Inflation and Unemployment: Is the Trade-off Dead or Alive in Pakistan?

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Available at: https://works.bepress.com/najid_ahmad/1/
Inflation and Unemployment: Is the Trade-off Dead or Alive in Pakistan?

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Abstract
The aim of this paper is to identify the relationship between inflation and unemployment in Pakistan perspective of Phillips curve. A time series data is used for the period of 1984-2012. Inflation rate is taken as dependent variable while unemployment rate, exchange rate, trade (percentage of GDP) is taken as independent variables. Ordinary Least Squares (OLS) is used after assuring the stationary of the variables with the help of Augmented Dickey Fuller (ADF) test. The paper has found significant results: there is an inverse relationship between inflation and unemployment rate in Pakistan. Concept of Phillips curve hold true in case of Pakistan.

Keywords: Unemployment, Inflation, Phillips curve, Pakistan.

Introduction
Principal features of a recession are a fall in output and a rise in unemployment rate. A change in output is measured by national product accounts. Change in unemployment is measured by unemployment rate. Unemployment means the situation in which people who are willing and able to work but unable to find job or unemployment means the situation of the economy in which supply of labor increases than the demand of labor. There are different types of unemployment like cyclical, frictional and structural unemployment. Cyclical unemployment is caused by general downturns in the economy. Frictional unemployment is temporary unemployment that is associated the adjustment in the changing. Its example can be when new entrants enter into the labor force they took time to find jobs or when some workers quit their jobs to find better. Structural unemployment occurs when skills or location mismatch with the jobs. During recession people cannot get full time jobs while they want full time work and businesses don’t change number of employees quickly. Managers often want to keep workers on job even they are not busy. They produce less than they could. Hence during recession the productivity of labor declines and economy can move to depression. Unemployed workers experience more and more difficulty in findings jobs.

Most of the economists agree and want the economy in which unemployment is required to accept first job available. So concept of full employment is meaningful but it can not be defined as unemployment rate of zero. Full employment is a situation in which unemployment rate can be as low as possible but it must be without causing the increase in the rate of inflation. The classical economists assumed that labor and other resources are always fully employed. They viewed that general unemployment and over-production is impossible. They say if unemployment persists in the long period of time it would be because of government interference or private monopoly. They think concept of laissez-fair as a guarantee of full employment. According to them full employment is a situation where there is no involuntary unemployment, though there may be seasonal, structural, technological and frictional unemployment. All jobs searcher are able to find jobs at prevailing wage rate. Classical economists believe that flexible prices and wages bring full employment in the economy. Keynes criticized and pointed out serious flaws in classical views.

Inflation means a process of rising general price level of goods and services. A situation is described as inflationary when either the prices or supply of money is rising. Inflation leads to decrease in the purchasing power of households. There are two types of inflation: Demand-Pull and Cost-Push Inflation. An economy experience Demand-Pull inflation when demand is rising rapidly. Buyers bid eagerly for goods and services. In short run, increase in money supply means increase the inflation in the economy. It encourages producers and production of goods and services will increase. For the production of goods and services they need labor and in this way unemployment rate will decrease. It shows that there is tradeoff between inflation and unemployment in the short
run. Cost-Push Inflation occurs when wages or other costs rise and these costs are passed along in the form of higher prices. Prices are “pushed up” by rising costs. It is also known as market power inflation.

There has been debate among the economists that whether it is possible to achieve two macroeconomics goals at the same time i.e. low inflation and low unemployment. In this regard the concept of Phillips curve emerged. Phillips curve is a tradeoff between inflation and unemployment. Debate about the existence of negative relationship between unemployment and inflation has gained much importance when renowned economist William Phillips wrote a paper on “The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861-1957”. After the publication of Bill Phillips’ (1958) paper the central focus of policymakers and macroeconomists has been remained to find the relationship between inflation and unemployment. The central piece of the debate was to testify the relation between unemployment and inflation whether there exists negative relation or not.

Phillips curve work under the three important assumptions like (1) there is tradeoff between inflation and unemployment rate in the short run. (2) Stagflation can break this tradeoff in the short run. (3) In the long run there is no tradeoff between unemployment and inflation rate (McConnel, 16th ed). It is a fact that increases in the prices of goods (daily use) put shocking effect on the purchasing power of the consumers. Consumers that are buying at a cheaper rate, now they are forced to buy those commodities at an expensive rate. Sudden increases in prices force consumers to buy less as they can’t afford the burden. It means they are spending more (income) to buy fewer goods at high prices. With the passage of time consumers’ ability to purchase decreases which in turn raise unemployment in the economy.

