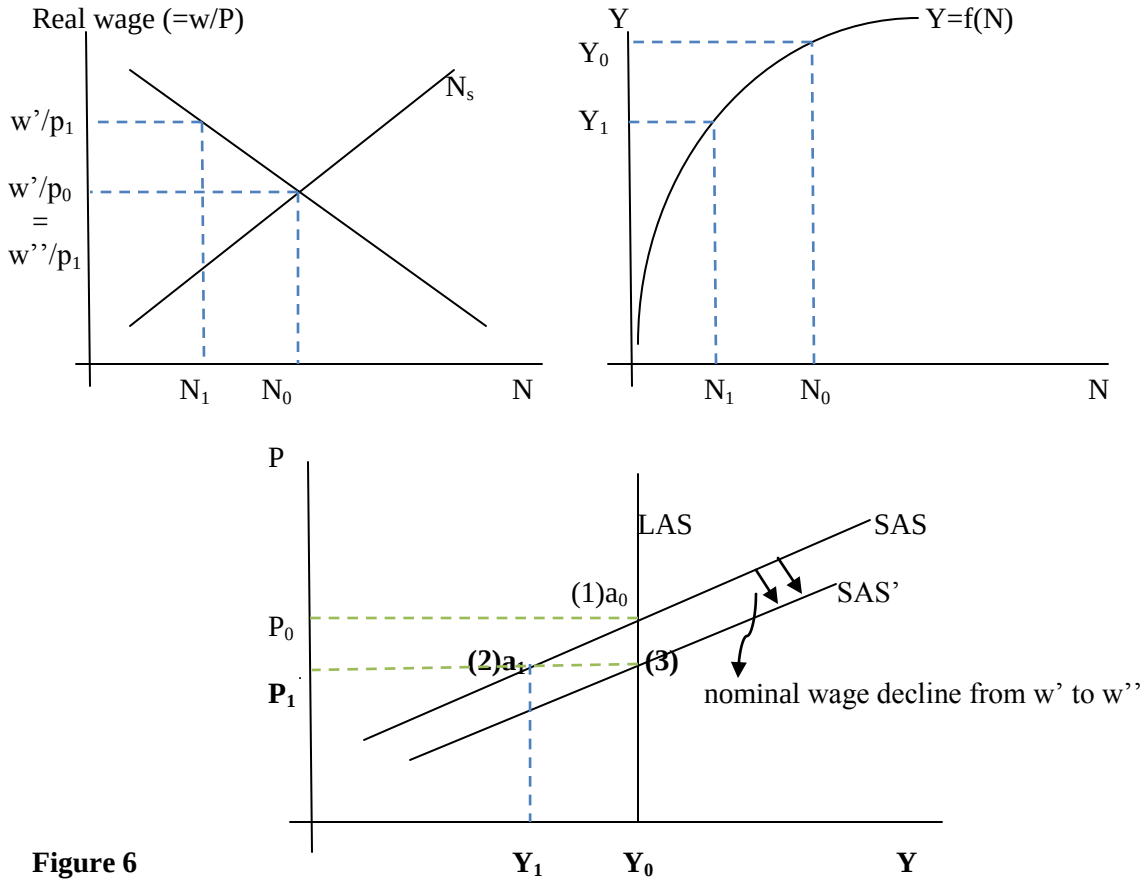

Figure 6

When the aggregate demand and *SAS* (short-run aggregate supply) curves are combined, as in Figure 7, the intersection of the two curves determines both the **equilibrium price level**, denoted by P^*, and the **equilibrium level of real GDP**, denoted by Y^*. If it is further assumed that the economy is fully employing all of its resources, the equilibrium level of real GDP, Y^*, will correspond to the **natural level of real GDP**, and the *LAS* curve may be drawn as a vertical line at Y^*, as in Figure 7.

