MONETARY THEORY AND POLICY-WEEK 3

ANALYSIS OF TRADE-OFFS IN MONETARY POLICY

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WEEK 3-ANALYSIS OF TRADE-OFFS IN MONETARY POLICY

The analysis of trade-off in monetary Policy can be discussed in the trade-off of the following-

1. Phillip's curve
2. Freidman/Phelps analysis
3. Taylor's rule

They are discussed below:

1. PHILLIPS CURVE

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

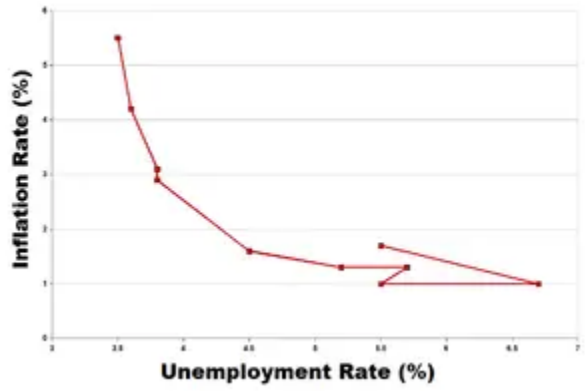
This implies that policymakers must choose between setting the unemployment rate or inflation first. Phillips curve study revealed there was a trade-off throughout the 1950s and 1960s, and policymakers may try to affect the rate of economic growth and inflation by using demand management (fiscal and monetary policy). In the case of high unemployment and low inflation, for instance, authorities could boost aggregate demand. Although it would increase inflation, this would aid in lowering unemployment.

The Phillips curve appeared to break down during the stagflation of the 1970s (higher unemployment and higher inflation). Monetarist economists who maintained that there was no long-term trade-off between unemployment and inflation challenged the Phillips Curve. Some economists believe that the Phillips Curve is still relevant and that policymakers should still consider any potential trade-offs between inflation and unemployment.

Origins of the Phillips Curve

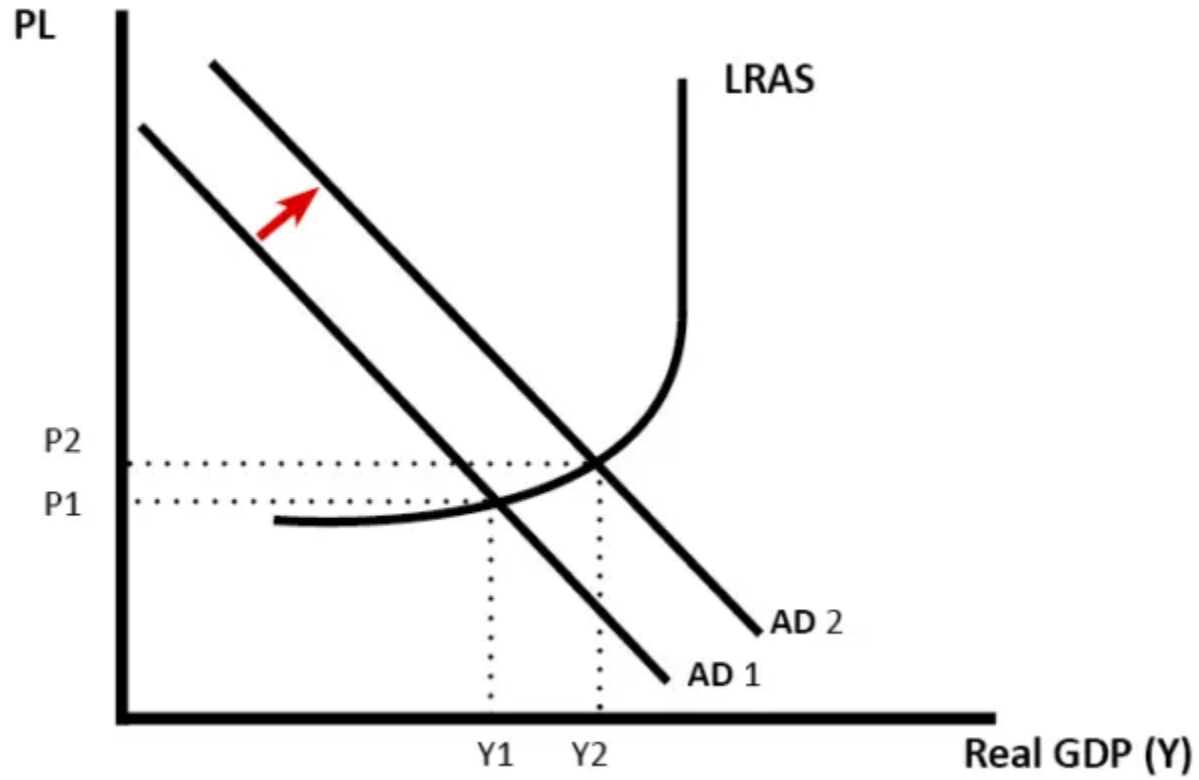
The Phillips curve was developed as a result of research contrasting wage growth and unemployment. A.W. Phillips' research in The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom 1861-1957 found an inverse relationship between the two variables. For instance, lower wage growth was linked to rising unemployment and vice versa.

