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THEORETICAL RELATIONSHIP BETWEEN INFLATION AND UNEMPLOYMENT: A MACRO STUDY

Pratinidhi[1] & NMP Verma[2]

[1]Research Scholar, Department of Economics, Babasaheb Bhimrao Ambedkar University, Lucknow, India

[2]Professor, Department of Economics, Babasaheb Bhimrao Ambedkar University, Lucknow, India

ABSTRACT

Inflation and unemployment are crucial variables for fluctuation in an economy and this relationship between inflation and unemployment are very debatable and frequently used in macroeconomics. We can see this relationship by the Phillips curve theory. It is the most pertinent tool for policy makers to frame policies for an economy. Phillips curve is particularly relevant to the Central Bank actions. You may have noticed that many financial publications talk about central banks' attempts to boost or slow the pace of economic activity, in other words, they are the expansions and contractions of money in the economy according to Phillps curve shape. Phillips curve theory established the relationship between rate of inflation and rate of unemployment. It shows inverse relationship between rate of inflation and rate of unemployment. Therefore, in this study, we explore the all-theoretical descriptions or details about the Phillips curve approach and in addition, examined the Phillips curve shape by the polynomial regression model and graphical presentation during 1991 to 2015 as well as it is also added to recent slowdown condition from 2018 Jan to 2019 October in Indian context.

KEYWORDS: *Descriptive, Inflation, Unemployment, Phillips Curve*

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INTRODUCTION

Macroeconomics studies the various aggregated dimensions of work in the geographical boundaries of a nation. It shows a very interesting branch within the economics discipline. The crucial economic activities are resource maintenance, production and generation of national output, distribution of produced output and the consumption of produced output ***(Verma, NMP, 2017).***The concept of inflation and unemployment are always debatable and current issues for economies whether developed or developing economies in the macroeconomic. It is a broad indicator or variable which describes the true picture of an economy such that it is going to boom, recession and equilibrium situational, though equilibrium situation is an imaginary picture. Most of the economy faces high or slow growth situation. These two variables are totally different concept where inflation is a monetary phenomenon. The issue of inflation continues to be a perennial problem in all economies. The problem of inflation has received more focused attention from the early 1970s. A continuous rise in the general price level over a long period of time has been the most common feature of both developed and developing economies; they have been facing the problem of rate of inflation (around 5 percent) even though the US economy was facing recession. Similarly, India, a fast developing nation growing at the rate of 9% per annum was also facing a high rate of inflation of 12% in the second half of 2008. This had severe economic, social and political consequences in the country, (***Deweidi, D. N, 2010, pp. 439***). Inflation affects both the Nation's economy and all the income groups of the society besides unleashing a host of social and economic disparities. While on the other hand, unemployment is the real phenomenon which relates to fiscal policy. The concept of Unemployment is one of the most visible indicators of economic action in a country. The rate of unemployment typically rises considerably during recessions and then falls as the economy recovers. Unemployment can make people economically deprived and socially marginalized besides retarding their standard of living. Hence, the media rightly publicizes high unemployment as a major social problem (***Jeffrey Parker, 2010***). The concept of Phillips curve describes how the relationship between inflation and unemployment and also their cause and effect relationship. Phillips curve is a most important or pertinent tool for policy makers to frame polices for an economy as well as it is very helpful for the growth and development of an economy. According to Philips curve shape, they are the expansion or contraction of liquidity in an economy. Nevertheless, time to time this theory has been modified by various concept or terms. Therefore, in this study, we explore all-theoretical descriptions or details about the Phillips curve approach and in addition, examined the Phillips curve shape by the polynomial regression model and graphical presentation during 1991 to 2015 as well as it is also added to recent slowdown condition from 2018 Jan to 2019 October in Indian context.

Inflation and Unemployment: A Phillips Curve Approach

In 1920s, an American Economist Irving Fisher noted that there was a Phillips curve relationship between Inflation and unemployment. However, the Phillips curve's original curve only described the behavior of Money wages. The concerns of the Phillips curve were mainly related to the policies of central bank and how it guided their initiatives to control inflation. We have noticed that many financial publications talks about central banks' endeavors to boost or slow the pace of an economic activity. This discussion also focuses on the impact of the central banks' activities on inflation illustration in a proposed contrary relationship between inflation and unemployment that is known as the *Phillips curve* theory. William Phillips, An New Zealand Economist wrote an paper in 1958 titled "***The Relation between Unemployment and The Rate of Change of Money Wage Rates in the United Kingdom***", 1861 to 1957, which was published in the Quarterly Journal Economics.