The aim of this paper is to shed light on the inflation-unemployment relationship in Pakistan. Our findings are parallel to Hameed Gul (2012) findings who confirm the existence of Phillips curve for Pakistan. The author finds negative and significant relation between unemployment rate and inflation rate in Pakistan. He suggests that government should enhance employment by controlling bad governance, political disputes, inefficient plans, and misallocation of resources which in turn guarantee to control inflation. Hassler and Neugart (2003), Aguiar and Martins (2005) are in a view that there exists tradeoff between inflation and unemployment in the short run and this relation is statistically significant. Our findings are parrel to Berger (2011) who says that increase in unemployment will decrease output which will lead to decrease in inflation. Christopoulos and Tsionas (2005) find uni-directional causality between inflation and total factor productivity in the short run and bi-directional in the long run. Antonio (2003) views that there is an inverse relationship between inflation and unemployment while Schreiber and Wolters (2007) documented that there is an inverse relationship between inflation and unemployment in Germany.

Milton Friedman (1968) introduced concept regarding natural rate of unemployment in which he says that in the long run Phillips curve is perfectly vertical that means unemployment is independent of inflation. Friedman was in a view that there is always a temporary tradeoff between inflation and unemployment but there is no permanent tradeoff. The short-run Phillips curve slopes downward to the right while it is vertical in the long run. During the 1970s, the idea of long run Phillips curve became widely accepted by those in the Keynesian and Classical traditions. Here is Ayesha (2013) who tries to investigate the impact of economic growth and inflation on unemployment by using time series data for the period of 1973-2010 for Pakistan. Johansen and Juselius (1990) technique is applied to find the long run relationship among variables used in the study (inflation, Trade Openness, real GDP per capita, urban population and unemployment). She finds positive relationship between inflation and unemployment in the short and long run. The author recommends that fiscal and monetary policies are required to control high inflation and increasing unemployment.

Data collection and Methodology
A time series data for the period of 1984-2012 is used for the analysis. Data on inflation rate, unemployment rate, trade (Percentage of GDP) and exchange rate has been collected from World Development Indicators (WDI) and Economic Survey of Pakistan (various issues). Inflation rate is taken as dependent variable while independent variables are unemployment rate, trade (% of GDP) and exchange rate.

Econometric model is given below:
\[ INF_t = \alpha + \beta_1 UN_t + \beta_2 TR_t + \beta_3 EXC_t + \epsilon_t \]

Where,
- \( INF \) = Inflation rate
- \( UN \) = Unemployment rate
- \( TR \) = Trade
- \( EXC \) = Exchange rate
- \( \epsilon_t \) = Stochastic error term

Moreover, \( \beta_0, \beta_1, \beta_2, \) and \( \beta_3 \) are respective parameters.

A famous technique, Augmented Dickey Fuller (ADF), is used to check the unit root properties of the variables. The results of ADF test are given in table 1:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Trend</th>
<th>Drift</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>INF</td>
<td>-1.969</td>
<td>-1.953*</td>
<td>I (0)</td>
</tr>
<tr>
<td>UN</td>
<td>-1.792</td>
<td>-1.424**</td>
<td>I (0)</td>
</tr>
<tr>
<td>Trade</td>
<td>-2.243</td>
<td>-2.012*</td>
<td>I (0)</td>
</tr>
<tr>
<td>EXC</td>
<td>-3.307**</td>
<td>0.581</td>
<td>I (0)</td>
</tr>
</tbody>
</table>

Note: * denote significance at 5% and ** denote significance at 10%
Source: Authors’ calculation using Stata 11.1

The results of Augmented Dickey Fuller test confirm that all variables are stationary at level [I (0)]. Therefore, Ordinary Least Squares (OLS) technique is appropriate to use. The results of OLS are given in the table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>T-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN</td>
<td>-1.1383</td>
<td>0.4524</td>
<td>-2.5163</td>
<td>[0.019]</td>
</tr>
<tr>
<td>Trade</td>
<td>0.8764</td>
<td>0.2144</td>
<td>4.0879</td>
<td>[0.000]</td>
</tr>
<tr>
<td>EXC</td>
<td>0.1294</td>
<td>0.0296</td>
<td>4.3664</td>
<td>[0.000]</td>
</tr>
<tr>
<td>C</td>
<td>-21.185</td>
<td>8.3352</td>
<td>-2.5416</td>
<td>[0.018]</td>
</tr>
</tbody>
</table>

R-Squared 0.5563  R-Bar-Squared 0.5031
DW-statistic 1.7865  F(3,25) 10.4502 [0.000]
Source: Authors’ calculation using Stata 11.1