Original Phillips Curve Diagram



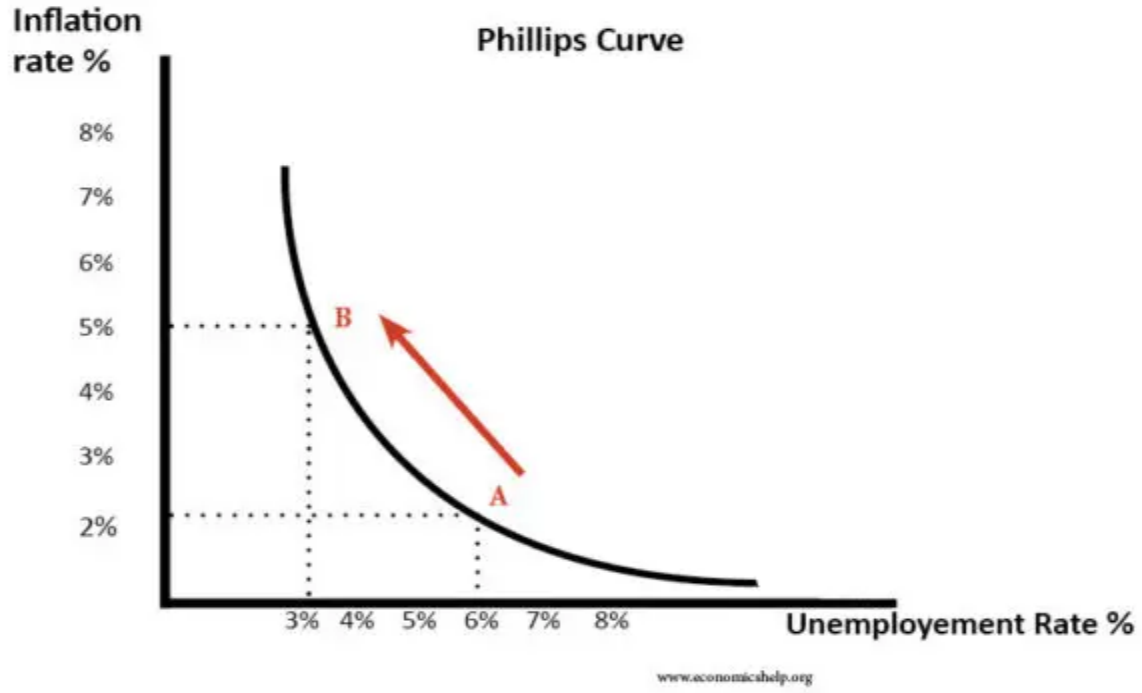
Later, this research was expanded to investigate the relationship between unemployment and inflation. Similar evidence of an inverse trade-off between unemployment and inflation was found in the 1950s and 1960s.

