

Phillips Curve: “The Indian Case”

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Abstract

The paper traces the presence of Phillips curve in India for both short run and long run. Unemployment and Inflation are issues that are central to the economic life of every developing nation. This paper estimates the short-run and long run trade-off between inflation and unemployment for the Indian economy over the period 1991-2021. In the short run we find that the relation between inflation and unemployment is more or less constant over the years. However from 2005-2008 we find the inverse relation as suggested by Phillips holds true. On using the data from 1991-2021, we found that inflation has negligible effects on unemployment. We have used textual, tabular and graphical analysis to examine the realism of the situation. The result obtained from our study is indeed surprising and is contradictory to what Phillips's theory suggests. Thus we can conclude that in India there may be several other factors apart from inflation rate which affects the rate of unemployment.

I. Introduction

The most well-known indicator of inflation is the Consumer Price Index (CPI), which measures the percentage change in the price of a basket of goods and services consumed by households.

Unemployment refers to the share of the labour force that is without work but available for and seeking employment. It is important for us to keep in consideration that the rate measures the percentage of unemployed job seekers in the labour force—the sum of employed and unemployed persons—and not the entire population.

It is in the motive of every government to reduce inflation as well as unemployment simultaneously. However as suggested by Phillips this dual problem cannot be handled side by side. According to him, high levels of inflation is associated with low levels of unemployment and low levels of inflation brings in high unemployment. Thus it is anticipated that both these variables would be inversely related.

In the present situation, every month there is a surge in prices ranging from fuel to

consumer goods. Also the pandemic has not only taken a toll on lives but has also taken away jobs of thousands. Unemployment is also rising at par with inflation.

The objective of the paper is to study the relationship between Inflation Rate and the rate of Unemployment India.

This paper seeks to explore whether the hypothesis developed by Phillips holds true in the case of India during the time period of 1991 to 2021.

II. Literature Survey

Jagdish Sahu (2013) in his paper named as “Inflation dynamics in India: A hybrid new Keynesian Phillips Curve Approach” pointed out that fuel price inflation, agricultural output gap, exchange rates and foreign inflation plays a major role in forming expectations for inflation. Their empirical study supported the significance of all such variables’ effect on the price level of the economy. They also suggested that smooth operation of supply mechanisms will maintain price stability in the long run. They have addressed the problem of endogeneity in expected inflation and used the generalized method of moment.

N. Verma; D. Singh (2016) in their paper titled “Trade-off between Inflation and Unemployment in the Short Run: A Case of the Indian Economy” conducted various tests to detect the existence of Phillips Curve in India, and satisfactorily they found an inverse relationship. Their paper also suggest policies for growth of GDP like better linkage of ministries; generation of employment, infrastructure etc. They have used OLS estimates and bi-variable regression analysis min formation of three models which mainly checks the relationship of Unemployment with Inflation using Vector Error Correction Model

Anup Sinha (2017) in his paper “Relationship between Inflation and Unemployment in India: Vector Error Correction Model” approached the trade-off using econometric analysis. They observed the variables to be stationary after first differencing and conducted

tests and used VECM for regression; which gave a favourable negative relationship, whereas in the long run both the variables moved in the same direction.

Xinhe Xia (2021) in his paper “Unemployment, Inflation and Impact on GDP in India”, pointed out that inflation is followed by low output adjustments and therefore fall in employment. The unemployed people have poor standards of living and thus fall in GDP. As a remedial measure, it suggests policymakers should give their attention in reducing unemployment, workers wage efficiency, infrastructural development and growth of GDP.

