

## **INFLATION IN INDIA: A STUDY OF PRE AND POST INFLATION TARGETING PERIOD**

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### **ABSTRACT**

Price instability in any country is like a human body with diseases. Countries which have higher price volatility are suffering from serious economic problems with social and political unrest. Consequently economies considered inflation as a plague and tries to control it by adopting various monetary and fiscal policy techniques. Among different monetary policy techniques the recent origin technique to this age old problem is 'Inflation Targeting'. The first country to adopt this strategy was New Zealand in 1989 followed by other countries. After observing many successful stories of different countries in stabilizing the inflation rate using Inflation Targeting(IT) strategy, Reserve Bank of India (RBI) also decided to adopt this strategy in 2015 based on Urjit Patel committee report.

With this backdrop the present study intends to compare the level of inflation before and after the adoption of Inflation Targeting in India. Further, it also measures the trends and pattern of inflation in India. The study is based on secondary data collected from the RBI, Ministry of Statistics and Programme Implementation (MoSPI) and office of the Economic Adviser. Though the RBI considers only Consumer Price Index (CPI) under Inflation Targeting strategy, the study uses Wholesale Price Index (WPI) as well. The collected data for the research are analyzed with simple statistical techniques such as graphs, percentages and Dummy Variable Regression analysis. The results of this analysis have some policy implications.

**Keywords:** Inflation, Consumer Price Index, Monetary Policy, Inflation Targeting.

### **1. INTRODUCTION**

'Macroeconomic policy' has become a very important economic policy instrument of modern welfare state to achieve the desired changes in the size and composition of National Income and

employment in the economy. The two important subdivisions of macroeconomic policy are the monetary policy and fiscal policy. These two policies are applied to serve as instruments of government economic policy<sup>1</sup>. From the days of Adam Smith till today the main focus of macroeconomic thinkers and policy makers is how to achieve macroeconomic stability. The macroeconomic stabilization needs the achievements of acceptable inflation rate, optimal growth of output, respectable value of the currency and favourable balance of payments.

Monetary policy is primarily concerned with the price stability. It is increasingly receiving attention in the world in determination of GDP growth and price level. In India also the main objective of monetary policy is that maintaining price stability.

In India, monetary policy framework has undergone significant transformation over time. In 1960s, as inflation was considered to be structural and inflation volatility was mainly caused by agricultural failures, there was greater reliance on selective credit controls. The aim was to regulate bank advances to sensitive commodities to influence production outlays, on the one hand and to limit possibilities of speculation, on the other. In the 1970s, there was a surge in inflation on account of monetary expansion induced by expansionary fiscal policies besides the oil price shocks<sup>2</sup>. Hence after 1970s to maintain the price stability the RBI and government of India have evolved some monetary policy frameworks as represented in the following table 1.

**Table 1: Different Monetary Policy Strategies followed by RBI**

Monetary Policy Strategy	Period	Focus is on
Pre Monetary Targeting Period	1970-71 to 1984-85	-
Monetary Targeting Period	1985-86 to 1997-98	Money Supply
Multiple Indicator Approach Period	1998-99 to 2014-15	Inflation, Growth, Employment, Exchange rate.
Inflation Targeting Period	Since 2015	Inflation

As the above table 1 mentioned India has been following different monetary policy frameworks in different time periods. Among them the recent origin monetary policy strategy is ‘Inflation Targeting’ in India. “Inflation Targeting (IT) is an economic policy, in which the central bank estimates and makes public a projected, or "target", inflation rate and then attempts to steer actual inflation towards the target through the use of interest rate changes and other monetary

<sup>1</sup> Vaish M C (2014), *Monetary theory*, Vikas publishing house PVT LTD, Noida, UP, India.

<sup>2</sup> Mohanty Deepak, Executive Director of the Reserve Bank of India, Speech at the Conference of the Orissa Economic Association, Baripada, Orissa, 21 February 2010.

tools”<sup>3</sup>. The first country to adopt this strategy was New Zealand in 1989 followed by Canada, United Kingdom, Australia and other countries. After many countries started to use this strategy as their monetary policy framework, it has received attention by many researchers to examine pros and cons of this new monetary policy framework.

Ball and Sheridan (2003) found that countries with high inflation have experienced reduction in their inflation level after the adoption of IT framework. Vega and Winkelried (2005) and Levin Andrew T, Natalucci Fabio M and Piger Jeremy M (2004), also found that IT countries have reduced their level of inflation. In 2010, in their study Roger Scott and Carvalho-Filho Irineu De suggested that, to deal with economic crisis IT framework is more effective. Hammond gill (2012) in his study sponsored by the Bank of England on “State of the art of inflation targeting” discussed many success stories of the IT countries.

