

**Short Run Linkage between Inflation and Unemployment  
during Pre and Post-Recession : A Study of India**

**ABSTRACT**

SUBMITTED TO

**BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY  
(A CENTRAL UNIVERSITY)  
LUCKNOW**



FOR THE AWARD OF DEGREE OF

**DOCTOR OF PHILOSOPHY**

IN

**ECONOMICS**

UNDER THE SUPERVISION OF

**PROF. NMP VERMA**

SUBMITTED BY

**PRATINIDHI**

**DEPARTMENT OF ECONOMICS**

**SCHOOL FOR AMBEDKAR STUDIES**

**BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY  
(A CENTRAL UNIVERSITY)**

**VIDYA VIHAR, RAEBARELI ROAD, LUCKNOW-226025 (U.P.), India**

ENROLLMENT NO. 079/15

YEAR: 2020

## ABSTRACT

---

### **Introduction**

Inflation and unemployment are probably the most pressing concerns for all economies in the world. Economists and policy mappers across the world are consistently devising strategies to overcome the anomalies created through these two macro variables. These variables are perhaps two of the most used economic indicators to gauge how well a country is performing in terms of economic growth. The adverse consequences that inflation and unemployment can cause on the living standards of people cannot be overstated. In its extreme form, unemployment alone can lead to political upheavals and perpetrate a host of social evils. Uncontrolled inflation can cripple economies and retard the industrial output, thus adding to the woes of unemployment. Hence, it is imperative to carefully measure inflation and unemployment. Moreover to contain inflation while ensuring healthy levels of employment in the country, the strategists must enlist the most accurate means to analyse unemployment and inflation.

In macroeconomics, Inflation and Unemployment are always current and debatable issues in each economy. This cause and effect relationship fluctuates around the economy and these two variables are effective facets for measuring the health of an economy. Inflation is a monetary phenomenon, while Unemployment is a real phenomenon. In other words, Inflation is the cause of Unemployment. Thus, it is very necessary to reduce these problems together. Both these problems are connected by the Phillips Curve theory. Phillips Curve is the most important tool for policymakers for mapping policies or plans in order to achieve price stability and full employment in the economy. This theory is very help for understanding the expansion and contraction of money in the economy.

The macroeconomics target is to achieve full employment, price stability, high productivity and economic development (Verma, 2017). Inflation and unemployment are crisis areas for all economies, be they developed or a developing one. In fact the health of a country's economy can be assessed by the rate of inflation and unemployment in the country. Therefore, these variables can lead to drastic fluctuations in the economy. Inflation is the procedure of increasing prices levels of goods and services that cause an

increase in the total consumption to expand, a standard measure of the price of inflation rate is the rate where prices escalation over time causing a reduction in the purchasing power of the money (*Parkin, et al., 2005*). According to John Maynard Keynes, a bit of inflation can help in the growth of the economy; the accurate measurement also helps to distinguish between currency values and real values in the economy (*op cit. 2005*).

Inflation is rightly considered as the big enemy of any economy. It reduces consumption, investment and standard of living. This leads to a slow developmental process in the economy. It has a negative impact on income distribution. Though the price increase looks to be beneficial for some people, it is detrimental for many others. While the income increases quickly for some earners during high inflation, it is the opposite for most earners who have fixed incomes. Since the real income declines during the periods of Inflation, the earning and the spending potential of many people decreases, thus retarding the economic growth.

Inflation also has an effect on the lending and savings. It is usually the borrowers who benefit from Inflation while the lenders and the savers remain disadvantaged. Due to the decline in the saving rate, the investment rate is affected negatively. Inflation also affects the foreign trade of a country. The competitiveness of a country may be affected by Inflation (*Kumar, 2012 P. 11*) which can be measured by the Consumer Price Index (CPI). Inflation is classified into two distinct types, namely, the Demand Pull Inflation and the Cost Push Inflation.