In this paper, A.W. Phillips described how he discovered an inverse relation between Money wage rate changes and Unemployment in the British economy over the stipulated time period. Phillips had found that there was an opposite relationship between the rate of change in the Money Wage Rate and The Rate of Unemployment. He presented this inverse relationship between the change in Money Wage Rate and The Rate of Unemployment in the form of a curve, called the Phillips Curve. Phillips established this curve through an empirical study which proved that there was an inverse relationship between the Rate of Unemployment and the Rate of increase in Money Wages.

This implies that Inflation reduces Unemployment. In addition, other economists found similar pattern. In 1960**,** ***Paul Samuelson and Robert Solow*** took Phillips work and made explicit link between Inflation and Unemployment. That is when Inflation is high, then Unemployment will be low and vice versa.

The general conclusion that is drawn from the Phillips empirical finding is that a rise in Money wage Rate reduces The Rate of Unemployment and a fall in Money wages increases The Rate of Unemployment. Besides, from a policy point of view, Phillips curve reveals that there exists a tradeoff between The Rate of Unemployment and The Rate of change in money wage rates, that is, a lower Rate of Unemployment can be achieved only by allowing Money wage rates to increase up to a certain level.

The Extension of the Phillips Curve

Although Phillips had traced the relation between the rate of change in money wages and the rate of unemployment, his analysis had been subsequently expanded to analyze the relationship between the rate of rising prices and the rate of unemployment. A plausible cause for this might be the fact that the trends in wages and prices were interlinked and travels in the same way. Under this interpretation of the curve, some economic experts have used the US data to verify the Phillips curve in the short run phases of different periods (***Dwivedi, D. N. Op. cit. Pp. 499***). For example Durnberg used US data for the period 1951-61, Dornbusch and Fisher for 1961 – 1969, Ackley for 1955-69, and Glahe for 1961-70. They all have found that Phillips curve relationship to be consistent with the US data in a short run. Their Philips curve shows a positive relationship between the rate of inflation and the rate of employment.

Modifications in the Phillips Curve theory

The Phillips curve short run phenomenon is only valid for a short run period. In the long run, Phillips curve keeps shifting up to the downward. For example, the subject fields which were held out on the foundation of US data for the decades 1060s, 1070s, and 1080s confirmed the existence of the Phillips curve only in a short run. The Phillips curve has found to be relevant only for 1960s, 1970s and late 1980s, might be at different rates of inflation and unemployment. Only when the entire unemployment and wage data for 1961-93 is plotted together, it brings out a Phillips curve that keeps switching up and down in the long run in a spiraling way (***Sameulson et al. 1994, pp. 588)***. Hence, it can be concluded that there exists either no relationship or a weak relationship between the rising prices and unemployment in the long run.

There are three ideologies on the Phillips curve which are: the ***Classical (Keynesian), Monetarist*** and the ***Neo-Classical.***

The Keynesian or the Classical Approach

Some of the traditional Keynesians followers like Lipsey, Samuelson, and Solow's belief were based on the concept of Static expectations. According to them, there are some other relations between inflation and unemployment, i.e., the Phillps curve is interpreted as a certain law or a certain dogma.

The Monetarists Approach

Monetarist economists such as Almund Phelps and Milton Friedmen criticized Keynesian views by the adaptive expectations. According to them, peoples' expectations are not static, it will change. People do not have money illusion. Their view varies according to their adaptive expectations based on the experience.

The Neo-classical Approach

Was headed by Lucas. Neo-classical approach used the term, rational expectations for criticizing the monetarist economists. They believed that inflation is based on present and future information that is available to the consumers. Hence, there is no short run or long run relationship that exists between the rate of inflation and the rate of unemployment.

Basis on the above ideologies we conclude that there is two possible explanation of Phillips curve approach such as short run relationship and long run relationship exists in economies.