III. Theoretical Background

Phillips Curve in the Short Run

The Phillips Curve, discovered by Professor A.W Phillips, establishes a relationship between unemployment and inflation. The relationship was based on the observations he made on unemployment and changes in wage levels from 1861 to 1957. He observed that there was a trade-off between unemployment and inflation, so that any attempt by governments to reduce unemployment was likely to lead to an increased inflation. This relationship was seen by the

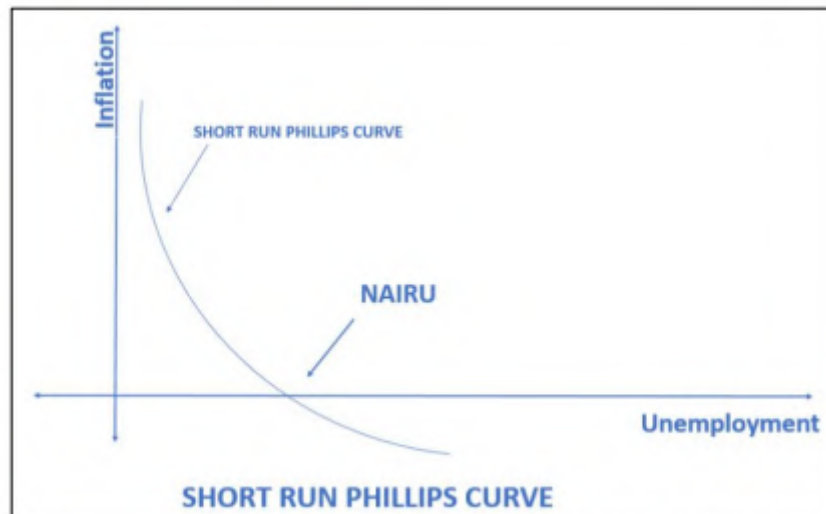
Keynesians as a justification of their policies. It puts forward an empirical relationship between unemployment (it is treated as endogenous variables) and inflation. If there is a fall in unemployment, workers can haggle their wages; causing wages to rise (similarly a rise in labor supply will cause wages to fall). The positive relationship between nominal wage and inflation was modified to establish the link between inflation and unemployment. Low unemployment is analogous with tightness in labor markets, high levels of consumer income and demand. Thus, the conditions for rapid wage and price increases exist on both the demand side and cost side. Ergo it is associated with a rapid

rate of inflation. Thus, society can opt for the cost of a high unemployment rate. The short run Phillips Curve is downward sloping, the point which cuts the horizontal axis shows the rate of unemployment with price stability (called the Non-Accelerating Inflation Rate of Unemployment by Milton Friedman) termed as NAIRU. NAIRU shows there exists unemployment friction, seasonal, structural but no cyclical unemployment.

Around 1970, however, the relation between the inflation rate and the unemployment rate started moving in the same direction for a few countries like Malaysia, France and the UK. The points were scattered in a roughly symmetric cloud. There was no longer any visible negative relation between the unemployment rate and the inflation rate.

Formation of the cartel by oil exporting countries, OPEC, in mid-1960 to eliminate competition among themselves, again, led to a significant surge in crude oil price, fuelling huge increase in cost of production and stagflationary situation. Friedman and Phelps famously predicted that as inflation rates would increase, inflation expectations would begin to play a major role in wage negotiation. High inflation in one year consequently to be followed by high inflation the next year. As a result, people, when forming expectations, started to take into account the persistence of inflation.

In turn, this change in expectation formation changed the nature of the relation between unemployment and inflation. Later Friedman and Phelps won the Nobel Prize as their prediction came true. The short run Phillips Curve is represented alongside.