The miasma of unemployment unleashes both economic and social turmoil, more so in a country like India. Unemployment refers to the condition in which the skilled workers who wish to be employed do not find work. According to a report on the impacts of economic slowdown on employment in India, about half million workers lost their jobs during October to December 2008 (GoI, 2009). Unemployment continues to plague India and remains the most critical of our country's problems. Lack of employment is a harbinger of host of economic, political and social ills in the society. An employable individual who is not engaged in work not only suffers monetarily but also faces social ostracism. When the organisations of a country do not hire, the country risks losing its

skilled human resource as unemployed youth often take to illegal means for generating income. This increases the crime graph besides widening the gap between the haves and have-nots. Thus, unemployment is at the root of both social and economic disparity in any country. With limited availability of work, the unemployed often resort to corruption to find work. Frustration due to declining standards of living among the unemployed leads to disenchantment with the social fabric of the nation. Moreover, increased inflation with no earning potential further entrenches poverty in the society, unleashing a vicious circle of economic gloom. With no income to support a household, the members of a family stand to be deprived of adequate healthcare, quality education or at times even nutritious food becomes unaffordable. Lack of income inevitably leads to reduced consumption and this creates recessionary or deflationary situation in the economy. Thus, the two variables of inflation and unemployment are connected by the *Phillips Curve Theory*.

The Phillips Curve theory found an association between the rate of inflation and rate of unemployment in the economy. This theory guides the policymakers about the stability of prices in the economy. According to the Phillips Curve shape, the two variables of inflation and unemployment expand or contract based on the liquidity of economy. Several economists, academician and researchers still argue about the connection between inflation and unemployment. The Phillips Curve is one of the best known, most debatable and most often used to examine the Macroeconomic relationships. The present Study is based on the Financial Crisis 2008, because it was a major crisis in the United States (US). The impact of economic crisis in the USA was not merely confined to United States. The US economy is the biggest economy in the world. United States is the largest exporter, importer and food supplier to the other economies in the world. Hence, any upheaval in the economy of the USA is bound to have a direct or an indirect impact on rest of the world economies. Many people lost their jobs in the wake of the Financial Crisis. The Indian economy was also affected with reduced jobs for skilled labour force. Even the inflation was less as compared to the other normal phases in the Indian economy. As observed by (*karuna, 2011*), the unemployment rate usually jumps and inflation falls slightly because the overall demand for goods and services is curtailed during the recession. As stated by (*Kose, 2009, P. 53*), the house and equity values

recession is also associated with the turmoil in financial markets. According to the International Labor Organization (ILO), as many as 51 million workers were fired in 2010 globally while 30 million more jobs were at risk. Moreover, the United Nations also predicted that 200 million workers, mostly in the developing economies could be pushed into more poverty. The global unemployment rate was estimated at 7.5 percent in 2010, up from 6.5 percent in 2009 and 6.7 percent in 2008. This implies that the Global Recession was already resulting in a drastic increase in the number of people joining the labor market and swelling the rank of unemployed. As observed by the (ILO, 2010), “*The labor market epidemic downsizing was also a result of the recession*”. According to (Kumar, 2009, P.8), the global economic downturn, which started with the collapse of Lehman Brothers on 23 September 2008, had an immediate impact on the Indian economy. Credit flows suddenly dried-up and, overnight, money market interest rate spiked to above 20 percent and remained high for the ensuing months. Financial Crisis started in 2007 with a problem in the *subprime mortgage market* in the United States. This problem later metamorphosed into an international banking crisis with the collapse of the Investment Bank which was named the Lehman Brothers on September 15, 2008 (Mark, 2010). In the words of Mark, “*the speed of the contagion that spread across the world like a wild fire was rather unprecedented.*” Due to Globalization, the impact of Global Financial Crises spread to the rest of the other economies in the world. The impact of the global crisis was transmitted to the Indian economy through three distinct channels which were: the financial sector, exports and exchange rates (*op.cit*, 2009). According to (Szentmihályi, & Világi, 2015, P. 5), during the prolonged global recession that unfolded due to the Global Financial Crises of 2007–2008, special attention was paid to the issue of the slope of the Phillips Curve. It is significant to note *Stock and Watson’s*, 2009, remark here which states, “*The Phillips curve framework relating inflation to economic activity continues to be the workhorse model for understanding inflation dynamics, even as it has faced a number of challenges in the past and is confronted with new complexities in the aftermath of the Great Recession*”. Ball and Maunders (2011), found that the Phillips Curve predicts deflation unless the expectations are at least partially anchored to the Federal Reserve’s target inflation rate. The International Monetary Fund observed in 2013 that the Global Financial Crisis caused a significant decline in