Short Run Phillips Curve Theory

It provides the inverse relationship between inflation and unemployment rate as represented by Phillips curve is only a short-term relationship and unstable because it prevails for a limited period. Many economists continue to be intrigued by the reasons for fluctuations in the Phillips curve in the long run. ***Edmund Phelps and Milton Friedman*** attempted to address this pattern of the Phillips curve. Envisions are explicated in the ensuing section.

The Theory of Natural Rate of Unemployment: Milton Friedman

Milton Friedman integrated the logic of short run Phillips curves into the macroeconomic theory and explained the spiraling Phillips curve. In this process, he made a long run Phillips curve. Friedman began by showing graphically that the Phillips curve holds only in the short run. In the long run, he argues, there is always a rate of unemployment whatever the rate of inflation. This rate of unemployment, he calls as the ***Natural Rate of Unemployment***. The natural rate of unemployment was subsequently termed as the *"**Non- Accelerating- Inflation Rate of Unemployment**" **(NAIRU).*** A significant characteristic of the NAIRU is that it survives even when the labor market is realized and coherent with the potential level of turnout. Friedman argues that NAIRU cannot be eliminated permanently by means of expansionary monetary and fiscal policies of the government. The expansionary policies may simply speed up the pace of inflation and cause an upward shift in the Phillips curve showing a higher degree of unemployment and inflation rate. In the final analysis, the Phillips curve becomes a vertical line. This is the crux of Friedman's theory about the natural rate of unemployment (Friedman, M., 1968). In the long-run there is no inverse relationship between inflation and unemployment, there is a direct relationship between the pace of rising prices and the rate of unemployment. In this situation, Phillips curve slope becomes a vertical line.

Figure 1: Mechanism of the Effects of Inflation on Unemployment.

Source: *Authors' Compilation*

Figure 1 presents the mechanism of the effect of the rate of inflation on unemployment. The central bank of India, RBI takes periodic actions for price stability in an economy. The first step of central bank is to decrease the Repo rate and Bank rate. The Repo rate is a short-term instrument and the Bank rate is a long-term instrument for maintaining the price stability in the economy. If the RBI increases the repo rate, then it creates more liquidity in the economy. Due to this, the people have more money to purchase goods and to invest in services. This leads to increase in consumption, saving and investment in the economy. These variables create employment for people in the economy. This is a cause and effect relationship between the Rate of Inflation and Unemployment. Thus, inflation is a major cause for unemployment. The equation can be written like:

UNEM = F (I) Inflation

Inflation is an independent variable that has been denoted as (I) and unemployment is a dependent variable, denoted as (U). This is the cause and effect relationship.

What are the causes that change the rates of inflation and unemployment? How the price level and degree of unemployment related? These have been key questions plaguing economists for atleast forty years (***Marco et al. Pp. 1).*** The Phillips curve is the most useful approach for showing the link between the unemployment rate and the inflation rate. That is why the policymakers enlist the aid of the Phillips Curve Theory.

Phillips Curve Description on Business Cyclical Phases

The business cycle postulates the increase and decrease in production output of goods and services in an economy. Business cycles are generally measured using the increase and decrease in the real gross domestic product. Business cycles are the reasons of fluctuations in economic activity that an economy experiences over a period of time. There are four phases of business cycles such as:

Phases of Business Cycles

Expansion or Boom Period

This phase provides an increase in output and employment and also an increase in demand in the market, capital expenditure, sales and subsequently an increase in income and profits. As well as the production level will be at the maximum capacity. The unemployment rates will be zero with the exception of voluntary unemployment and frictional or structural employment.In this phase, both the prices and cost increase at a faster rate. However, generally, the public enjoy prosperity and a higher standard of living. The growth rate will eventually slows down as the economy approaches its peak.In this phase Phillips, curve shape is downward and negative slope. It describes the inverse relationship between inflation and unemployment.

Peak Point

In this phase, the output is at maximum and the involuntary unemployment is zero. As the economy goes through expansion their demands increases and so does their prices also. This indicates to an increase in the price of consumer goods as well. Income does not have a proportional increase. So, consumers have to review their expenses and cut back their consumption. Aggregate demand in the market will be stagnate. This will mark as the end of the expansion phase. The growth of the economy stabilizes at the peak for a short period. Then it goes in the reverse direction. In this phase, Phillips curve shape is constant. In this point we describe the concept of wage cumulative gap.