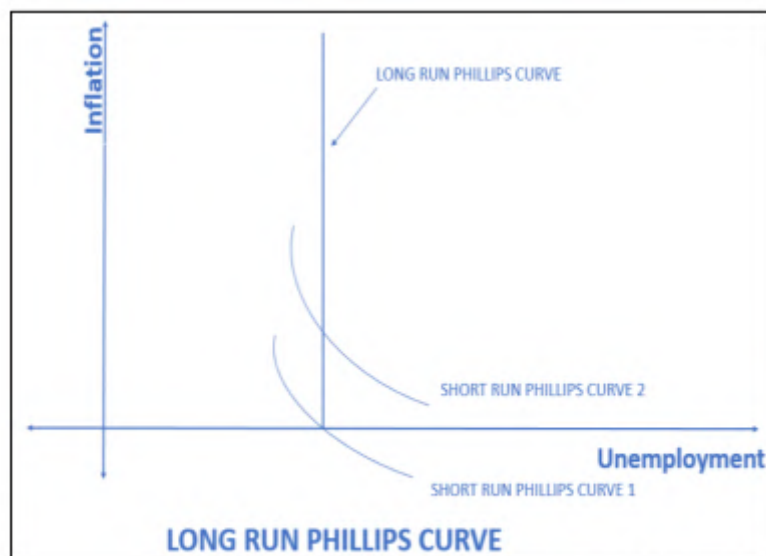


Source - Self Computed

Phillips Curve in the Long Run

The long run Phillips Curve is an extension of the ideas on which the short run Phillips Curve was formulated. It was Milton Friedman who challenged the idea of the inverse relationship between the rate of inflation and unemployment with his Adaptive Expectations theory. His theory behind the long run Phillips Curve has been briefly discussed below. Monetarist propositions suggest that in the short run, monetary policy or the quantity theory of money will have its impact on the real variables also so that by manipulating the quantity of money, output, employment and inflation can change. In the long run, money is neutral, so changes in the quantity of money will have its impact on the price level and the real variables would be affected only by the real factors. Thus, the trade-off between unemployment and inflation might exist in the short run but Friedman and Phelps believed that there is no reason to believe that inflation and unemployment are related in the long run.

Thus as illustrated by Friedman and the Monetarist school, the long run Phillips Curve would be a vertical line at the corresponding Natural Rate of unemployment.



Source - Self Computed

IV. Data and Methodology

In this study we have used time series data on unemployment (in percentage) and inflation (in percentage) for India from the year 1991 to 2021. We have used data for the past 31 years and the data has been sourced from World Bank Open Data.

We have segregated our paper into two parts: the Short Run analysis and the Long Run analysis. In the Short Run analysis we have accounted for the data for the last 16 years while for the Long Run analysis we have taken data for the last 31 years.

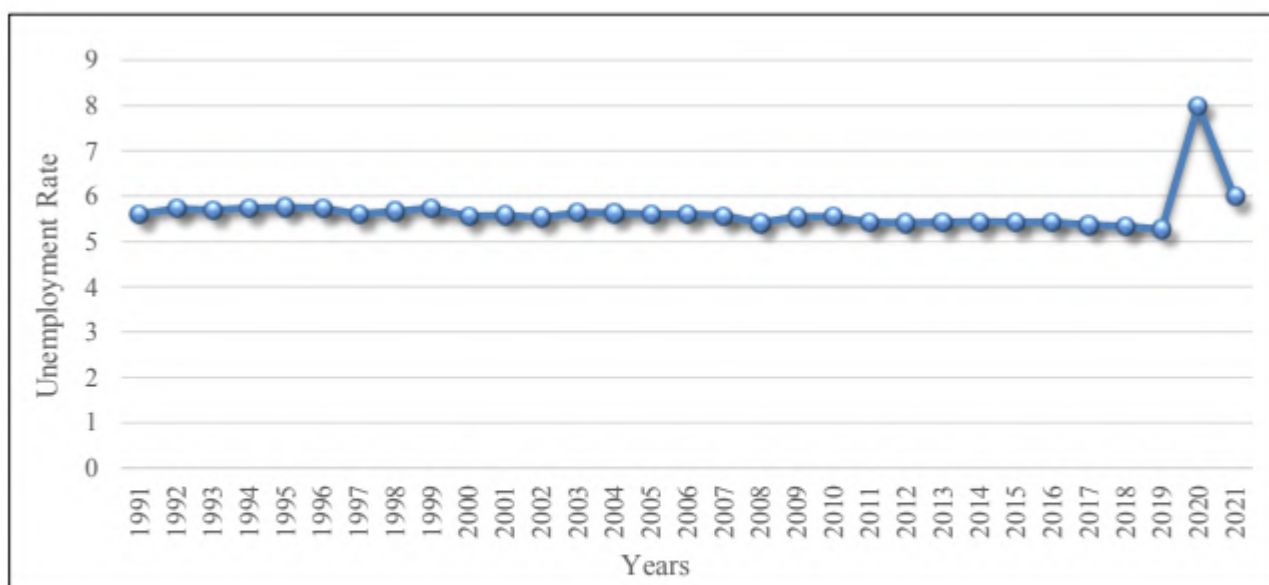
The methodology used in the analysis of the paper is textual, graphical and tabular.