economic activity. This further reiterates the link between economic activity and price inflation. Elsewhere, while the inflation decline was much less, the very recent downward pressures on inflation seemed to suggest otherwise. There was the general impression that during the *Great Recession*, inflation fell by less than one might expect. This has been attributed variously to long-term inflation expectations being firmly anchored at pre-defined inflation targets (*Matheson, and Starview, 2013*). A flatter Phillips Curve implies a weakening of the tradeoff between rate of inflation and the rate of unemployment (*Kocheriakota, 2010*). *Stock and Watson* also state that with an increase in the Structural Unemployment and a related decline in the potential output, the output gaps were not as negative as they might appear. *Stock and Watson* argue that inflation in the U.S. had been affected by domestic real activity mainly recessions. *Meier, (2010)*, provides more ambiguous evidence for OECD countries; in particular, pointing to difficulties in identifying such a relationship in an environment with very low inflation. The Financial Crisis came about in 2007 and changed to an economic crisis, commonly known as the Great Recession affecting the output produced inflation and unemployment. Many OECD countries entered into a long recession period with a significant decline in Gross Domestic Product and an increase in the unemployment rate. Data on unemployment rate as tallied with NAIRU shows that the unemployment rate was higher than NAIRU and this difference became greater and during the recession period. One of the characteristics of this *last recession* was the great decrease of the output during this period, and the slow growth and the considerable weakness that many countries faced after the recession period. Thus the period of recession and its drastic effect became apparent in the slow growth that led to a downward pressure on prices. This developed into a deflation period (*Fendal, et al. 2008*). A study by *Carlos et al. (2012, P. 1)* states that, “*after the collapse of Lehman Brothers Investment Bank in 2008-09, which resulted in a significant loss of output (GDP), there was a large amount of increase in unemployment and a deflationary scare in many countries and the forecasters’ expectations of inflation and Gross Domestic Product growth deteriorated in 2008*”.

In addition, the present research endeavor has added one more concept which is the Output Gap. This study examines the Philips Curve relationship in the context of the India. In India, there is no regular or yearly data on unemployment. Therefore, we added

Output Gap. Output Gap is a difference between the Actual Output and the Potential Output. It provides the idea or guidance for policymakers about the expansion or the contraction of money in the economy. The output gap indicates a summary measure of demand situations in the economy and is a useful indicator of the state of the macro economy. It is also an important input for monetary policy. Conventionally, inflation has been seen as the sole symptom of macroeconomic imbalances in the economy captured by fluctuations in various measures of the output gap (*Rath, 2018*). In other words, output gap demonstrates that how much extra capacity an economy has in case of a chance of a rise in demand.

India is a rich country and the main reason of India's poverty and backwardness is unemployment. Even in the present globalized context, most Indians are still engaged in agriculture and its related work through agro-industry. Unfortunately, the agriculturalists are totally based on monsoon with limited access to advanced knowhow of farming. Lack of better vocational education and the weak structure of our economy further compound the problems. On the other hand, inflation has also increased leading to substantial increase in the general price level of goods and services in our economy over a period of time. Thus, with the increase in the cost of living, there is a dismal decline in the standard of living of the people who are unable to afford the expensive costs of daily utilities. Low purchasing power reduces consumption and depletes saving and further reduces investment. This situation ultimately increased unemployment. Moreover, it also creates ups and down in the economy.

In context of the aforementioned issues and facts, the present Research Study intends to examine whether the Philips Curve shape or theory exists or not in the Indian context, particularly during the Global Financial Crisis. Furthermore, we have also mapped the measurement of the Output Gap from 2002 to 2015.

## **Research Gap**

This research study has reviewed many relevant research articles related to the present study area at both the international and national level. At the international level, many studies have been done on short-run linkages of inflation and unemployment during the

recession period. However, no studies have been done on the developing countries like India during the Pre and Post-recession periods. Many studies have been conducted on inflation and unemployment but are based on different dimensions in India. Therefore, under this study, we will show short run linkages between Inflation and Unemployment in three phases which are, the Pre- Recession, during Recession and Post-Recession periods with special reference to the Indian context. We will try to fulfill the research gap of this dimension. Hence, this Research Endeavor's intent is to investigate an aspect of the Indian economy which was not undertaken before by any other researcher. In short, after an in-depth review of literature, the present study has tried to validate of Phillips curve relationship in the Indian economy taking account of the financial crisis.

### **Contribution of the Study**

- The research study contribution is more inclined around the temporal factors of recession unlike the other major works that focused more around the current scenario.
- The examination will prove a help to the economy to better judge whether the Phillips curve is best applicable in such recessionary situation in Indian environment with its shocks included. Any unlike situation would divert our attention towards search of better measures on fiscal terms.

