TRADEOFF BETWEEN INFLATION AND UNEMPLOYMENT

Is There Any Tradeoff Between Inflation And Unemployment? The Case of SAARC Countries

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ABSTRACT

The aim of this paper is to identify the relationship between inflation and unemployment in SAARC countries from the perspective of Phillips curve. Unbalanced annual panel data of 8 SAARC members (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) and 6 expected member of SAARC (Republic of China, Russia, Indonesia, Iran, Myanmar and South Africa) have been used for the period 1980-2010. This paper has found significant results; there is a negative relationship between inflation and unemployment rate in the SAARC Countries. Concept of Phillips curve holds true.

Keywords: Inflation, Unemployment, SAARC countries
1. INTRODUCTION

From few decades, it has remained hot debate among economists that whether it is possible to achieve two main macroeconomic goals, low inflation and low unemployment, in the particular economy at the same time? It’s remained one of challenge for developing countries to sustain low inflation at low unemployment rate. In this regard in 1960, the concept of Phillips curve emerged, named A W Phillips who is the pioneer of the Phillips curve in UK. This curve suggests negative relationship between the rate of inflation and unemployment. There are three assumption of Phillips curve; first one is, in short run, there is tradeoff between inflation and unemployment. Second, aggregate supply shock can break the concept of Phillips curve because it can cause both higher the rate of inflation and unemployment which is also known as stagflation. Third, in long run there is no significant tradeoff between inflation and unemployment. Therefore economists have best interest to identify their relationship; there is a short run tradeoff between the rate of inflation and unemployment, (McConnell, 16th ed).

In this regard it has been also seen in many studies that there is short run tradeoff between inflation and unemployment in different countries in different time periods. Though, the rate of low inflation and low unemployment are major economic goals. But it is not possible to achieve both economic goals (low inflation and low unemployment) simultaneously. Inflation is the function of monetary policy while unemployment is the function of fiscal policy. The aim of monetary policy is to control the level of inflation or to maintain the sustainable inflation in the economy by sacrificing employment. In contrast the goal of fiscal policy is to make low unemployment in the economy at any rate of inflation. Therefore, coordination among the policies is very important in order to maintain optimal level of tradeoff between inflation and
unemployment which is known as Natural rate of unemployment or some time it is also called
NAIRU (non accelerating inflation rate of unemployment).

NRU (natural rate of unemployment) determines Inflation in the long run, and an attempt to push
the economy below that rate of unemployment, sometimes it is also called the non-accelerating-
Inflation-rate-of-unemployment (NAIRU), would lead to increase in Inflation rates while an
unemployment rate is higher than that will cause deflation. But it has also been seen that supply
shocks (oil prices) or changes in the way workers and firms form expectations regarding future
inflation caused the breakdown of the Phillips curve. (Neugart, 2003). The concept of NAIRU
refers to maintain the consistent unemployment rate at constant rate of inflation, and if
unemployment deviates from the NAIRU then this deviation is associated with deviations of the
level of output from its potential level. Thus, hypothetically, if policy makers succeed in setting
the actual unemployment rate equal to the NAIRU then the economy will be producing at its
maximum level of output without inflationary pressure. (Mikael Apel, Empirical Economics
(1999)).

Basically, the term inflation refers to increase in overall price level of goods and services in the
economy which leads to decrease in the purchasing power of household. Because whenever
prices will increase, the value of money will be depreciated and ultimately the real income of
household will decrease. Usually it is assumed that increase in prices of goods and services are
just like decrease in income and vice versa. There are two types of inflation: demand pull
inflation and cost push inflation. Demand pull inflation is caused by increasing money supply
and excessive aggregate demand. In short run Increasing the supply of money leads to increase in
the rate of inflation because whenever fed goes towards expansionary monetary policy, they have
to increase the supply of money in the economy in order to boost up the economic activities that
can encourage the production of goods and services and also realize the need of labor workers in the economy which can reduce the unemployment rate from the economy, so in this scenario short run Phillips curve also holds and suggests that there is inflation-unemployment tradeoff, as it is mentioned in our literature review. Aggregate demand refers to the overall demand of the economy which is made by household, businesses and government. Whenever the aggregate demand exceeds from the aggregate supply, means the overall production is not sufficient to fulfill the existing needs of the customers in the economy, shortage will occur, which directs upward pressure in prices that is known as inflation. Whereas the costs push inflation is stimulated by supply shock and increasing cost of production. Increase in the cost of production reduces the aggregate supply of goods and services and that will lead to decrease in the real output and increase in unemployment. It is determinant of supply as well, if the cost of production is high, supply will be low and ultimately it will increase the rate of inflation at existing demand and vice versa. Supply shocks have also impact on inflation which had been seen in 1970 in USA when oil prices went up, the cost push inflation effects occurred and prices level increased rapidly. At that time unemployment also augmented, which caused breakdown of Phillips curve.