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



An increase in aggregate demand (AD1 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



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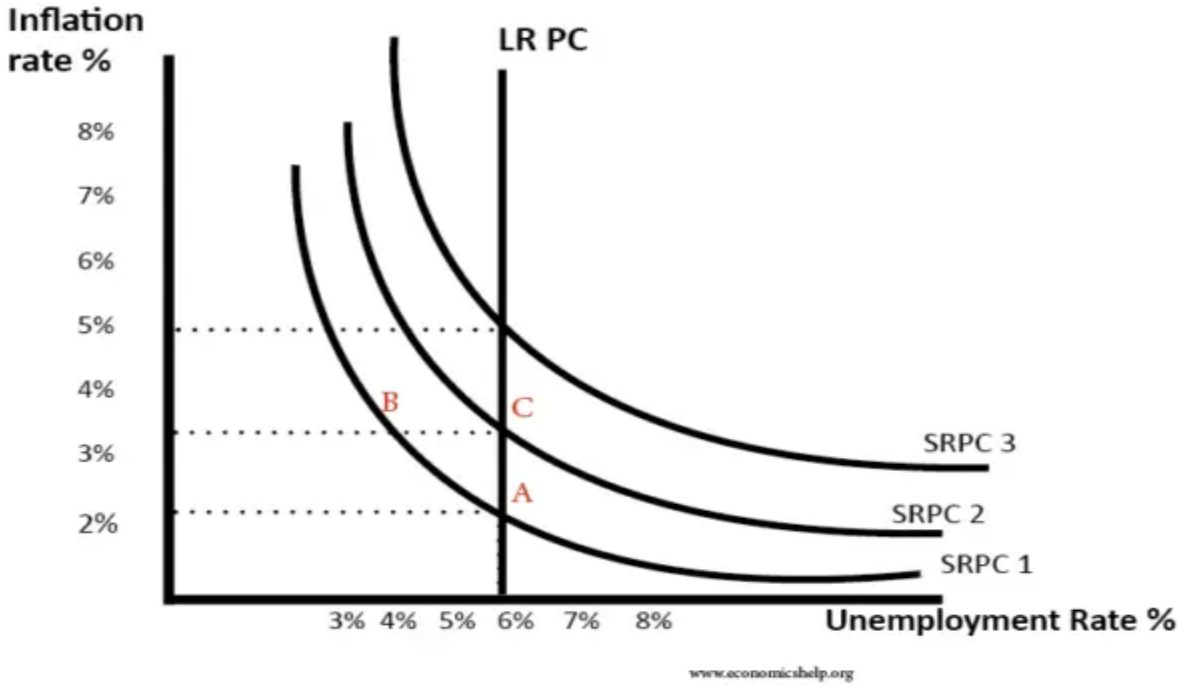
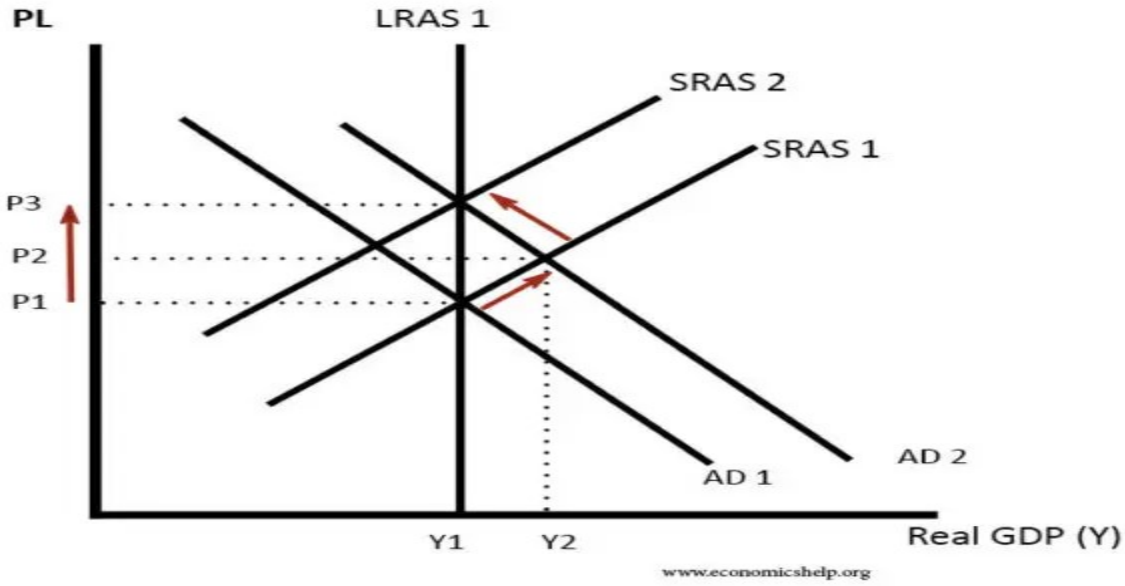
However, Monetarists have always been critical of this Phillips curve trade-off. They argue that in the long run there is no trade-off as Long Run AS is inelastic. Monetarists argue that if there is an increase in aggregate demand, then workers demand higher nominal wages. When they receive higher nominal 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