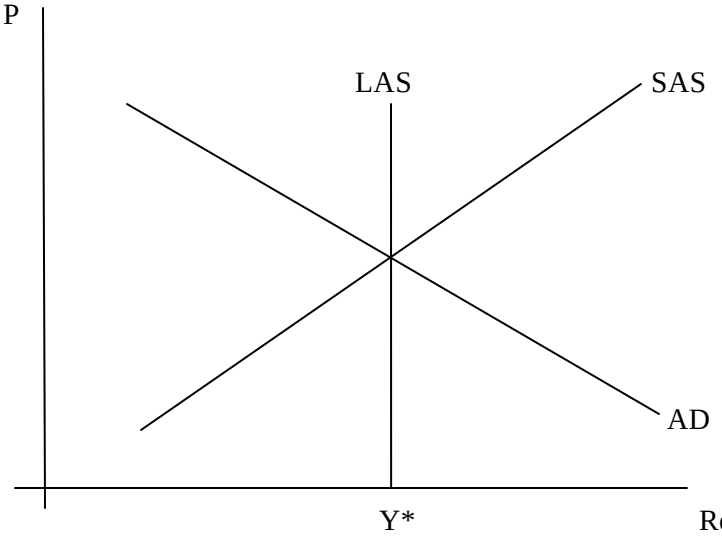

Figure 7

Consider what happens to this situation when the aggregate demand curve shifts to the *right* from AD_1 to AD_2, as in Figure 8. The immediate, short-run effect is that the equilibrium price level increases from P_1, to P_2, and real GDP increases *above* its natural level, from Y_1, to Y_2. The increase in real GDP is due to the fact that input prices have not yet risen in response to the increase in the price level for final goods; the economy is still operating along the old *SAS* curve, SAS_1 . Eventually, however, input providers will demand higher prices to reflect the increase in the general price level. Production costs will therefore increase, and the supply of real GDP will be reduced. This is represented by the shift to the *left* of the *SAS* curve from SAS_1 to SAS_2. The end result is a higher price level, P_3, at the same, natural level of real GDP, Y_1.

The graphical analysis presented in Figure 8 applies only to the case where there is zero economic growth, and the economy is already at the natural level of real GDP when aggregate demand increases. **In the case where the economy is not fully employing all of its input resources and has therefore not yet attained its natural level of real GDP, an increase in aggregated demand—depicted in Figure 9 as a shift from AD_1 to AD_2—causes both an increase in the equilibrium price level from P_1 to P_2, and an increase in the equilibrium level of real GDP from Y_1 to Y_2. In this case, the increase in the equilibrium price level does not necessarily lead to an increase in input prices because the economy is not fully employing all of its input resources.** When unemployed inputs are available, input prices do not tend to rise. The result, in this case, is that the *SAS* curve *does not* shift left and cancel out the increase in real GDP brought about by the increase in aggregate demand.