The definition of unemployment is that the condition in the economy when supply of labor exceeds the demand of labor in the labor market of the economy. Simply, a person who is willing to do the job but due to shortage of the jobs he or she could not find the job in the economy is known as unemployment. There are many types of unemployment likewise structural unemployment, cyclical unemployment, frictional unemployment and classical unemployment. Structural unemployment occurs due to globalization and technological advancement which replace the workers with the machinery that causes the layoffs in the economy. It is also caused
by mismatch of skills of workers from the underlying jobs. Cyclical unemployment is also known as Keynesian unemployment; it occurs when the aggregate demand of the economy is not sufficient to give the jobs to everyone who wants to work, because aggregate supply of goods and services exceed from the aggregate demand that can discourage the production and consequently it reduces the workers. Frictional unemployment occurs when the skills of the workers are mismatched with the underlying jobs, it is like a structural unemployment but it is short run in nature while structural unemployment has long lasting effect. Classical unemployment occurs when government set the wage rates above the equilibrium prices that cause labors to rush for the jobs in the labor market which exceeds from the existing vacancies.

As it has been seen, in many articles that there is short run Phillips curve tradeoff between inflation and unemployment in many different countries in different time periods. Therefore, from this paper concludes that most of the time short-run Phillips curve is hold in various countries in different periods of time. In short run there is inverse relationship of inflation with the unemployment, increase in inflation leads to decrease in unemployment and vice versa. That implicitly indicates that research should be conducted in SAARC countries in order to know whether there is a tradeoff between inflation and unemployment or not and if there is a tradeoff, then task will be to identify whether there is only short run Phillips curve tradeoff or long run Phillips curve tradeoff between inflation and unemployment.

The rest of the article is organized as follows. Section first, is the introduction. Section second, comprises on Literature review. Section third defines Phillips curve model. Section fourth reports on the data and presents the empirical results. Section five, comprises on interpretation of empirical results. The last section summarizes and draws some conclusions.
2. LITERATURE REVIEW

Immense number of researchers have conducted research on this topic; trade-off between inflation and unemployment. Some of those authors and their researches are mentioned in this paper.

Aguiar, and Martins (2005), Hassler and Neugart (2003), Aguiar, Meneul and Martinst (1997), they have argued that Phillips curve is linear and it is statistically significant. There is a tradeoff between inflation and unemployment, while non linearity has shown by Okun law but it is not significant that it should be granted.

Liu and Jansen (2010), they had argued that, the basic concept of traditional Phillips curve model holds that there is a tradeoff between inflation and real activity (unemployment), therefore, it is still used to forecast inflation. Berger (2010), they find that increase in cyclical unemployment will lead to decrease in output which ultimately causes to decrease in inflation. Lundborg and Sacklen (2006), argued that, ADP (Akerlof, Dickens and Perry) model says “low inflation may cause unemployment to persist at high level”. Michaelk also supported the tradeoff between unemployment and price shocks. They also suggested that monetary policy does not affect unemployment rate other than price shocks. N. Gregory Mankiw, said, short run tradeoff between inflation and unemployment still exist in economics, because all economists are agreed that monetary policy affect unemployment in short run and also estimates the inflation in long run.

Karanassou and Sala (2010) they argued that there is a tradeoff between inflation and unemployment in long run because of money and productivity growth which leads to decrease in unemployment, while supply shocks like oil prices which leads to increase in unemployment. In the case of 1970, monetary expansion led to increase in inflation and reduced the unemployment
which is very negligible, and slow down in productivity also led to increase in inflation and unemployment. While in 1990, loosing monetary policy led to increase inflation but decrease unemployment very significantly, and increase in productivity also led to decrease the rate of inflation and unemployment. Karanassou, Sala and Snower, they argued that increase in productivity growth causes decrease in inflation and also fall in unemployment. While expansionary monetary policy is responsible to increase in inflation and decrease in unemployment. Elimination of budget deficit also decreases the inflation and unemployment. While decline in trade deficit also led to decrease in inflation and unemployment.

Gambetti, and Pistoresi (2004), they found that technology has a positive relationship with labor productivity and wage rates. While negative shocks in interest rate will increase wage rates and decrease the unemployment, and positive shocks in aggregate demand will also decrease the unemployment, it give sense to those economy where unemployment is higher, to apply deregulation in their policies in order to reduce the unemployment. Lim, Dixon and Tsiaplias, they argued that if wage rigidities fall, unemployment will be reduced by equilibrium unemployment rates. There is timely measure of inflation and unemployment tradeoff. As they found that deviation of actual unemployment from equilibrium unemployment rates will produce inflationary pressure.

