Patterns of Inflation in India
A Comparative Study of Pre and Post Reform Era

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Abstract

The present paper attempts to explore the nature, trends and patterns of inflation in India during 1980-2016. The selected time period has been trifurcated purposively into three-time spans namely, pre-reform period (1980-90), after reform period (1991-2000) and subsequent period (2001-16). The endeavour of the paper is to examine the dynamics of inflation over the three-time spans from 1980-2016 in the Indian economy. It has been found that the inflation, based on WPI and CPI, is continuously rising since 1980. Up to 1995, the trend in CPI and WPI were same and there was no significant difference between them. However, after 1995, CPI has recorded larger growth as compared to WPI.This study further contributes in the available literature by comparing the patterns of Inflation in Pre and Post-reform Period.

Keywords: Inflation, Wholesale Price Index (WPI), Consumer Price Index (CPI), Money Supply, Industrial production (IIP).

JEL Codes
E30, E31, E50, E51

Introduction

Inflation is one of the most important macroeconomic variables which needs to be tackled prudently. It has been recognised in the economic literature that inflation is obvious consequence of the growth process. The inflation as amacro variable does not exist in isolation, it makes pattern with other important macro variables. The understanding of such pattern provides in depth understanding of the working of the economy which, in turn, provides adequate instruments in the hands of authorities to control the menace of inflation. Though, divergent opinions exist regarding relationship among these variables but adequate theory has been developed in due course. India is a developing country and has a long history of inflation. The pattern of relationship among these variables may be different from the established theory and what had been experienced in the developed countries.

Objectives of the Study

1. To study the pattern of inflation experienced in the Indian economy.
2. To trace the changes in inflation over a period of twenty-six years during the Pre and Post Reform Era.
3. To examine the dynamics of inflation over the three-time spans from 1980-2016 in the Indian economy.

Review of Literature

There has been plenty of studies on inflation in India. Most of these studies generally follow either a monetarist or a structuralist approach to determine inflation in India. According to Pandit (1993) Indian government was giving over importance to the demand-pull factors and ignored the cost push. The paper also emphasised that contractionary fiscal and monetary policies, cannotbe replaced for efficient resource utilization. On the contrary, it may have detrimental effects on thecountry.

Gary (1995) also studied the inflationin Nigeria for the time period between 1960 and 1993 and foundout thatincrease in money supply is primarily responsible for inflation in Nigeria. Also, devaluation and agro-climatic conditions played a prominent role. Similarly, Lim & Adedeji (1997) tried to find out the major factors causing inflation in Turkey for the period between 1970 and 1995. The paper used Johansen's cointegration approach and came up with a conclusion that money supply, wages, export and import prices have positive impacton Inflation.

John (2003) has studied post liberalization data to find out the causality between monetary aggregates and exchange rates. Vector

Autoregressive (VAR) technique has been used to figure out as to which monetary aggregate explains the inflation in the best way. It has been concluded that the broad money measure (M3) is better.

Bishnoi and Koirala (2006) examined the dynamics of inflation models in Nepal, for this purpose they have used a test of cointegration between inflation and its explanatory variables. It was established that there was long period cointegrating relationship among relevant variables.

Mosayed& Mohammad (2009) also studied the factors affecting inflation in Iran for the data from 1971-2006. They have used Autoregressive and Distributed Lag (ARDL) model and came to the conclusion that exchange rate, money supply, gross domestic product, and foreign prices are equally responsible for high prices in Iran.

On the same lines Sahadudhen (2012) examined the factors affecting inflation in India on the quarterly data (1996 Q1 to 2009 Q3) by making use of the cointegration and Vector Error Correction model. It was concluded that GDP and broad money have a good effect on inflation.

Laurence Ball, Anusha Chari AndPrachi Mishra (2016) investigates the behaviour of quarterly headline inflation and core inflation in India since 1994. They have tried to explain Core inflation with a Phillips curve and also found that Headline inflation is more volatile as compared to the Core.

However, Ravindra H Dholakia &Virinchi s Kadiyala (2018) found that the dynamics of Indian inflation has changed tremendously. They also found that the headline inflation reverts to the core and but the opposite of this is not true which means that there are no the second-round effects.

Database and Methodology

To explore the dynamics of inflation in Indian economy, monthly data for the period from 1980 till 2016 has been used. This period encompasses the eras of high to moderate inflation hence; represents adequate variation in the data. Relevant macroeconomic variables have been obtainedfrom official website of Ministry of Statistics and Policy Implementation (*www.mospi.gov.in*), RBI (*www.rbi.org.in*). The data so obtained has beenanalysed by using various statistical techniques. Arithmetic mean, median, variance, correlation, skewness and kurtosis have been used for the general description of the variables.