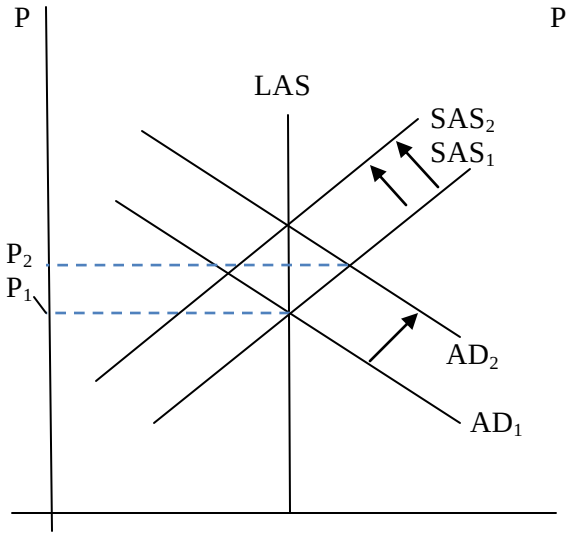

Figure 8

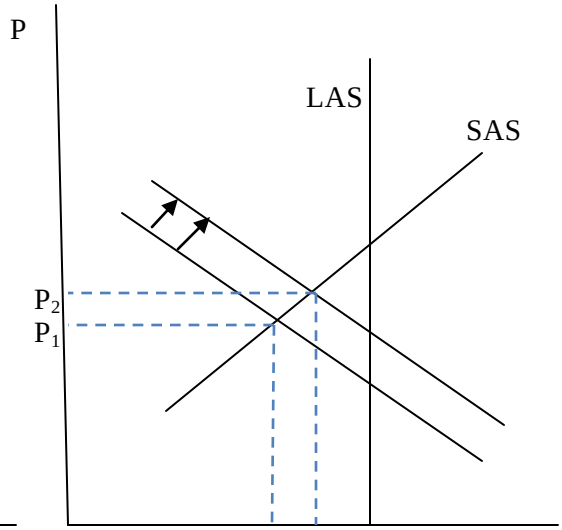

Figure 9

The LR situation is also referred to as the Classical AS curve and the SR upward (horizontal) situation is referred to as the Keynesian AS curve. In the Keynesian case, output is essentially demand determined with no effect on price levels.

The AS-AD analysis allows us to study the effect of AD shocks (sudden fall in demand for exports) and AS shocks (oil crisis) on the economy. Figure 10 and 11 below highlight the difference in impacts of such shocks on the real economy

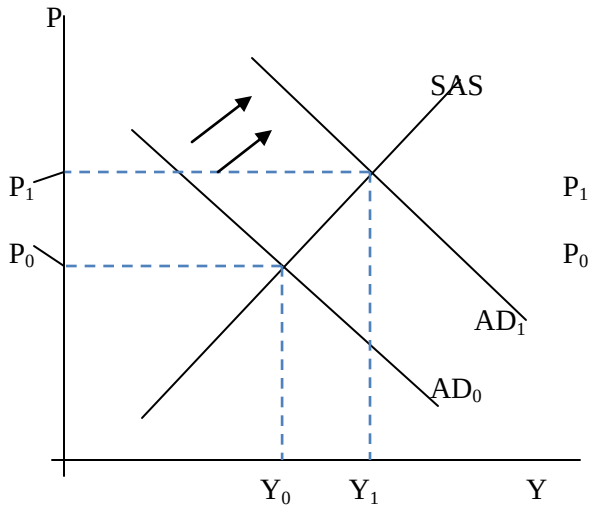

Figure 10

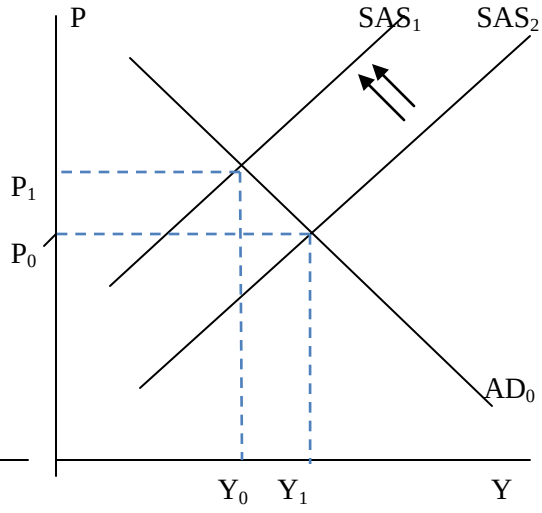

Figure 11

(This section on AS curves has been taken from: CliffsNotes.com.: http://www.cliffsnotes.com/WileyCDA/CliffsReviewTopic/topicArticleId-9789,articleId-9738.html).

What we have seen above is a one-time change in the price level. The continuous rise in price level or the rate of change of the price level (dP/dt) is called the **rate of inflation**. Figure 12 and 13 show two possible causes of inflation: demand pull (from increases in AD) and cost-push (due to shifting of SAS) respectively. The key cause for inflation arises from the "wage-price" spiral where increases in price-level trigger wage increase adjustments, which in turn trigger price-level increases. This is depicted in Figure 14 below.