Phillips-curve-monetarist-long-run



Monetarist view of AD / AS



The increase in AD only causes a temporary increase in real output to Y1. After inflation expectations increase, SRAS shifts to the left (SRAS2), and we end up with higher inflation (P3) and output of Y1. This AD/AS model explains why we only get a temporary fall in unemployment.

Adaptive expectations monetarists argue that the trade-off between unemployment and inflation only exists in the short run.

There is no trade-off, even in the short run, according to rational expectation monetarists. According to the rational expectation model, workers anticipate that real wages will remain unchanged because they perceive an increase in AD as an inflationary force.

Summary of Monetarist v Keynesian view

A monetarist would argue unemployment is a supply-side phenomenon. 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).

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 about whether this policy is valid in 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 is 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 policymakers 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.

2. THE FRIEDMAN-PHELPS MODEL

With the existence of stagflation, new economic models appeared during 1970s. M. Friedman and E.S. Phelps sought to explain the phenomenon of stagflation (or the

instability of the Phillips curve) in terms of inflationary expectations; changes in inflationary expectations cause shifts in the Phillips curve.

According to the Friedman-Phelps model, the Phillips curve is wrongly specified because it is the real wage, and not money wage, that responds to the excess labour demand. The Phillips curve trade-off between money wage inflation and unemployment can exist only temporarily so long as the buyers and sellers of labour are fooled, i.e., so long as they both confuse money wages with real wages and do not correctly anticipate the inflation rate.

In other words, changes in money wage rates can offset the rate of unemployment only in the short run because it is only in the short run that employers and labourers confuse money wage changes with real wage changes and thus wrongly interpret inflation.

For example, because of an expansionary monetary policy, an economy experiences price and wage inflation. This increase in money wages will be incorrectly interpreted by the producers as a reduction in the real wages and by the labourers as an increase in real wages.

The short-run effect will therefore be an increase in both employment and the rate of inflation. It appears that the Phillips curve prediction is true i.e., inflation has led to a reduction in unemployment. But this is only a temporary phase.

Eventually, the producers and the labourers will correctly learn about the higher rate of inflation. They will both incorporate this correct expectation into new labour contracts and the unemployment rate will return to its old natural level. Thus, there is no long-run trade-off between inflation and unemployment. The Friedman-Phelps model can be

summarised in the following equation system:

$$\dot{w}_t = f(u_t) + \propto \dot{p}_t^e \quad \ldots(1)$$

$$\dot{p}_t = \dot{w}_t \quad \ldots(2)$$

$$\dot{p}_t^e = \dot{p}_{t-1} \quad \ldots(3)$$

where w_t is the current rate of wage inflation ; $\dot{p}_t$ is the current rate of price inflation; and u_t is the current rate of unemployment.

(*i*) Equation (1), which is known as the expectation-augmented Phillips curve, shows that the rate of change of money wage is equal to some function ($f(u_t)$) of the current rate of unemployment (*i.e.*, the original Phillips curve relation) plus some proportion (α) of the expected rate of change in price inflation. The original Phillips curve analysis assumes the value of $\propto$ as zero, implying no allowance for expected inflation, while the Friedman-Phelps model assumes its value as one, implying a full allowance for expected inflation.