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Prsent Study

Though, it cannot be denied that inflation is a perpetual problem and needed to be taken care always. But it is expected that with the change in the structure of the economy in terms of the sectoral distribution of the economy, the inflation may show different trends and patterns during the three period segments. As, the role of service sector has increased in recent decades and the share of agriculture in GDP has declined considerably in recent decade. Accordingly, reflection in the nature of inflation and its relationship with other variables are obvious consequences.Not only the structure of the economy has witnessed changes, under the influence of globalization and the consumerism has impacted the consumption pattern of the people. New things are appearing in the consumption basket of the people and some are disappearing from it. Therefore, it is interesting to study the nature and trendsof inflation in India.

Inflation: Nature and Trends

Inflation in India is measured by using mainly three price indices. Changes in the prices of goods at the wholesale price level are measured by the Wholesale Price Index (WPI) whereas changes in prices of goods and services at the retail level are measured by the Consumer Price Index (CPI). Another technique to measure changes in prices, apart from estimating price indices, is to use the Gross National Product (GNP) deflator. However, GNP numbers are not used to measure inflation in India.

Wholesale Price Index (WPI)

The changes experienced in the wholesale price level are gauged by the Wholesale Price Index (WPI). WPI for the base year 2004-05 are based on the weighted average of 676 commodities and 5482 price quotations which are taken into account while calculating the index. The constituents of WPI are categories between three categories – primary articles (food, non-food and minerals), fuel and power (coal, mineral oils and electricity) and manufactured products (food products, beverage, tobacco, textiles, wood, paper, leather, rubber and chemicals).

The WPI is a weighted average of three categories of commodities. The shift in weight overtime provides us an indicator of the changing production and use pattern of the commodities. These weights shift indicates the structural change in the economy. As the economy moves from lower level of growth to higher level the weights are expected to shift away from the primary commodities and in favour of manufactured and fuel and power. Indian economy has witnessed dramatic growth after the introduction of new economic policy in 1991. Table reveals that weight of primary items has decreased to 20.1 percent in 2004-5 to from 22 percent in 1993-94. Its weight was 32.29 in 1981-81.

However, such weights have been seen increasing overtime in the categories of fuel and manufactured products. The growing economy is expected to experience such shifts (Table). The figures will be more revealing, if the shift in sub-categories is seen minutely. In primary articles, shares of food and non-food articles have witnessed decrease overtime. In the category of fuel and power, the weights of oils and coal have increased whereas

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decreased in electricity component. So far, the weights in the manufactured products are concerned, the weight of traditional items has declined and it has increased in other items which are emerging important in the growth process.

Table 1: Wholesale Price Index Weights

Commodity	1981-82	1993-94	2004-05
Commodities	100	100	100
(A) Primary Articles	32.29	22	20.1
Food Articles	17.39	15.4	14.3
Non-Food Articles	10.08	6.1	4.3
Minerals	4.82	0.5	1.5
(B) Fuel and Power	10.66	14.2	14.9
Coal	1.26	1.8	2.1
Mineral Oils	6.67	7	9.4
Electricity	2.73	5.5	3.5
(C) Manufactured Products	57.05	63.7	65
Food products	10.14	11.5	10
Beverage and Tobacco	2.15	1.3	1.8
Textiles	11.54	9.8	7.3
Wood and Wood Products	1.2	0.2	0.6
Paper and Paper Products	1.99	2	2
Leather	1.02	1	0.8
Rubber and Plastic	1.59	2.4	3
Chemicals	7.35	11.9	12
Non-Metallic	2.48	2.5	2.6
Machinery and Tools	7.63	8.3	10.7
Transport and Equipment	6.27	8.4	8.9
Basic Metals and Alloys	2.71	4.3	5.2
	0.97	0	0

Source: Office of the Economic Advisor, Ministry of Commerce

The WPI is a weighted average of three categories of commodities

Consumer Price Index (CPI)

Information regarding Consumer Price Index (CPI) in India is available in four formats namely (a) CPI for Industrial Labourers (IL); (b) CPI for Agricultural Labourers (AL); (c) CPI for Rural Labourers (RL); and (d) CPI for all India (or combined CPI) (CPI for urban Labourers was discontinued in April, 2010). India did not have one composite CPI before the start of all India CPI. The broad items of consumption expenditure of CPI (IL) and CPI Composite are divided into 5 groups (a) Food; (b) Pan, Supari, Tobacco and Intoxicants; (c) Fuel and Light; (d) Clothing, Bedding and Footwear; (e) Miscellaneous (includes medical care, education, recreation and amusement.