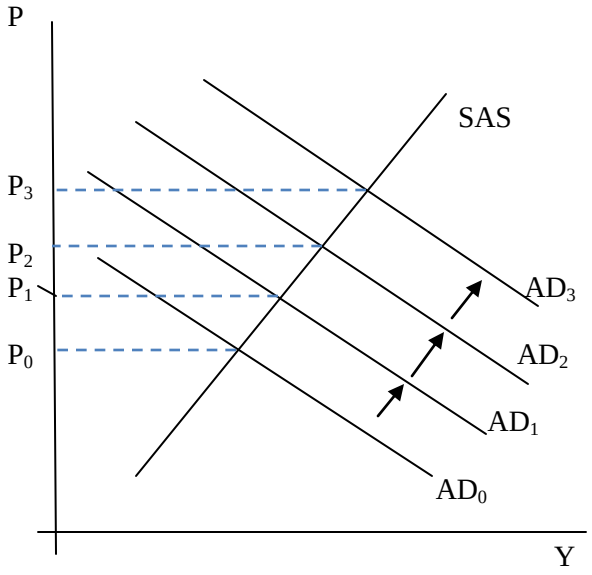

Figure 12

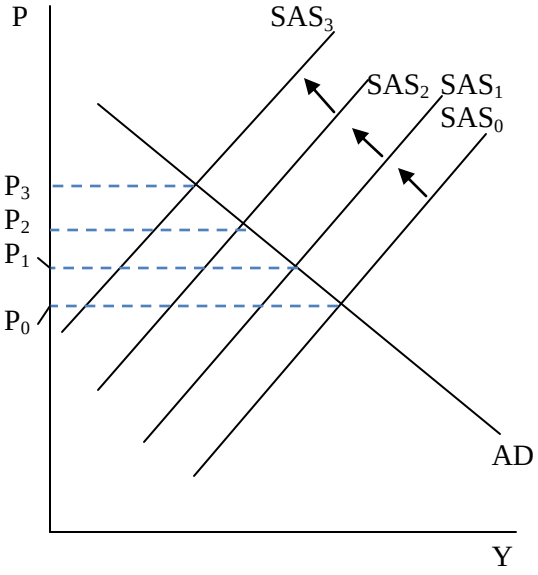

Figure 13

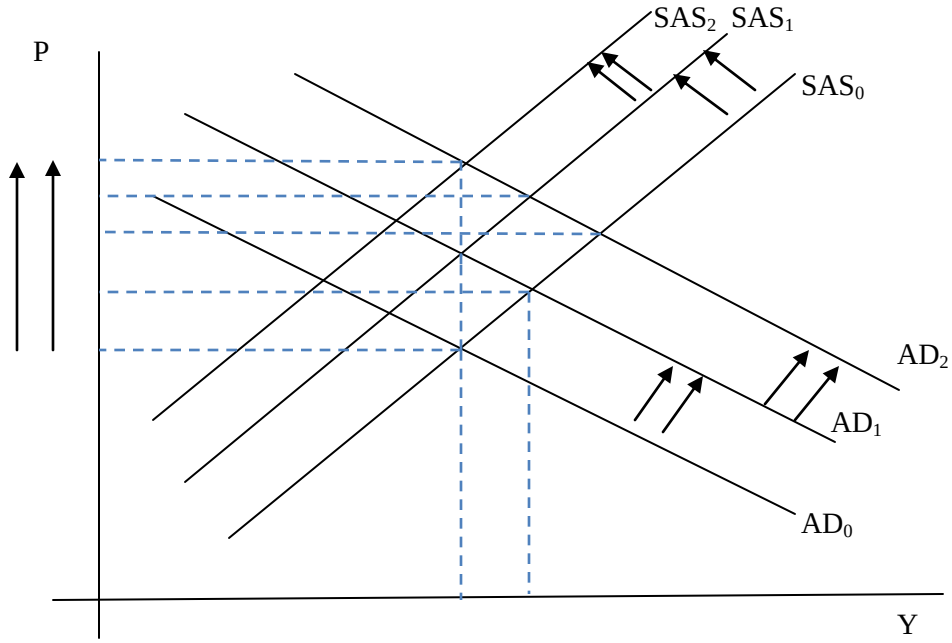

Figure 14

Inflation Measurement

Inflation is a rise in the general price level over a period of time. In any economy, prices are rising and falling all the time - some rise by quite a lot and others will fall. This is not just the prices in shops for food but also prices of things like insurance for both individuals and businesses, the prices of raw materials like oil, copper and steel, tuition fees for education at university and the price we pay for different sorts of entertainment like the cinema.