Contraction Period

At the peak of an economy, demand is stagnant. Then after that, demand starts falling in certain sections of the economy. This is the start of the contraction phase of the trade cycle, which is the opposite of the expansion phase. Investment levels and employment levels decrease along with the demand. There will be a mismatch between demand and supply in the market. Due to shortage of investment and demand, the producers become aware of the shift in the economy and they start disinvesting, scaling back operations, canceling orders for goods and labor. At this turning point in the economy, the prices of the goods also decrease. Income levels decreases that lead to fall in consumer spending as well. The outlook about the economy will be pessimistic and we will see a contraction in economic activities across all sectors. We call this as phase recession. In this phase, Phillips curve shape is flatter or horizontal or vertical shape about the condition of demand in the economy.

Depression Period

Is the lowest of the all phases of business cycles. It is a severe form of recession. In this phase, we can see a negative growth rate in the economy. There will be a continuous decrease in the demand. The companies that cannot dispose of their stocks will keep reducing their prices. Some companies will be forced to shut down due to mounting losses, this will adversely affect employment rates. Interest rate is at its lowest. After this phase, the economy will recover by additional investments, and then the business cycle will continue. In this phase Phillips curve shape is vertical with negative.

Graphical Presentation of Phillips Curve Shape in Context of Indian Economy from 1991 To 2015

We have drawn the Phillips curve using log-log model (algorithm) model to remove the variance of series, so, we have taken the log 10 after it has been plotted the Phillips curve slopes by the polynomial regression.

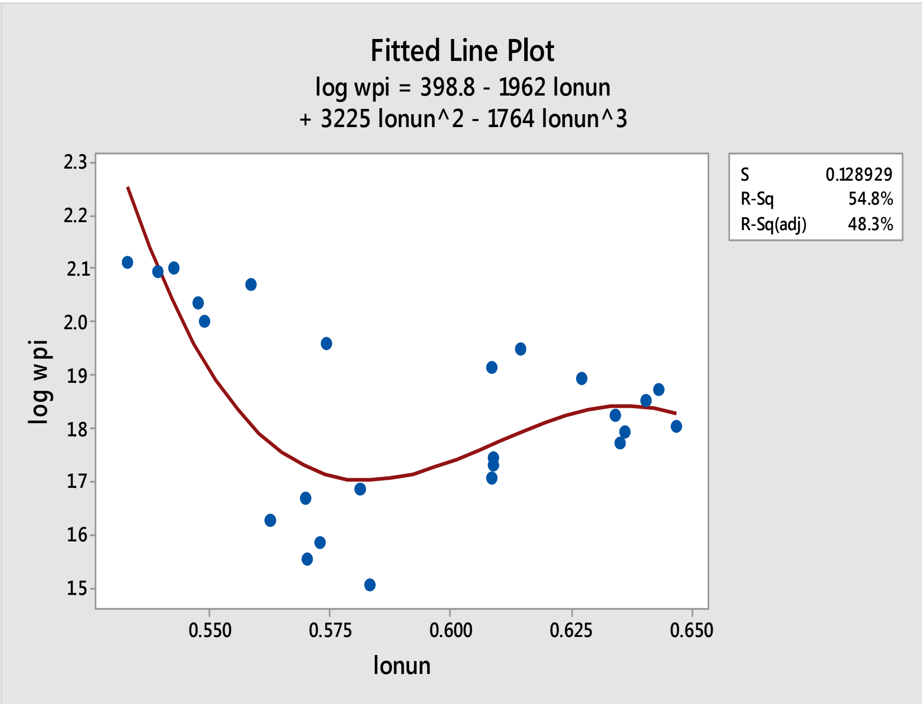

Figure 2: Phillips Curve Shape using Polynomial Regression Model.

Data Source: *The World Bank Dataset*

This figure 2 shows the inverse relationship between rate of inflation and rate of unemployment for some time, after that it shows the direct relationship between rate of inflation and rate of unemployment in the Indian context from

1991 to 2015, although we have found a uni-directional relationship among these variables and not a bi-directional relationship.