(*ii*) Equation (2) says that assuming zero productivity ($\dot{x}_t$), the rate of price inflation ($\dot{p}_t$) will be equal to the rate of wage, inflation ($\dot{w}_t$) and the equation $\dot{p}_t = \dot{w}_t - \dot{x}_t$ becomes $\dot{p}_t = \dot{w}_t$.

(*iii*) Equation (3) represents that the expected rate of price inflation in period (t) is equal to the actual rate of inflation that occured in period (t-1).

Thus, assuming that the rate of price inflation is equal to the rate of wage inflation, and that neither producers nor labourers suffer from money illusion, i.e., both correctly anticipate inflation, the Friedman- Phelps model implies- (a) that the anticipated changes in the price level will be fully incorporated into money wage contracts and (b) that, as a consequence, the rate of change of money wages will be a function of both the unemployment rate and the anticipated rate of prices.

Figure 10, which provides a graphic representation of Friedman-Phelps model, distinguishes between the short run and long run effects of unanticipated inflation. It is assumed that the natural, long run level of unemployment is un. '5 per cent' Phillips curve shows the inverse short run relationship between actual inflation and unemployment when employers and employees anticipate an annual inflation rate at 5 per cent.

Along this curve, a temporary trade-off between inflation and unemployed exists because the actual rate of inflation differs from the anticipated rate and the employers and employees are fooled.

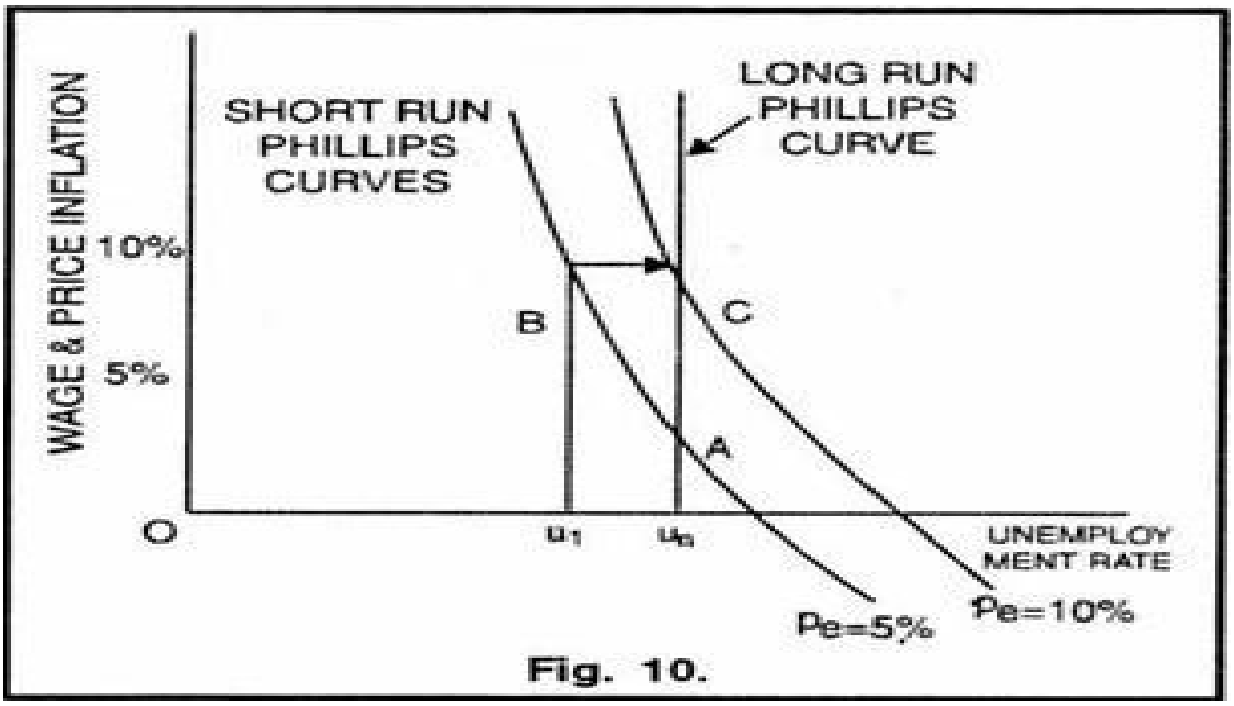


Fig. 10.