From this, they compile a picture of how prices are changing on average. The Consumer Price Index (CPI) or the Wholesale Price Index (WPI) are used to measure the rate of inflation.. They give us an idea of what is happening to price changes throughout the economy. A CPI figure of 2.0% means that prices on average rose by 2.0% compared to the same period a year before. An item priced at Re.1.00, therefore will now be Re. 1.02.

It is important to remember that this is an average and that it does not mean that every good and service has increased by that amount. A small positive rate of inflation (for India ~ 4-5%) is sometimes set a target for the rate of inflation. This, it is believed, is a rate that is consistent with a growing and dynamic economy. Businesses need to have some incentives to expand and if prices are rising then it provides such an incentive to keep growing and seeking out profits and good returns on investment.

If inflation rises too quickly, however, it can cause problems. How quick is 'too quick' is not easy to specify. The danger of letting inflation get out of control is something that most governments want to avoid.

The dangers of inflation are as follows:

1. Inflation distorts prices between different time periods. Normally, people save some money, and there is a balance between savings and spending. Savings go to banks where they become loans for business investment. If there is inflation, you're better off spending the money now before it loses its value, so consumption now rises at the expense of consumption later; savings are money you plan to spend later.

2. Instead of saving, consumers may start borrowing. £10 000 borrowed now will buy lots of things, and by the time you repay it in a few year's time, the £10 000 is worth less, and is probably easier to repay if your salary has risen because of inflation. So consumers tend to borrow more and spend even more.

3. Interest rates rise. If a lender normally wants 5% to let someone else use the money for a while, and inflation is also 5%, then the lender will want 10%. This puts up business costs and makes borrowing less and therefore investment less; less investment means less growth and employment.

4. Inflation causes uncertainty which increases risk. Higher risk means businesses are less likely to invest, with the results mentioned in 3.

5. Inflation re-distributes wealth and income. People with fixed incomes eg some pensioners see the real value of their income fall (they become worse off) and other people get pay rises to compensate for inflation (they become better off). Wealth moves from savers to borrowers eg house price inflation makes the owners of houses much better off, and the mortgages become easier and easier to repay.

6. Input prices (raw materials, wages and supplies) rise so business costs rise. Wages are often the largest business cost, and there could be a danger of a 'wage-price' spiral where rising costs leads to higher prices, workers ask for a pay rise in compensation, so costs rise again, so prices rise again, and so on.

7. 'Shoe-leather' costs. Because prices are always changing businesses and consumers spend a lot of time looking for the best price (walking up and down the high street) which is a cost and they may not find the best deal, which is another cost.

8. 'Menu costs' are the costs of constantly changing prices as in the literal example of reprinting the menu. But it's not just the price labels on the goods, but the whole business system that has to be changed.

9. Wage negotiation. If there is inflation, workers will want pay rises. The actual time and cost of negotiating this, and making the necessary administrative changes can be quite high. Whilst managers are negotiating, they aren't doing anything else.

10. Asset-price inflation. Houses, shares and other investments (even art & antiques!) often rise in price during inflation as investors look for a safe haven for their money. These prices then rise due to strong demand, which attracts further buying. So normal spending patterns are changed because of less spending on normal goods and services and more spending on assets. This switch reduces demand for normal businesses and creates an artificial 'bubble' in these other markets.

11. Trade. If the UK has higher inflation than competitor countries (which it isn't now, but it has been for a lot of the last few decades) then UK prices gradually rise above imported prices. More imports are bought, so demand leaks out of the country and leaves UK businesses in a weak position. The same effect occurs with UK export businesses. The eventual effect may be a fall in the £ which puts prices back where they were, but leaves UK consumers worse off because they can buy fewer imports than before.