Results of OLS indicate that the effect of unemployment on inflation is negative and significant at 5% level of significance. Furthermore, there exist positive relation between trade, exchange rate and inflation. The value of \( R^2 \) (coefficient of determination) represents that 56 % of the variations in dependent variable (Inflation) is due to independent variables. The model is free from the problem of autocorrelations (DW= 1.786) and F-statistic is also significant at 5% level of significance.
Diagnostic tests are applied to confirm whether error term is normally distributed, model is suffering serial correlation or not and whether coefficients are stable. The Diagnostic tests results are in table 3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Applied</th>
<th>CHSQ ($\chi^2$)</th>
<th>Probability value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial correlation</td>
<td>Lagrange Multiplier Test</td>
<td>0.3265</td>
<td>[0.568]</td>
</tr>
<tr>
<td>Functional Form</td>
<td>Ramsey’s reset test</td>
<td>1.0479</td>
<td>[0.306]</td>
</tr>
<tr>
<td>Normality</td>
<td>Test of skewness and Kurtosis</td>
<td>0.2220</td>
<td>[0.895]</td>
</tr>
</tbody>
</table>

Source: Author

Table 3 reports different diagnostic tests. These tests confirm that there is no serial correlation. Error term ($\epsilon_t$) is normally distributed (Appendix-A) and functional form is reliable. Moreover, there is no multicollinearity in the model (Appendix-B).

**Figure 1: Plot of Cumulative Sum of Recursive Residuals**

![Plot of Cumulative Sum of Recursive Residuals](source)

Source: Author

**Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals**
Conclusion and Recommendation

An attempt was made to investigate the relationship between inflation rate and unemployment rate to testify the existence of Phillips curve in Pakistan with the help of time series data for the period of 1984-2012. Inflation rate was taken as dependent variable while unemployment rate, exchange rate and trade as a percentage of GDP were treated as independent variables. As all variables were stationary at level so Ordinary Least Squares were appropriate technique to use. The results of OLS confirm the existence of inverse relationship between unemployment rate and inflation rate. So Phillips curve hold true in Pakistan. Diagnostic tests show that there is no serial correlation, functional form is normal and model is structurally stable. Macroeconomic policies objectives are to maintain full employment and stability in the economy through low level of inflation. If the economy is growing, the aggregate demand will increase and this leads to increase in employment. At initial stage, the economy will work with little increase in wages. But if it grows faster, the more people will be employed. The wages will start increasing. This increase in wages draws great impact on the cost of production. High cost means high prices of the goods and services.

Pakistan is facing many socio-economic problems with persistent rise in price level and unemployment. Energy crisis in Pakistan is a big issue for the industrialists. Production is decreasing and labors are going unemployed. Cost of production is increasing because of the increase in prices of goods. Foreign direct investment is going lesser and lesser and domestic investors are investing in other countries. Government can control unemployment and inflation by using fiscal and monetary policies. Fiscal policy goal is to achieve low unemployment rate in the economy and monetary policy aim is to control the level of inflation. Coordination among policies is important to achieve these goals. The most important implication of the Phillips curve is to forecast inflation. Government should manage unemployment and inflation with Keynesian policy. Inflation is not always bad if it is in reasonable rate. It encourages investment that allows growth. However if inflation crosses the reasonable limit then it would be harmful for the economy. To control high unemployment rate government can put reasonable high inflation.
References


APPENDIX-A

Figure 3: Error Term ($\epsilon_t$) is normally distributed

Histogram of Residuals and the Normal Density

Source: Authors’ Calculation

Figure 4: Actual VS Fitted Plot

Plot of Actual and Fitted Values of INF

Source: Authors’ Calculation

APPENDIX-B
### Table 4: Correlation Matrix and Descriptive Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>INF</th>
<th>Un</th>
<th>TR</th>
<th>Exc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs</td>
<td>29</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Mean</td>
<td>8.5825</td>
<td>5.6307</td>
<td>34.538</td>
<td>45.658</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>4.000</td>
<td>1.5641</td>
<td>2.7096</td>
<td>23.999</td>
</tr>
<tr>
<td>Min</td>
<td>2.9141</td>
<td>3.071</td>
<td>28.129</td>
<td>14.046</td>
</tr>
<tr>
<td>Max</td>
<td>20.286</td>
<td>8.27</td>
<td>38.909</td>
<td>93.395</td>
</tr>
<tr>
<td>INF</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UN</td>
<td>-0.1547</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>0.4668</td>
<td>-0.3548</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EXC</td>
<td>0.2711</td>
<td>0.6455</td>
<td>-0.3669</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Authors’ Calculation

### Table 5: Absence of Multicollinearity

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exc</td>
<td>1.78</td>
<td>0.5616</td>
</tr>
<tr>
<td>Un</td>
<td>1.76</td>
<td>0.5673</td>
</tr>
<tr>
<td>TR</td>
<td>1.19</td>
<td>0.8414</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.58</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ Calculation