To start with, the economy is at point A, where the employers and employees correctly anticipate the 5 per cent rate of inflation and the unemployment rate is at its natural rate u„. Suppose that the unemployment rate is considered very high and an inflation rate of 10 per cent per annum is generated through a combination of monetary and fiscal measures.

If this new inflation rate is unanticipated by the employers and labourers, the economy will move from point A to point B and the unemployment will fall to u1. It appears that a 5 per cent point increase in inflation has been traded off for a decrease in unemployment rate from un to u1.

Eventually, both employers and labourers will realise that the actual inflation rate is 10 per cent per annum. New labour contracts will take this realisation into account and the unemployment rate will return to the natural level (5 per cent) and the economy moves from point B to point C.

Point C lies on '10 per cent' Phillips curve and at this point the actual rate of inflation (10 per cent) is correctly anticipated. Now, if unemployment is to be reduced, a still higher unanticipated rate of inflation is required.

Point A and point C are the points on the long run Phillips curve. Long run Phillips curve can be derived by finding the unemployment rate when the inflation rate is correctly anticipated. The long run Phillips curve is vertical and its position is determined by the natural rate of unemployment.

In this long run, there is no trade-off between inflation and unemployment. Thus, the Friedman-Phelps model can explain the existence of (a) short run Phillips curve and (b) a long run Phillips curve based on a set of shifting, unstable Phillips curves.

The policy implication of the Friedman-Phelps model is that monetary policy (or fiscal policy) can affect employment and output in the short run because these policies can fool the people, i.e., can lead people to make errors in anticipating inflation, in the short run.

But, in the long run, these policies will become ineffective because, in the long run, employers and employees will fully and correctly anticipate the inflation rate and as a consequence, unemployment will return to its natural rate.

Natural Rate of Unemployment

Friedman-Phelps model is based on the notion of natural rate of unemployment. It is the rate of unemployment to which the economy returns in the long run after the stabilisation policies are correctly anticipated by the people.

The natural rate of unemployment consists of two kinds of unemployment:

(i) Frictional unemployment or the type of unemployment experienced by people who are between steady jobs.

(ii) Unemployment due to rigidities in the economic system and its interferences with labour mobility or wage rate changes.

Various rigidities and interferences are:

(a) Union activity which restricts supply of labour.

(b) Licensing arrangements granted by regulatory agencies.

(c) Minimum wages laws and

(d) Welfare system that reduces incentives to work.

According to Friedman, stabilising policy can affect only frictional unemployment and that also temporarily by fooling the buyers and sellers of labour. Phillips curve trade-off simply represents a temporary change in the frictional unemployment.

Criticisms of the Friedman-Phelps model

The model has been criticized on the following grounds:

1. Persistence of Unemployment

Friedman-Phelps model fails to provide proper explanation for the persistence of unemployment at levels either above or below the equilibrium or natural rate. According to this model, unemployment persistence is caused by delays in the flow of information generated endogenously in the model by the inflationary or deflationary surprises.

However, the delay is not generated endogenously by the model and its length is a matter of judgment. Thus, it is difficult to test how much of the observed variance in unemployment can be attributed to inflationary or deflationary surprises.

2. Degree of Adjustment to Inflation

Friedman-Phelps model depends crucially on a specific assumption regarding the degree of adjustment of expected inflation to actual inflation (or the value of $\propto$ in the model).

There are three possibilities

(i) α in the model can take the value unity, which implies that expected inflation is fully incorporated into current wage changes, so that there is absence of money illusion; there is no trade-off between inflation and unemployment in the long run and the Phillips curve is vertical.

(ii) If, on the other extreme, α takes the value zero, then Phillips' original formulation is correct which means that there is only one negatively sloping Phillips curve regardless of price expectations; inflation-unemployment trade-off exists and workers have money illusion.

(iii) In between these two extreme cases is the situation in which $0 < \infty < 1$, which means that there is partial but not complete compensation for anticipated inflation. This case implies that there is a long-run Phillips curve which, although more steeply sloped than the short-run ones, is not vertical; there is some trade-off between inflation and unemployment, and workers have money illusion even in the long-run.