### **This Research Study has been Conducted with the Following Objectives**

1. To examine the comparative study between inflation and unemployment (2002-07) Pre-Recession, (2008-09) During-Recession and (2010-15) Post-Recession period.
2. To examine the impact of the global financial crisis on macro-economic variables.
3. To examine the Philips curve shape & the output gap from 2002 to 2015 for 14 years.
4. To study the policy implications of targeting inflation and unemployment in India.

## **The Hypothesis of the Study**

The following hypotheses have been formulated as the basis for the Study:

1.  $H_0$ : There is no impact of global financial crisis on trends of inflation, unemployment and other macro-variables
2.  $H_0$ : Output gap fluctuations are negatively associated with the pre and post-recession and over the total period of the study.
3.  $H_0$ : Inflation and unemployment are positively associated with recession or over the period of the study.

## **Data and Methodology**

The present study is wholly based on the secondary data. The study uses time series database, taken from authentic data source such as the published official reports and data.

Following are the reference points for collating data:

1. Report on Inflation published by the Reserve Bank of India.
2. Annual Report published by the Ministry of Labour and Employment Labor Bureau, the Government of India.
3. Ministry of Statistics and Program Implementation (MOSPI), the Government of India.
4. Handbook of Statistics on Indian Economy via the Reserve Bank of India.
5. National Sample Survey Organization (NSSO) India.
6. Economic Political Weekly Research Foundation (EPWRF)
7. World Bank Database

We have used quantitative and time series data such as monthly, quarterly and annual data on Wholesale Price Index, Consumer Price Index, Gross Domestic Product and unemployment rate. The present Study has taken data pertinent to the time period from 2002 to 2015. This study has been divided into three sub periods such as Pre-Recession

Period (2002-2007), During Recession Period (2008 to 2009) and Post-Recession Period (2010 to 2015)

After collecting of data, according to the objective of this research, we present the data in various ways and various graphs. This study uses some statistical tools and techniques. In addition, we have used econometrics method and models which are: the Least Square method, Simple Regression Model, Vector Error Correction Model (VECM), Vector Autoregressive Model (VAR), Auto Regressive Distributed Lag Model (ARDL), polynomial regression model, Chow test and Kim & Perron test for structural breaks and Hodrick Prescott Filter (HP) method. To find the estimation of the different models mentioned above we have used various software like: Microsoft Excel 13, Stata 13, Eviews 10, Minitab, 16 and Amos, 22.

### **Significance of the Study**

The Phillips curve is the core theory in this inductive study and it establishes the relationship between inflation and the unemployment rate from 2002 to 2015 in India. The significance of this present study is in determining how the policymakers can formulate effective strategies to ensure employment while containing inflation. Undoubtedly, inflation and unemployment have played a central role in monetary policy. The Central banks have tried to use this relationship by influencing unemployment through their inflation policy. Theory of Phillips curve is not only strong theoretically, but is also important for political foundations. The central banks' objective has always been to use their monetary policies to keep inflation and unemployment low, but they could only do so at the expense of high unemployment. On the other hand, an acute knowledge of the nature or relationship of inflation and unemployment in the short-run enables the policy makers to outline policies to minimize the harmful effects of inflation and unemployment for the society. Additional approach, the output gap is an important variable for monetary policy and it is a key source of inflationary pressures in the economy. When the demand for goods and services is high, then economy has the capacity to produce while influencing high pressures on prices. When the rate of inflation actuates higher than expected, it is typically a sign that demand for goods and services are

pushing against the limits of capacity. When the rate of inflation always ends lower than expected, it is generally a sign of weak demand and of spare or unused capacity.

## **Outline of the Thesis**

The present study entitled as “**Short Run Linkage between Inflation and Unemployment during Pre and Post-Recession: A Study of India**” consist of seven chapters.

The *first* chapter deals with the introduction parts enlisted in the background of the study, research objectives, hypothesis, data and methodology, significance and limitations of the study.

The *second* chapter discusses about the conceptual and theoretical framework of inflation and unemployment with relevance to Phillips curve analysis.

The *third* chapter deals with the trends of Inflation along with concept of inflation and trends of (inflation) with two measurement approaches such as the Wholesale Price Index and Consumer Price Index. This has been analyzed by the econometric tools such as least square and regression model which are used for trend estimation and analysis.