<u>How is Inflation Caused?</u>

There are three main views about how inflation is caused:

1. Demand-pull. This means buyers want to buy more than sellers can actually produce; so sellers start to put prices up.

2. Cost-push. This means business costs start to rise (e.g. oil prices rise, or wages start to rise) and sellers need to put prices up to compensate.

3. Monetarist view. This means the government allows too much money to be created. If the supply of money rises, then the price falls just as if the supply of potatoes rises, then the price falls. The price of money here is how many goods and services it will buy. If the price of money falls, then it will buy fewer goods and services i.e. prices of goods and services rise and the value of money falls. This is inflation.

4. In practice, we might get bits of each.

How is Inflation Prevented?

As well as the activities of the MPC, there are other factors which make inflation more or less likely. Basically, inflation is rising prices, so anything that stops prices rising will make inflation less likely.

1. Competition. If there is a lot of competition in a market, businesses try harder to keep prices low to keep buyers.

2. Elasticity of demand. If goods are elastic, buyers will resist price rises. Elasticity is related to substitutability, so if there are plenty of substitutes, then buyers will simply switch spending away from the more expensive products. Imports are a kind of substitute. Competition leads to more choice, so this affects substitutes as well.

3. Elasticity of supply. If businesses can increase output without increasing costs, then price rises are less likely. For example, economies of scale make sellers keen to actually cut costs to expand output and sales.

4. If output rises, businesses buy more inputs, so we need to think of the elasticities of supply and demand in these markets as well, not just finished products. As businesses buy more inputs, these prices may stay much the same, or start to rise which puts up business costs. Wages are especially important because wages can be a very large business cost, and because the labour market isn't quite the same as the potato market.

5. Labour causes particular problems:

- Wages are 'sticky' downwards. If there are too many potatoes on the market, the price falls until buyers decide to buy again. But workers don't like wage cuts, and it is much easier to put the price of labour up than down, even if it might be a good idea. This gives us a rare benefit of inflation, because it cuts the real cost of wages (albeit slowly) while other prices are rising, so labour ends up being cheaper if this is what is needed eg unemployment is high.

- Skills shortages may develop in particular parts of the labour market. For example, two years ago there was a desperate shortage of IT workers due the dot.com boom. Wages for these workers rose sharply, and businesses even started 'poaching' each others' employees with ever-ritzier job offers. This puts up costs. Inevitably other groups of workers got jealous and began to press for rises which put up costs even more. At the same time there were pockets of high unemployment in the country because some workers are geographically immobile (they won't/can't move to where the jobs are) or occupationally immobile (they don't know how to do the new jobs) or both.

6. Efficiency. If costs rise there are two answers. Only one is to raise prices. The other is to become more efficient so unit costs fall and profits are restored. The more efficient businesses are, the less likely it is they will have to raise prices, and the less likely is inflation.

How do developed countries calculate inflation?

Most developed countries use the Consumer Price Index (CPI) to calculate inflation. CPI is a statistical time-series measure of a weighted average of prices of a specified set of goods and services purchased by consumers. It is a price index that tracks the prices of a specified basket of consumer goods and services, providing a measure of inflation.

CPI is a fixed quantity price index and considered by some a cost of living index. Under CPI, an index is scaled so that it is equal to 100 at a chosen point in time, so that all other values of the index are a percentage relative to this one.

Economists however say that it is high time India abandoned WPI and adopted CPI to calculate inflation. Most countries use the CPI as a measure of inflation, as this actually measures the increase in price that a consumer will ultimately have to pay for.

A research paper of prominent economists V Shunmugam and D G Prasad says that CPI is the official barometer of inflation in many countries such as the United States, the United Kingdom, Japan, France, Canada, Singapore and China. The governments there review the commodity basket of CPI every 4-5 years to factor in changes in consumption pattern. It pointed out that WPI does not properly measure the exact price rise an end-consumer will experience because, as the same suggests, it is at the wholesale level. The paper says the main problem with WPI calculation is that more than 100 out of the 435 commodities included in the Index have ceased to be important from the consumption point of view. Take, for example, a commodity like coarse grains that go into making of livestock feed. This commodity is insignificant, but continues to be considered while measuring inflation.