As a part of our graphical analysis, we have taken the aid of scatter diagrams and line graphs to check the relationship between the two variables and approximately guess about the direction of the trend.

The research carried out in this paper is casual and the data is secondary in nature.

V. Study of Unemployment in India

The unemployment rate in India from the years 1991-2021 has been analysed using a line graph as presented in the adjoining figure.



Source - Self Computed

Trend-line of Unemployment rate from 1991-2021

The line diagram shows that the rate of unemployment in India has remained relatively stable at around 5.5% on an average with some minor fluctuations in some of the years, other than 2020. The after effects of the Covid-19 pandemic can be easily seen in 2020's unemployment rate. In that year the rate of unemployment reached its peak with almost 8% of the working population unemployed, the highest in the past 30 years. However the drastic fall of the unemployment rate again to 5.98% in 2021 suggests how efficiently the government has been able to tackle the post COVID crisis in India. Although 5.9% accounts for the second highest unemployment rate in the country since 1991, one has to keep in mind that unemployment had fallen by about 2.20% from 2020, the biggest fall ever recorded in the past 3 decades.

VI. Study of Inflation in India

The inflation rate in India from the years 1991-2021 has been analysed using a line graph as in the adjoining figure.



Source - Self Computed

Trend-line of Inflation rate from 1991-2021

The economic reforms Liberalization - Privatization - Globalization was introduced in the year 1991, which showed an inflow of foreign reserves and an upside down change in economic policy. The year 1991 shows an inflation rate of 13.67%. One of the reasons for such a high figure could be an increase in money supply.

We also notice a drastic fall in the inflation rate in the year 1993. A few reasons can be the political turmoil (demolition of Babri masjid and Bombay blasts), lack of articulation and evaluation of policy alternatives, slow utilization and low absorption of funds.

From the year 1999, we observe a downward trend because of many reasons possibly turbulence in international economic background (recession in Japan, severe financial crisis in Russia, unusual volatility in capital and forex markets of industrial countries) which decreased the inflow of capital, slowdown in GDP growth; also unfavourable weather in some parts of the country and slowdown in manufacture of consumer goods which resulted in low private consumption and thus low aggregate demand, fall in industrial growth. Soaring rise in inflation is noticed from 2009 to 2013. In 2007 it was 6.37% and 2008 it was 8.35% which rose to 10.88% and 11.99% in 2009 and 2010.

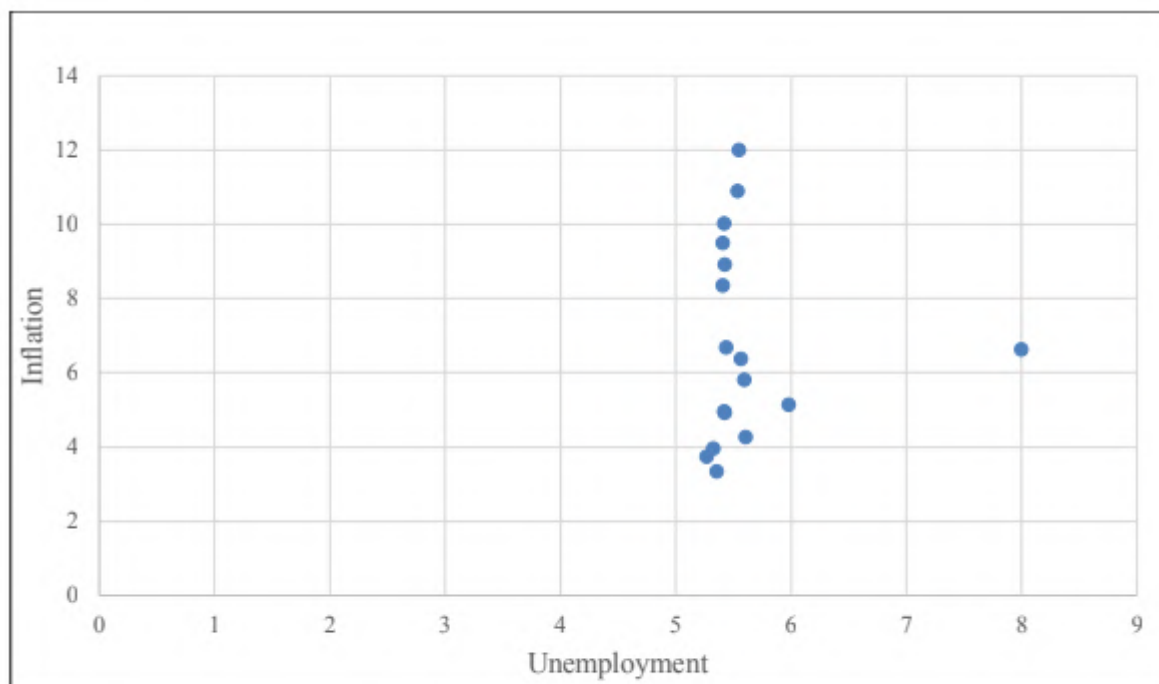
Lastly we caught a sight of fall in inflation rate in the year 2014(6.67%); the reasons