Bitros and Panas (2006), Christopoulos and Tsionas (2005), they argued that, there is unidirectional tradeoff between short-run inflation and total factor productivity. In the long-run there is bi-directional relation. There are also causalities on the basis of long-run and short-run. 1st unidirectional causality is identified in the long-run inflation to productivity growth. 2nd bi-directional causality is identified in the short-run but in five out of fifteen countries (Denmark, Germany, France, Italy and Portugal). Rossiter (1999), suggested that there are two ways
causality between inflation and employer cost of labor, because labor market is affected by expected inflation and future inflation expectation. Phillips curve has also shown output gap which represents the access demand when unemployment is below natural rate.

Antonio (2006), argued that when a country’s economic system faces recessions (downturns), Inflation and unemployment go in conflicting directions. And when the economy is smooth and prospers it demonstrates the upbeat relations, both move in same direction, they don’t go in a conflicting directions. D Hodge (2002), there is no short-run tradeoff between inflation and unemployment. In addition, another positive and significant relationship is identified that is between inflation and growth rate.

Mallick and Mohsin (2010), findings reveal that inflation, both in the short and long term, negatively affects consumption and investment, and has a positive impact on the current account. Johnson and Shipp (1999), they argued that tendency in distribution of income and consumption response the same way to changes in inflation and unemployment. Results also suggest that there is no significant effect of unemployment in measures of inequality while inflation has a significant effect, that a decrease in inflation will cause an increase in inequality.

Wolfgang Franz (2010), concluded that it is very hard to assess the NAIRU if the joint relationship of inflation, wage increases and unemployment get worse because NAIRU is the point where inflation is constant at consistent rate of unemployment. Apel and Jansson (1999), argued that Phillips curve equation also helps in precision of estimating the potential output and the NAIRU.
3. DATA AND METHODOLOGY

The data is taken from (World Bank) Unbalanced panel data is used over the phase 1980-2010, to check the relationship between levels of inflation and unemployment rate in SAARC countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.) and also those countries which are willing to become member of SAARC in future (Republic of China, Russia, Indonesia, Iran, Myanmar and South Africa). Unbalanced regression model is used with annualized data for all variables.

In this paper’s Model, dependent variable $I_{it}$ is Inflation rate; percentage rate change in price level. And the independent variables are $U_{it}$ is unemployment rate; share of labour force without work but available for and seeking unemployment, $R_{it}$ Real interest rate; it is the real cost of fund to the borrower and real interest yield to lender, nominal interest rate minus inflation rate, $DS_{it}$ is Debt servicing; amount needed over a given period of time to payback interest and principle on debt, ER is an Real effective exchange rate index; From the index of major currencies, a weighted average of any currency with the adjustment of inflation is taken , $GCF_{it}$ is a gross capital formation; net expenditure on the fixed assets added with net changes in the level of inventories of the economy, $(GCF \times R)_{it}$ is combined effect of gross capital formation and real interest rate, and $(\log(ER) \times U)_{it}$ is the interaction term. All These variables are taken in this paper in order to examine the Phillips curve for SAARC countries.

4. RESULTS

Results are mentioned in Table (1) that shows the impacts of unemployment and other variables over inflation rate. Table is assigned three columns, column (1), column (2) and column (3).
Each column is a separate regression equation and rows contain variables names, coefficients estimates and p-value.

\[ I_{it} = \beta_0 - \beta_1 U_{it} - \beta_2 R_{it} - \beta_3 DS_{it} - \beta_4 \log(ER)_{it} \beta_5 GCF_{it} + \beta_6 (GCF \times R)_{it} + \beta_7 (\log(ER) \times U)_{it} + e_{it} \]

**TABLE (1)**

<table>
<thead>
<tr>
<th>Regressor</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>19.86352**</td>
<td>41.94058***</td>
<td>56.76397***</td>
</tr>
<tr>
<td></td>
<td>(0.0393)</td>
<td>(0.0008)</td>
<td>(0.0000)</td>
</tr>
<tr>
<td>U</td>
<td>-0.09213</td>
<td>-0.800207**</td>
<td>-1.49172**</td>
</tr>
<tr>
<td></td>
<td>(0.9207)</td>
<td>(0.0234)</td>
<td>(0.0151)</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td>0.860893***</td>
<td>-2.44784***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0000)</td>
<td>(0.0035)</td>
</tr>
<tr>
<td>DS</td>
<td>-0.601696**</td>
<td>-0.47064</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0459)</td>
<td>(0.1144)</td>
<td></td>
</tr>
<tr>
<td>LOG(ER)</td>
<td></td>
<td></td>
<td>-3.82692*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.0544)</td>
</tr>
<tr>
<td>GCF</td>
<td>-0.799181***</td>
<td>-1.08867***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0099)</td>
<td>(0.0004)</td>
<td></td>
</tr>
<tr>
<td>GCF*R</td>
<td></td>
<td>0.140001***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>LOG(ER)*U</td>
<td></td>
<td>0.370373*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0911)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.000066</td>
<td>0.241341</td>
<td>0.360675</td>
</tr>
<tr>
<td>$R^2$</td>
<td>-0.0066</td>
<td>0.212162</td>
<td>0.316365</td>
</tr>
<tr>
<td>SER</td>
<td>76.29243</td>
<td>8.732508</td>
<td>17.35687</td>
</tr>
</tbody>
</table>