Friedman-Phelps model, with its prediction that there is no inflation-unemployment trade-off in the long- run, is based on the assumption of $\alpha = 1$ (i.e., first possibility) and ignores the other possibilities (i.e., second and third).

3. Empirical Evidence

What is the actual value of α in the actual world is an empirical question. Majority of the research studies have shown that α falls in the range between 0.3 to 0.8, implying the existence of a negatively sloping long-run Phillips curve. Such findings suggest that, while people are rational and do adjust to inflation, they are subject to some degree of money illusion and do not therefore fully adjust to inflation.

4. Implication about Money Illusion

Even if the degree of adjustment to inflation (value of α) is significantly less than unity or nearly zero, this need not necessarily imply the presence of money illusion. In case where the wage is determined by collective bargaining, the workers may, for some reason, be prevented from fully incorporating their inflationary expectations into money wage settlements.

It has been argued that the transactions costs involved in continuously adjusting the real wage under inflationary conditions may be sufficiently high to discourage complete adjustment for expected inflation.

5. Formation of Expectations Criticized

Friedman-Phelps model assumes that expectations are generated according to the adaptive expectations mechanism which implies that current expectations are equal to the weighted average of past rates of inflation.

This assumption has been challenged by the recent development of the concept of rational expectations, according to which expectations are formed rationally based on an economic model of the determination of the variable in question, rather than based on weighted average of past values of the variable.

6. **Rational Expectations Hypothesis:**

Friedman-Phelps, model maintains that monetary policy can affect real variables like employment and output only in the short run, because people can be fooled only in the short run, and not in the long run. According to the rational expectations hypothesis, the stabilisation policies cannot systematically fool people.

For example, monetary policy cannot lead people to wrongly estimate the rate of inflation; some will underestimate, and others will overestimate. This implies that the stabilisation policy cannot systematically influence employment and output even in the short run.

7. Vague Concept of Natural Rate of Unemployment

The concept of natural rate of unemployment on which the Friedman-Phelps model is based has been criticised on the ground that it is a vague concept. It has not been defined in specific terms.

Tobin suggested a compromise between the negatively sloping and vertical Phillips curves. His modified Phillips curve is vertical at low levels of unemployment and becomes negatively sloping at relatively high levels of unemployment.

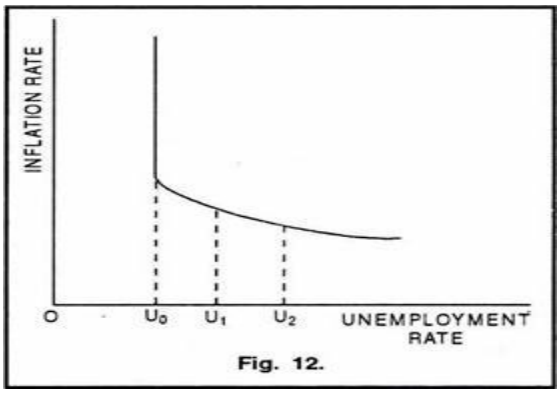


Fig. 12.

The vertical portion of the Phillips curve at U0 level of unemployment indicates that there exists no trade-off between inflation and unemployment. The negatively sloping portion of the Phillips curve beyond U0 level of unemployment indicates that there exists a trade-off between inflation and unemployment at higher levels of unemployment.

It means that at higher levels of unemployment increasing inflation will reduce unemployment (from U2 to U1 and to U0). This might be due to the downward stickily nature of wages; workers resist a decline in the wages. At U0 level of unemployment, the curve becomes vertical.

This implies that as unemployment falls to U0, the tradeoff between inflation and unemployment disappears, implying that changes in the rate of inflation no longer affect the level of unemployment. At very low levels of unemployment, further employment may not be provided because of imperfections of labour market.

Conclusion:

Broad conclusions of the Friedman-Phelps model of stagflation are given below:

(i) The phenomenon of stagflation (or the instability of the Phillips curve) has been explained in terms of inflationary expectations. In other words, change in inflationary expectations cause shifts in the Phillips.