(as stated by Raghu Kumar in an article of Economic Times) are positive response in capital market to rise in SENSEX, increase in jobs through Make In India Movement and RBI opted not to cut repo rate to control the deflationary market, also as noted the WPI inflation was 0%.

Finally the jump in the inflation rate in the year 2020 from 3.73 % (2019) to 6.62% (2020) can be solely attributed to the COVID outbreak and closure of industries, and all other economic activities for several months.

VII. Short Run Trade-off between Inflation and Unemployment

Trade Off between Unemployment and Inflation in 2005 and 2021



Source - Self Computed

Scatter plot of inflation and unemployment in short run

Unemployment rates in India remained close to 5.5% on an average during 2005 to 2021. However the inflation rates had fluctuated drastically during this time period. The effect of this fluctuating inflation rate could not be found in the unemployment data, as it remained more or less constant. Years of high inflation recorded approximately the

same rates of unemployment as compared to the years of low inflation. Thus, the inverse relation between the two variables as suggested by Phillips does not hold good for India especially during this span of time. This however implies that the rate of unemployment remained independent of the rates of inflation for the Indian economy.

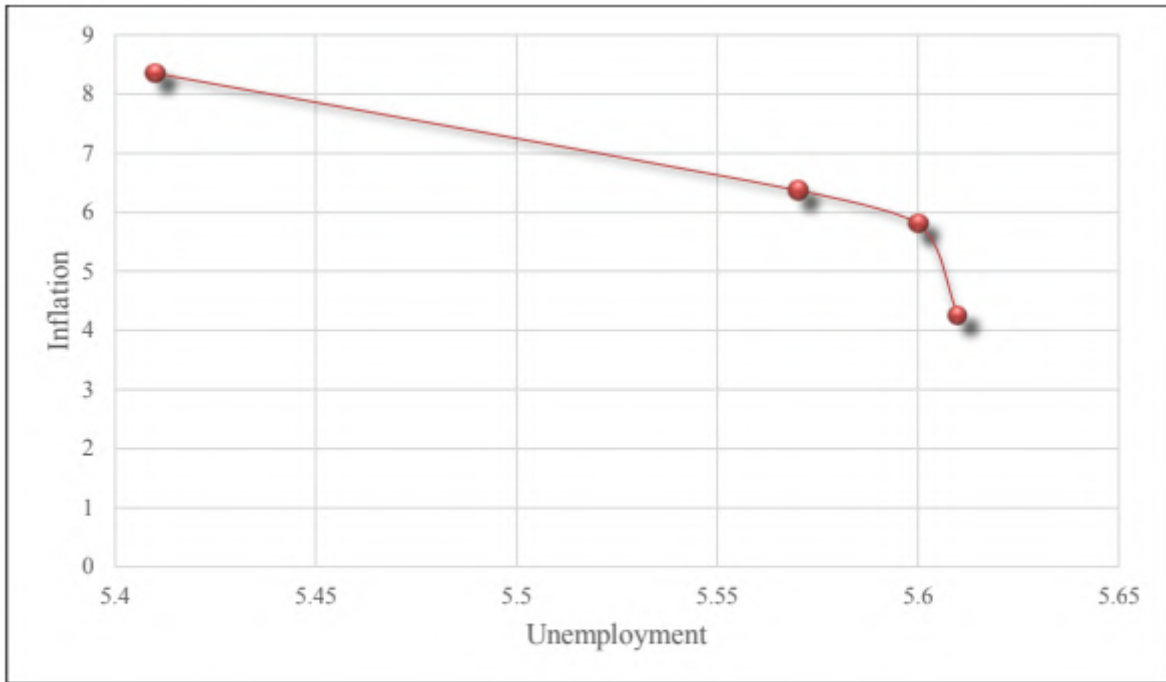
Observed Phillips Curve

Year	Change in Inflation	Change in Unemployment
2005	0.48	-0.02
2006	1.55	-0.01
2007	0.57	-0.03
2008	1.98	-0.16

Source - Self Computed

Table showing changes in inflation rate and unemployment rate from 2005-2008

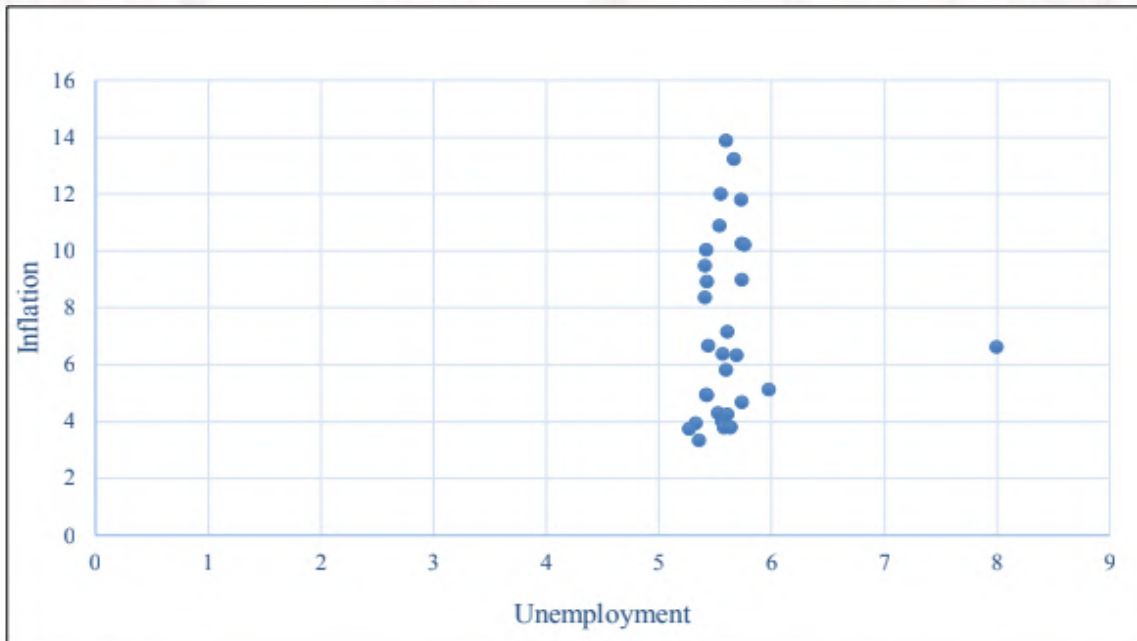
From the table we can see that from 2005 to 2008, there exists an inverse relationship between unemployment and inflation. Although this situation was transient and could not be seen from 2009 onwards. Now on plotting the unemployment and inflation data for the respective years on the scatter plot we get a downward sloping curve. Although the curve is not the same as the short run Phillips Curve but however it bears some resemblance. We cannot find the convexity in the curve but however the downward sloping or the inverse trend as suggested by Phillips could be seen. Again such a relationship was found in 2012, 2014, 2016 and 2018 but it was not consistent and was isolated. We thus cannot conclude a strong presence of the Phillips relation in the short run.