The regressions were estimated using panel data for 14 (8 SAARC and 6 future members of SAARC countries) countries (3780 observations total) described in table. P values are given in parenthesis under the coefficients. The individual coefficient is statistically significant at the *10% level, **5% level or ***1% significance level.

As this paper has already discussed the importance of inflation-unemployment tradeoff in SAARC countries because it plays an important role in economic policies formation and
implementation. Therefore, it is needed to know the tradeoff between inflation and unemployment in SAARC member countries. We have already calculated the results which are shown above in the table (1). Interpretation of the above mentioned results.

In table column (1) presents the results for the OLS regression of the rate of inflation on the unemployment; the estimated coefficient of the unemployment is negative and statistically insignificant. The next two regressions in table include additional potential determinants of the rate of inflation without time and state fixed effects. In column (2), including additional macroeconomic variables increase the estimated coefficient on the unemployment, relative to the regression in column (1). It is statistically significant.

Other macroeconomic variable in column (2), such as Real interest rate is statistically significant. The estimated coefficient of the Real interest is positive. High real interest rate is associated with high inflation in the economy. The estimated coefficient of the Debt service is negative. It is also statistically significant. It gives very interesting result which suggests that higher the debt associated with lower the inflation rate. Another macroeconomic variable such as gross capital formation is statistically significant as well. The estimated coefficient of the gross capital formation is negative. Higher GCF is associated with lower inflation rate. The regression $R^2$ increased significantly when additional variables are added. It shows that the additional variables account for a large amount of the variation in inflation. Adjusted $R^2$ also shows the dramatic changes in column (2). Standard Error of Regression also falling very dramatically, this is a positive sign for model.

The regression in column (3) add one more set of variables that includes Log (ER) and two interaction terms GCF*R and LOG(ER)*U. It resulted in decrease in the estimated coefficient of
unemployment. The sensitivity of the estimated unemployment coefficient is more to including these variables. The coefficient of unemployment is still statistically significant. Including additional variables in column (3) also results decrease in the coefficient of real interest rate, even estimated coefficient goes to be negative, which shows that real interest rate is the most sensitive to real effective exchange rate index and interaction term. It is still statistically significant. The estimated coefficient of Debt servicing has increased in a very small amount which shows that it is less sensitive and it is still negative, but now it is no more statistically significant. In column (3) the estimated coefficient of log(ER) is negative which is statistically significant. These variables also negatively affected the estimated coefficient of GCF but it is still statistically significant. The first interaction term in column (3), GCF*R (gross capital formation and real interest rate) is statistically significant. Its estimated coefficient is positive. The combined effect of both variables gives more sense as compared to separately. The other interaction term in column (3), LOG(ER)*U (log of real effective exchange rate and unemployment) is statistically significant. Estimated coefficient of LOG(ER)*U is positive. The regression $R^2$ increases in column (3) when additional variables are included. It shows, other additional set of variables also account for a large amount of the variation in inflation. Adjusted $R^2$ increased, this makes model more perfect.

5. CONCLUSION

This paper has estimated the regression model by using panel data with eight regional member countries of SAARC and six expected future member countries data from World data bank. Employing regional member countries data has the advantage that we can draw on more than 420 observations for our estimates of the regression model, although only a time span of 30 years is covered from 1980 to 2010.
Estimated results in table (1) shows negative Phillips curve, change in Inflation is more with respect to unemployment. As data on unemployment rates and inflation levels is given in percentage form, which makes it easy to interpret the tradeoff. The estimated coefficients on the unemployment rates are significantly different from zero (see Table (1)). It shows that the coefficient on the unemployment is statistically significant. Inflation-unemployment tradeoff exists in SARRC member countries and regional unemployment data fits very well. The results suggest that by using the unemployment instrument one can control the inflation rate in the respected economy. For OLS model results get an inflation-unemployment tradeoff with the estimated coefficient on the unemployment in column (2) is lower than column (3). Hence, the results imply that the aggregate effects of all macroeconomic variables suggest that there is inflation-unemployment tradeoff. It also suggests that cooperation between monetary and fiscal policies may be used to stabilize the business cycle. However, the inflationary pressure raises with lower unemployment rates.
REFERENCES