(ii) The problem of stagflation cannot be solved by adopting a stabilization policy.

(iii) Demand-management (monetary and fiscal) policies should be aimed at achieving stable and lower inflation, and not at reducing unemployment rate.

(iv) Supply-side policies, such as changes in the tax structure to improve incentives to work and return to investment, may be more successful in increasing employment.

3. TAYLOR'S RULE

In economics, the Taylor rule helps central banks determine how interest rates should be changed to promote economic growth. Explore the definition, formula, and examples for the Taylor Rule in economics, learn the formula for the rule, and recognize its benefits and limitations.

Definition and importance of the Taylor Rule

The Taylor rule, created by John Taylor, an economist at Stanford University, is a principle used in the management of interest rates. For example, central banks use the rule to make estimates of ideal short-term interest rates when there is an inflation rate that does not match the expected inflation rate. A central bank is a national bank that oversees a country's commercial or governmental banking system, such as the Federal Reserve System. It may also distribute currency or oversee monetary policies.

It is also useful when the expected gross domestic product (GDP) is different from the actual GDP growth in the long term. The GDP is the total cost of products and services delivered by an individual country in one year.

The main aim of the Taylor rule is to bring stability to the economy for the near term, while still sustaining long-term expansion.

Taylor's rule guiding principles.

The Taylor rule is based upon three factors:

(i) The targeted rate of inflation in relation to the actual inflation rates.

(ii) The real levels of employment, as opposed to full employment.

(iii) An interest rate consistent with full employment in the short term

According to the rule, central banks should increase short-term interest rates when one or both of the following occurs: the expected inflation rate exceeds the target inflation rate, or the anticipated GDP rate of growth exceeds its long-term rate of growth. Conversely, when inflation rates and GDP growth rates are below what was expected, interest rates are expected to decrease.

Formula for the Taylor Rule

Below is a simple formula used to calculate appropriate interest rates according to the Taylor rule:

Target Rate = Neutral rate + 0.5 (GDPe - GDPt) + 0.5 * (Ie - It).

This formula is broken down below to explore what each one of the terms means:

Target rate: the interest rate that the central bank should target in the short term.

Neutral rate: the current short-term interest rate when the differences found among actual and expected inflation and GDP growth rates are equal to zero.

GDPe: expected GDP growth rate

GDPt: long-term GDP growth rate

Ie: expected inflation rate

It: target inflation rate

How Does the Formula Work?

Taylor rule calculators are available online. However, we explore with the example below and calculate manually.

Application of Taylors formula

We will use the following variables:

Long-term GDP growth rate of 2.5%

An annual GDP growth rate of 3% during the first two months

An expected rate of inflation of 4%

Plugging in the above variables into the target rate formula we get,

Target short-term interest rate = 4% + 0.5 * (3% - 2.5%) + 0.5 * (4% - 2%) = 5.25%.

When compared to the targeted rates, the increased rate of inflation and the anticipated growth in GDP has made it necessary to increase interest rates to cool down the economy.

Benefits and Limitations of the Taylor Rule

The Benefits

There are three major benefits to using the Taylor rule:

(i) It can provide a useful benchmark for policymakers. It relates policy setting systematically to the state of the economy in a way that, over time, will produce reasonably good outcomes on average.

(ii) The rule helps financial market participants form a baseline for expectations regarding the future course of monetary policy.

(iii) It is useful in the central bank's communication with the public. This is important for the transmission mechanism of monetary policy

The Limitations

1. The use of the Taylor rule requires that a single measure of inflation be used to obtain the rule prescriptions. Other researchers have used the inflation measure based on the consumer price index (CPI). Over the past fifteen years, the Federal Reserve has emphasized the inflation rate as measured by changes in the price index for personal consumption expenditures (PCE).

2. The implementation of the Taylor rule and other related rules requires determining the level of the equilibrium real interest rate and the level of potential output; neither of them are observable variables, and both must be inferred from other information.

3. The formula is simple and uses a small number of variables. However the real economies are complex and cannot be fully analyzed by any small set of summary statistics.

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