Source - Self Computed
Scatter plot of inflation and unemployment in 2005-2008

VIII. Long Run Tradeoff between Unemployment and Inflation

Trade Off between Unemployment and Inflation in 1991 and 2021



Source - Self Computed
Scatter plot of inflation and unemployment in long run

The scatter diagram of unemployment and inflation in the long run apparently looks identical to that of the short run. This suggests that the rate of unemployment remained more or less around the 5.5% mark irrespective of the changes in the rate of inflation. However we find an outlier which is in the 2020 data when the unemployment rate skyrocketed because of the COVID-19 pandemic in the country. This somewhat vertical Phillips Curve falls in line with the theories suggested by Edmund Phelps and Milton Friedman. Such a relationship between the unemployment rate and the rate of inflation also reinstates the existence of Friedman's theory of Adaptive Expectations for the Indian economy as well.

IX. Policy Implications

Inflation and unemployment rates are tough to tackle. In India with rapidly rising numbers in rates of inflation and unemployment, the Government should take immediate measures to control the persistent rise. Providing active skill training and 100 day wage-jobs to reduce unemployment rates and monetary policies like Non uniform taxation (higher taxation for richer sections), other fiscal policies to ensure monetary stability. The government of India should aim at increasing productive capacity, and sufficiency in food items, to strengthen the base of the economy.

Generating greater revenues from export i.e. a stronger export basket will lead to better balance of trade.

X. Conclusion

In our study we have tried to analyse the relationship between the rate of Unemployment and the rate of Inflation for the Indian Economy from the year 1991-2021. It was anticipated that the rate of unemployment would vary inversely with the rate of inflation. However the scenario was quite different as we found that the rate of unemployment remained fairly stable for different rates of inflation. This was in contradiction to what Phillips had observed for the US unemployment and inflation data. However in the

long run the Phillips Curve remained fairly vertical, reinstating the ideas of adaptive expectation of Friedman and Phelps.

This inconsistency in the result might have occurred because there are a lot of educated unemployed in India. Thus even if there is inflation, the unemployment situation doesn't change, the poverty trap strengthens, thereby aggravating the rates of unemployment. Thus on the basis of this analysis we can conclude that the unemployment rate in India is not a significant factor behind the rates of inflation. This relationship is also suggestive of the fact that the government can very well achieve the dual objectives of lower inflation and lower unemployment as opposed by Phillips as long as policies are directed to achieve the same.

References

1. Jagadish Prasad Sahu (2013) "Inflation dynamics in India: A hybrid new Keynesian Phillips Curve approach" *Economics Bulletin Volume 33, Issue 4, pp 2634-2647*
2. Anup Sinha (2017) "Relationship between Inflation and Unemployment in India: Vector Error Correction Model Approach" *IJARIE -Volume 3, Issue 6.*
3. Md Qaiser Alam, Md Shabbir Alam(2016) "The Determinants of Inflation in India: The Bounds Test Analysis" *International Journal of Economics and Financial Issues, 2016, 6(2),pp 544-550*
4. Dr. M. Thiruneelakandan , Dr. R. Ullam Udaiyar(2018) "A STUDY ON UNEMPLOYMENT AND INFLATION IN INDIA: THE SHORT RUN PHILLIPS CURVE APPROACH" *IJRAR-Volume 5 , Issue- 2*
5. Singh, K. B., Kanakaraj, A. and Sridevi, T. O. (2010). "Revisiting the empirical existence of the Phillips Curve for India". *Journal of Asian Economics, 22(3), pp \ 247-258.*
6. Afzal, M. & Awais, S. (2012). *Inflation-Unemployment Trade Off: Evidence from Pakistan. Journal of Global Economy, 8(1), 21-32.*
7. Dolly Singh, Nmp Verma (2016) "Tradeoff between Inflation and Unemployment in

*the Short Run: A Case of the Indian Economy” International Finance and Banking
Vol. 3, No. 1*

8. *Xinhe Xia (2021) - “Unemployment, Inflation and Impact on GDP in India”
Advances in Economics, Business and Management Research, volume 166.*

9. *Samuelson, P.A. and Solow, R.M. (1960) ‘Analytical aspect of anti-inflation policy’,
American Economic Review, Vol. 50, No. 2, pp.177–194*

10. *<https://data.worldbank.org/indicator>*