Table 2: Weights Assigned to Consumer Price Index (Base2001)

Particulars	Weights
Food	57
Pan, Supari, Tobacco and Intoxicants	3.15
Fuel and Light	6.28
Housing	8.67
Clothing, Bedding and Footwear	8.54
Miscellaneous	16.36
All Groups	100

Source: Ministry of Labour and Employment

Table 3: Weights Assigned to Combined Consumer Price Index (Base 2010)

Particulars	Weights
Food, Beverage and Tobacco	49.71
Fuel and Light	9.49
Housing	4.73
Clothing, Bedding and Footwear	9.77
Miscellaneous	26.31
Total	100

Source: Ministry of Labour and Employment

The table 4.2 and 4.3 depict that there is dramatic change in the weights assigned to different groups' overtime. The weights of food items have reduced overtime whereas such weights have increased in terms of clothing, housing and fuel. These are the indicators of a growing economy.

Consumer Price Index (CPI) and Whole Sale Price Index (WPI) Trends

CPI in India is considered as the true representative of inflation. For, it reflects the ground realities by tracking the prices of the goods that are purchased on daily basis by general public. This index is very much popular in most of the countries. In India now, bimonthly monetary policy makes the CPI as the base for the policy inputs.

Moreover, inflation rates and its control are always on the agenda of respective governments. Therefore, to control and make the appropriate policy in this context it is important to watch the trends in the indices of CPI and WPI. The trends in the CPI and WPI are presented in table.
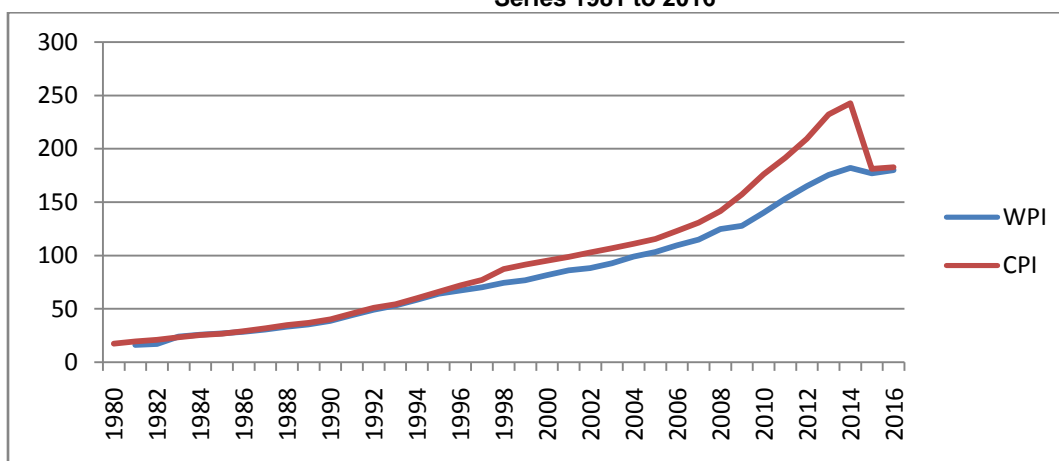
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Table4: Consumer Price Index (CPI) & Wholesale Price Index (WPI) Series 1981 to 2016 (2004-05=100)

Pre-Reform Period			Post-Reform Period			Subsequent Period		
YEAR	WPI	CPI	YEAR	WPI	CPI	YEAR	WPI	CPI
1981	16.40	19.56	1991	44.21	45.77	2001	86.06	98.78
1982	17.18	21.10	1992	49.31	51.17	2002	88.19	103.02
1983	24.32	23.60	1993	53.14	54.42	2003	92.88	106.94
1984	26.01	25.57	1994	58.67	59.98	2004	99.02	110.97
1985	27.22	26.99	1995	64.37	66.12	2005	103.37	115.68
1986	28.72	29.34	1996	67.24	72.05	2006	109.59	122.90
1987	30.73	31.93	1997	70.32	77.21	2007	114.94	130.75
1988	33.41	34.80	1998	74.41	87.43	2008	124.92	141.67
1989	35.66	36.89	1999	77.03	91.51	2009	127.86	157.08
1990	38.89	40.20	2000	81.84	95.18	2010	140.08	175.92
						2011	153.35	191.50
						2012	164.93	209.33
						2013	175.35	232.17
						2014	182.03	246.92
						2015	177.03	261.42
						2016	179.89	273.56

Note: Data based on average of Monthly data for obtaining Annual figure.

