The Phillips Curve Analysis: Tradeoff between Inflation & Unemployment

The AD-AS model focuses on the relationship between the price level & RGDP. However, we know that the level of RGDP being produced in an economy has a direct relation to its employment level (since labor has to be employed to produce output). So, it should be possible to relate the inflation & unemployment rates directly. This is done in the Phillips curve framework, named after the economist who popularized it (the New Zealand economist A.W. Phillips).

There are two time horizons for the Phillips curve analysis: The Short & the Long Run.

The Short Run Phillips Curve

Definition: The short run Phillips curve shows the tradeoff between inflation and unemployment, holding constant two factors:

1. The expected inflation rate
2. The natural unemployment rate

Digression:

The natural unemployment rate (Definition): It is the unemployment rate present in the economy even when it is at the full employment potential output level.

The natural rate of unemployment occurs because of:

Job search: By individuals who are in the process of looking for vacancies that exist in the economy but have not been discovered by the searchers, or by individuals who leave their current jobs looking for more suitable ones.

Job rationing: Firms sometimes pay their workers more than the equilibrium level to maintain their efficiency (called the efficiency wage, it keeps the workforce at a permissible level of well-being). Sometimes minimum wage laws are set for the purposes of social justice by governments. But both these causes lead to some amount of unemployment in the economy, as the wage rate departs from its equilibrium rate.

The natural rate of unemployment is affected by factors like:

1. Demographic change: A larger working population means that the job search process becomes more complicated. Also, changing family patterns leading to multiple-worker families may allow workers from any single family to take more...
time to find their most satisfactory job, as in the meantime they can be dependent on the other working members.

2. Unemployment compensation: higher unemployment compensation means that more people may just prefer to live on this compensation than work at the going wage rate.

3. Structural changes: Development and obsolescence of industries over time means that workers are retrenched, need to be retrained, and might need to relocate. This contributes to the natural unemployment rate.

Coming back to our discussion of the Phillips curve:

The diagram of the Phillips curve is seen in Fig 1.of the class notes (or Fig. 14.8, Parkin, Ch. 14, page 342).

Let the expected inflation rate (kept constant when drawing the short run PC) be 10% per year, and the natural rate of unemployment 6% (also constant). Point A in the diagram corresponds to these two rates. The point given by the combination of the expected inflation rate & the NRU (point A in this case), will always lie on the Phillips curve. Whenever actual rate of inflation deviates from its expected rate, unemployment will deviate from its natural rate (as in points B & C in fig.1, when the actual inflation rate is above/below the expected rate and unemployment is below/above its natural rate, respectively). Thus, we see that there is an inverse relationship between actual inflation & unemployment rates.

We shall now connect the Phillips curve analysis with the AD-AS analysis.

See Fig. 2 of class notes (or Fig. 14.9, Parkin, Ch. 14, page 343).

We start out from full employment equilibrium, with the intersection of AD 0, SAS 0 and the LAS. Suppose demand is expected to increase to AD 1 (causing inflation), and this evokes a supply response (through a hike in money wage contracts) and the short run supply curve shifts backwards to SAS 1. If demand actually increases to AD 1, then we have unemployment rate at its natural rate (since output remains at its potential level), and inflation rate at the expected rate. This corresponds to point A in the Phillips curve seen earlier.

Suppose though, the demand level stayed the same at AD 0 & hence the expected inflation did not occur. Then we would have actual inflation less than the expected rate,
but employment below its natural rate too. This corresponds to point C on the Phillips curve in Fig. 1. Likewise, a shift greater than what is expected to AD 2 raises actual inflation above the expected rate & the employment above its natural rate. This corresponds to point B on the Phillips curve.

So the employment rate is greater/equal/lesser than (to) the NRU as the actual rate of inflation is lesser/equal/greater than (to) the expected rate of inflation.

Note: This might seem confusing, but remember that inflation is a cause of demand increases in this case. So lower demand will mean less equilibrium output and hence lower employment, though we would have a lower level of inflation because of a lower level of demand.

**The Long Run Phillips Curve**

Definition: The long run Phillips curve shows the relationship between inflation & unemployment when the actual inflation rate equals the expected inflation rate.

The long run PC is a vertical line at the natural unemployment rate. So, in the LR we assume that expectations are always correct.

Recall that if inflation is always expected, then both supply and demand curves will shift such that the equilibrium is always at the potential level of output, though the price level will be different.

Fig. 3. (See class notes)

So, changes in expected inflation rates over the long run would shift the short run Phillips curve (since the expected inflation rate was kept constant while drawing the SRPC), with the intersection of the different SRPCs & LRPC occurring at the different expected inflation rates for different time periods. We can think of the LRPC as the line drawn by joining the different combinations of the NRU & expected inflation levels for different SRPCs. As the NRU is fixed, but the expected inflation rate changes, we can intuitively see that the LRPC must be a vertical straight line at the NRU.

(See Fig. 14.10, page 345)

**Changes in the natural rate of unemployment (NRU)**

If changes occur to the natural rate of unemployment between two periods (due to any of the factors discussed earlier), then we have shifts of both the SRPC & the LRPC. The intersection points of the SRPC & LRPC for a certain period would occur at the natural
rate of unemployment for the period, and the expected inflation rate (which does not change in this case, as we are considering a change in the NRU only). Since the LRPC is vertical at the NRU, it is not surprising that it shifts for a change in the NRU. The SRPC was drawn keeping the NRU constant, so it is also intuitive that it would shift for a change in the NRU.

(See Fig. 14.11, page 345)

**Inflation & Interest Rates**

There are two kinds of interest rates: The real rate of interest, and the nominal rate of interest.

Real rate of interest = Nominal rate – Inflation rate.

The real interest rate is determined in the capital market by the interaction of demand of capital for investment & supply of capital through savings. It is the price that clears the market where investment borrowing & the lending of such funds occur (capital market). Now, for a higher inflation rate, investors are willing to pay a higher nominal rate for funds (by the amount of higher inflation) that they borrow from savers (lenders) since in reality they are not paying them more than the real rate they were paying before (as the value of the money they return has gone down due to inflation).

*Note:* The real interest rate is determined in the capital market & the nominal interest rate in the money market. But also note that the savings of an economy can either be held as money, or loaned out as capital: but not both at the same time. So there is a link between the demand for money & the supply of capital. For a certain capital market clearing real interest rate, the supply of funds loaned in the capital market affects money demand (since economic agents would not be able to hold money, as well as lend out the same money in the capital market at the same time). This in turn affects the nominal interest rate that would clear the money market. Thus, we see there is a connection between the money and capital markets. That is why we have the above-mentioned relationship between the nominal & real interest rate.