Nominal GDP Growth vs. Real GDP Growth

GDP or Gross Domestic Product is the value of all the goods and services produced in a country. The Nominal Gross Domestic Product measures the value of all the goods and services produced expressed in current prices. On the other hand, Real Gross Domestic Product measures the value of all the goods and services produced expressed in the prices of some base year. An example:

Suppose in the year 2000, the economy of a country produced Rs.100 billion worth of goods and services based on year 2000 prices. Since we're using 2000 as a basis year, the nominal and real GDP are the same. In the year 2001, the economy produced Rs.110B worth of goods and services based on year 2001 prices. Those same goods and services are instead valued at Rs.105B if year 2000 prices are used. Then:

Year 2000 Nominal GDP = $100B, Real GDP = $100B
Year 2001 Nominal GDP = $110B, Real GDP = $105B
Nominal GDP Growth Rate = 10%
Real GDP Growth Rate = 5%
Once again, if inflation is positive, then the Nominal GDP and Nominal GDP Growth Rate will be less than their nominal counterparts.

The GDP Deflator:

GDP Deflator is the GDP recalculated at the constant prices of the previous year. It is calculated by dividing the GDP to the current prices. The GDP deflator shows how much a change in the base year s GDP relies upon changes in the price level. It is also known as the: GDP implicit price deflator. The GDP deflator can be depicted mathematically by this equation given below:

GDP deflator = (Nominal GDP / Real GDP)*100.

Nominal GDP: In a nominal GDP, inflation is not taken into account or consideration. It is evaluated on the basis of the current market price.

Real GDP: Real GDP is computed by taking the market price of some base year. By measuring t the nominal GDP of a base year price level 2 the real GDP is calculated. Real values are adjusted for different price level in a year.

By dividing the nominal GDP with GDP deflator, the real GDP is computed, and hence, deflates the nominal GDP. Actually, the difference between the deflator and a price index, like the CPI, is not huge. GDP deflator almost gives the accurate measurement of changing prices in the overall economy. Apart from GDP, unemployment is another important variable that help us track the performance of an economy.

Unemployment rate: broadly speaking it is the percentage of the labour force that is willing to work at current levels of wages but is unable to find work. In the US, the Census Bureau computes monthly unemployment rates based on a survey of 60,000 families. There are many types of unemployment, including:

Frictional unemployment: when a worker moves from one job to another, i.e. when a person is searching for a job. In microeconomic theory, asymmetric information is seen as a primary cause for high rates of frictional unemployment in the job market.
Classical unemployment: unemployment that occurs because of strong unions and prevailing minimum wage laws.
Structural unemployment: this occurs because of a mismatch of jobs between what firms want and what the labour force has to offer. This includes factors like geographical location and skills.
Seasonal unemployment: occurs when employment is not available during certain seasons.
Cyclical or Keynesian unemployment: occurs due a deficiency in aggregate demand. This is caused by recession in the economy and the wage level not being able to adjust to ensure full employment. Cyclical unemployment is the main focus of short-run macroeconomic analysis.

Open unemployment is not a true indicator of the gravity of the unemployment problem in an economy such as India, characterized as it is by large-scale underemployment and poor employment quality in the unorganized sector, which accounts for over 90 per cent of the total employment. The organized sector contributes only about 9 per cent to the total employment.

Underemployment in various segments of the labour force is quite high. For instance, though open unemployment was only 2 per cent in 1993-94, the incidence of under-employment and unemployment taken together was as much as 10 per cent that year. This is in spite of the fact that the incidence of underemployment was reduced substantially in the decade ending 1993-94.

Though statistical data is not easily available for different types of unemployment in India, we still cannot ignore the fact that recessionary trends in the economy may cause significant increases in cyclical unemployment. Short-run policy responses are therefore important. In the longer-run it is growth in GDP that would have a positive impact on chronic unemployment rates including underemployment.