Source: RBI (*www.rbi.org.in*); Ministry of Statistics and Policy Implementation (*www.mospi.gov.in*)

Graph1- Consumer Price Index (CPI) & Wholesale Price Index (WPI) Series 1981 to 2016

Source: Compiled from the Table

The inflation chart and table above feature an overview of the Indian inflation based on WPI & CPI since 1980. From the above table and graph, it appears that inflation, based on wholesale price index & CPI, has been continuously rising since 1980 except for few years. The lowest figure of WPI & CPI was recorded for the year 1981-82 &, while the highest one for WPI is 182.03 for the year 2013-14& for CPI is 273.56 for the year 2015-16. The Trends can be studied into three time spans namely, pre-reform period (1980-90), Post reform period (1991-2000) and subsequent period (2001-16). Pre-reform period- for this phase, comparison of data is done over a period from 1980-81 to 1989-90. It can be seen from the table that both WPI & CPI registered a continuous increase in this phase. WPI & CPI inflation never entered the negative territory during this phase. Though the rate of increase is not uniform in both. In the post reform period the rate of increase in WPI is greater as compared to CPI & the third phase was very turbulent and severe in terms of the inflation, as it registered a big jump in WPI to 182.03 in the year 2014-15 & in CPI to 273.56 in the year 2015-16. It thus surfaces that there is a clear pattern of increase in the whole period.

Table 5: Trend Growth Rate: Consumer Price Index (CPI) & Wholesale Price Index (WPI) (1981-2016)

Period	Trend Growth Rate		Standard Deviation	
	WPI	CPI	WPI	CPI
Pre-Reform Period	9.68	8.25	7.40	6.88
Post Reforms Period	6.85	8.77	12.47	17.50
Subsequent Period	5.78	7.45	35.25	61.45
Total	6.83	7.68	51.73	73.8

Source: Computed by the researcher.

It can be seen from the above table that the Trend Growth Rate of WPI inflation was highest in the Pre-reform period as is clearly depicted in the table& the overall TGR stands out to be 6.83 percent. Whereas the Trend Growth Rate of CPI inflation was registered highest in the post reform period.The overall TGR of both the indicators is higher in CPI as compared to WPI.

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Table 6: Correlation between WPI & CPI

Period	Correlation Coefficient
Pre-Reform Period	.979* (0.00)
Post Reforms Period	.987* (0.01)
Subsequent Period	.944* (0.00)
Total	.986* (0.00)

Source: Computed by the researcher
*Insignificant values, Figures in Parentheses are P values

A look at above table also reveals that the inflation rate based on both the indicators has been volatile, particularly during the Subsequent period. The volatility in WPI & CPI inflation is highest during this phase, as indicated by the standard deviation of 51.73 & 73.8 in WPI & CPI respectively. The highest volatility recorded is for the last phase. The fluctuations in WPI & CPI inflation are however moderate in the Pre-reform& post reform period, as is clear from the standard deviation of the same.

Major Research Findings

The major findings emerging out of the analysis can be stated as follows:

1. The weights of primary articles have declined in weights of whole sale price index whereas such weights have registered considerable increase in the categories of manufacturing and fuel and power. The shift in weights overtime provide us an indicator of the changing production and use pattern of the commodities in Indian set up. Moreover, the weights of traditional items have declined and it has increased in other items which are emerging important in the growth process.
2. The changes witnessed in weights of CPI are indicators of a growing economy. For, the weights of food items have reduced overtimes and such weights have been increased in terms of clothing, housing and fuel.
3. The inflation, based on WPI & CPI, has been continuously rising since 1980.Up to 1995, the trend in CPI & WPI were same and there was no significant difference between them. However, after 1994, CPI has recorded larger growth as compared to WPI. Besides, such trend continued in subsequent period. Such gap was more dramatic during this period. This is a question of major concern. Why such divergence has occurred? Conventionally the main reason for the CPI inflation being higher than WPI inflation is that food articles had a higher weight (48.3 per cent) in CPI than in WPI (24.3 per cent). The second main reason is the Non-food inflation. WPI and CPI have very different composition. Fuel and power category has a much bigger weight in WPI than in CPI. What is included in this category also differs very much. The third reason is that CPI includes "Service Sector", rising cost of education, health services leads to

bigger CPI. As India grows, demand for services increases from urban middle class, due to which CPI increases.

4. During the period under study the CPI grew faster than WPI. Surprisingly, WPI grew faster than CPI during pre-reform period. However, the rate of growth in CPI was faster than WPI during the post reform period and subsequent periods. Inflation rate based on both the indicators has been volatile, particularly during the subsequent period. The volatility in WPI & CPI inflation is highest during this phase. The fluctuations in WPI & CPI inflation are however moderate in the Pre-reform& post reform period.

Conclusion

Nature of inflation during the period under study has been quite different. Prices of many commodities responsible for inflation during the pre-reform period did not register substantial increase during the post reform period and their place has been taken by other commodities. Prices of fuel, power, light and lubricants rose at a rapid rate in the post reform period. During the Post Reform period there had been higher increase in the prices of manufactured goods compared to that of agricultural commodities.

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