The *fourth* chapter deals with trends of unemployment and impact of recession on macro variables. It analyses the impact of Global Financial Crisis on three macro-variables such as export, lending rate and inflation rate. There is empirical analysis to determine if the short run causality or long run causality exists in this study or not. In addition, the concepts of unemployment, measurement approaches, comparative and descriptive analysis have been discussed by referring to the three Quinquennial National Statistics Survey Organisation, rounds.

The *fifth* chapter discusses about the Wholesale Price Index based Inflation, Linkage with Unemployment. It also provides the short run linkage between inflation and unemployment such as Phillips curve relationship.

The *sixth* chapter takes care of the linkages between inflation and real Economy. It discusses the output gap and the potential output gap that is related to the Phillips Curve theory. In addition, this chapter also examines whether the short run and long term relationship exists or not between inflation and output gap.

The **final** chapter deals with major findings of the study, conclusion and policy implications along with summary of the present study. In addition, to this, there are some other formalities including reference, annexure and glossary.

## **Findings and Conclusion**

**In the Pre-Recession Period**, the lending rate was affected due to supply shocks (permanent effect). The export has been affected due to both supply shocks and demand shocks (permanent & temporary effect) and there was no impact on the inflation rate. During the **Recession Period**, there was no impact on export and inflation rate. However, the lending rate were affected by supply shocks and demand shocks when structural breaks were also found in export, lending rate, and inflation rate. **In the Post-Recession Period**, all the variables such as export, lending rate, and inflation rate were affected by supply shocks and demand shocks and it is significant and proved. **In addition**, this chapter also aimed to comparatively, descriptively analyse the quinquennial unemployment rates taking into account the recession period. We found that there is significant impact of the Global Financial Crisis on recession and post-recession period in the Indian economy. Chapter 5 shows the relationship between inflation and Unemployment which is the main intent of this thesis. During the Global Financial Crisis, there was inverse relationship between the rate of inflation and the rate of unemployment in the Indian economy and this trend continued in the Pre-Recession (2002-2008), Post-Recession (2009-2010) and over the period of 2002 -2015. It was noted that when rate of inflation was high, then the rate of unemployment was low and vice versa. Furthermore, we also examined the Phillips curve relationship in the extended period from 1991 to 2015. We found existence of the short run and long run Phillips Curve theory for the period of study. We also found here a unidirectional rather than a bi-directional relationship between them. Chapter 6 shows the output gap concept which is proxy

variable of unemployment. We found positive output gap as well as short run relationship between the rate of inflation and rate of unemployment in Indian economy over the same period. Due to more investment and government expenditure in Indian economy, the role of public expenditure became highly significant. These outcomes conclusively establish that the Phillips curve relationship as a crucial tool for policymakers as a relevant theory even in the present day economic landscape.

This chapter is a summation of the whole thesis and an enunciation of the findings along with suggestions for further study in the similar domain. The existence or validity of Phillips curve in the present scenario is the most important concept. This theory emphasises on the notion that ideal concepts are not possible to achieve in either a developing or a developed economy. To achieve full employment, we have to contend with certain inflation. Should the governments keep a cap on the price levels, an environment of unemployment is inevitable. This is indeed a major dilemma for the governments and policymakers. At present, most of the economies use Phillips curve as a controlling tool in an inflationary situation.

### **Suggestions for Policy Recommendations**

- India is labour surplus economy; therefore, the government should provide more job opportunities. Phillips curve depicts a stable relationship, so the government should manage this relationship from time to time by focusing on both the fiscal policy and monetary policy such as demand and supply management of money.
- Taxation policy through the direct taxes and indirect taxes through the fiscal mechanism will finally assist in reducing unemployment and inflation. High inflation and high unemployment is harmful for a developing economy like India and it is not in the position to tolerate either.
- The main issue is how to achieve a workable balance between inflation and unemployment. This balance requires effective instruments. The policymakers should enlist concepts such as jawboning, wage guide post, wage freeze, tax linked wage policy and carrot & stick policy.

**Note:** *This research work's results are based on the dataset from the year 2002 to 2015. The current data is not part of the research's ambit. However, few limitations of the research work that could not be addressed are stipulated below:*

### **Limitations of the Present Study**

- This study is valid only for the Indian economy from 2002 to 2015.
  - This study has referred to National Sample Survey Organization (NSSO) for its empirical facts. But NSSO conducts its survey only after a period of five years. Hence, the data outsourced could be at variance from the actual one. Furthermore, the number of unemployed registered with the employment exchange is also highly unreliable.
- 

This study focuses on only the estimation of Phillips curve shape rather than Phillips curve slope in purely mathematical form.