Graphical Presentation of Phillips Curve Shape in Context of Indian Economy from Jan-2018 to October-2019

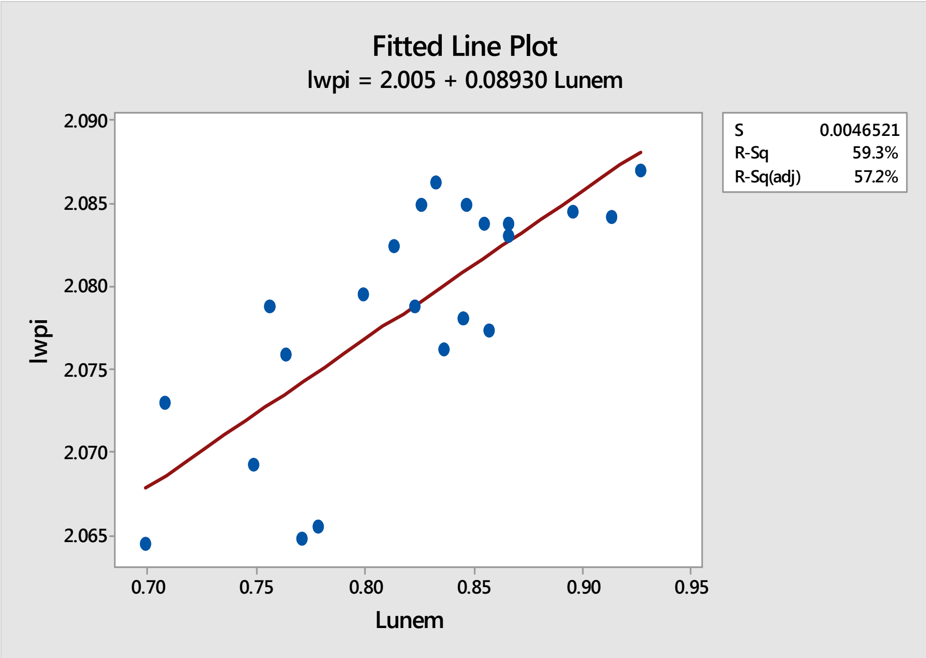

Figure 3: Phillips Curve Shape using Polynomial Regression Model.

Data Source: RBI & CMIE

This figure 3 shows that there is no short run or long run relationship between inflation and unemployment during this period of study because inflation is at high as well as Unemployemnt . Therefore, in the figure 3 we can see that there is a upward and flatter Phillips curve shape. This is a very concerning subject of the Indian economy

CONCLUSIONS OF THE STUDY

It is concluded in this study that there exists a short run or long run Phillips curve relationship from 1991 to 2015 in the Indian economy as shown in the graphical presentation of Phillips curve shape. We have mentioned few studies which are premised on the Phillps Curve, namely, Cyril A. Ogboko, (2005), Fumitaka and Furuoka (2007), Fumitaka Furuoka, Qaiser, Munir and Hanafiah, Harvey (2013) from other countries and Singh, B. K., et al. (2010), Singh, D. and Verma, NMP (2016)Kumar, M. and Vashist, D.C. (2012) from India. These studies had established similar results and supported that the Phillips Curve trade-off that still existed in the economies. However, we have talked about to recent economic slowdown situation in an Indian economy, and then we have found that there is no short run Phillips curve relationship exists from Jan 2018 to October 2019.

In addition, there are three ideologies on the Phillips curve theory such as the *classical (Keynesian), Monetarist* and *the Neo-Classical.* Which describes different ideas on Phillips curve approach and criticized own concept for example the classical economists occurs when there is an inverse relationship between inflation and unemployment. the monetarist economists occurs when there is an inverse relationship which exists in only the short term period but in the long run there is a direct relationship between inflation and unemployment due to adaptive expectations. The neo-classical approach occurs when that is kinked shape Phillips curve exists in the economy. The core issue is about how to strike a balance between inflation and unemployment, especially the Indian economy spirals downwards in its present GDP 5.0 % at Q1, FY, 2019-20 and dismally high unemployment record of 6.1% at FY 18 according to the latest surveys. Economists and policy makers can achieve this desired balance by drawing the concepts such as jawboning, wage guide post, wage freeze, tax linked wage policy and carrot and stick policy.

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