## **2. INFLATION TARGETING (IT): THE CURRENT MONETARY POLICY FRAMEWORK**

Inflation targeting is a monetary policy strategy used by Central Banks for maintaining price level at a certain level or within a range. It indicates the primacy of price stability as the key objective of monetary policy. The argument for price stability stems from the fact that rising prices create uncertainties in decision making, adversely affecting savings and encouraging speculative investments. Inflation targeting brings in more predictability and transparency in deciding monetary policy. If the central banks could ensure price stability, households and companies can plan ahead, negotiating wages on the basis of expecting low and stable inflation. Various advanced economies including United States, Canada and Australia have been using inflation targeting as a strategy in their monetary policy framework. The case for inflation targeting has been made in India as the country has been experiencing a high level of inflation till recently<sup>4</sup>. Hence the RBI decided to form a committee namely “Expert Committee to Revise and Strengthen the Monetary Policy Framework” headed by Urjit Patel. The committee finally recommends for adopting a new monetary policy framework in India. The main recommendation of the committee was to anchor monetary policy to the Consumer Price Index (CPI) and to bring down CPI inflation to 4 % with a band of +/- 2 %.

## **3. OBJECTIVE OF THE STUDY**

To analyze the trends and pattern in the level of inflation during pre and post Inflation Targeting period in India.

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<sup>3</sup> Sudacevschi Mihaela (2011), “Pros and Cons of Inflation Targeting Strategy” Lex ET Scientia (LESIJ) Vol. 18, Issue 2, p.no 228-235.

<sup>4</sup> [http://arthapedia.in/index.php?title=Inflation\\_Targeting\\_In\\_India](http://arthapedia.in/index.php?title=Inflation_Targeting_In_India)

**4. HYPOTHESIS OF THE STUDY**

There is a significant decrease in inflation rate during Inflation Targeting period.

**5. METHODOLOGY**

The present study based on the use of the secondary data collected from the RBI, Ministry of Statistics and Programme Implementation (MoSPI) and office of the Economic Adviser.

**Table 2: Sources of data.**

Variable	Frequency of Data	Time Period	Source
Rural CPI	Monthly Yearly	Jan 2012 - Sep 2018 2013-14 to 2017-18	RBI
Urban CPI	Monthly Yearly	Jan 2012 - Sep 2018 2013-14 to 2017-18	RBI
Combined CPI	Monthly Yearly	Jan 2012 - Sep 2018 2013-14 to 2017-18	RBI
CPI for Industrial Worker	Monthly Yearly	Jan 2012 - Sep 2018 2006-07 to 2017-18	RBI
CPI for Agricultural Labour	Monthly Yearly	Jan 2012 - Sep 2018 2006-07 to 2017-18	RBI
WPI	Yearly	2012-13 to 2017-18	Office of the Economic Adviser, Ministry of Finance, Govt. of India.
Components of CPI	Monthly	Jan 2014 - Sep 2018	MoSPI, Govt. of India.

The collected data for the research are analyzed with simple statistical techniques such as graphs, percentages and Dummy Variable Regression analysis.

To compare the level of inflation rate between pre and post inflation targeting the study used dummy variable model. The dependent variables are different forms of CPI namely, Rural CPI, Urban CPI, Combined CPI, CPI for Agricultural workers and CPI for Industrial Labours. The independent variable is dummy variable represent time before and after implementation of inflation targeting period assuming the values of 0 and 1. 0 and 1 stands for pre and post inflation targeting period respectively. Model has been specified as follows:

$$Y_t = \beta_0 + \beta_1 D_t + U_t$$

Where,

Y = Different forms of CPI

$\beta_0$  = Intercept

$\beta_1$  = Coefficient

D = Inflation Targeting Dummy

U = Error Term

## 6. RESULTS AND DISCUSSIONS

This section discusses the results of the study pertaining to the trends and pattern of inflation level before and after the implementation of IT. Keeping in view the objective of the study, the results are elaborated as follows:

**Table 3: Descriptive Statistics of Different forms of CPI in India**

Different forms of CPI	N		Minimum		Maximum		Mean		Std. Deviation	
	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT	Before IT	After IT
Rural CPI	37	44	3.15	1.52	12.34	6.66	8.91	4.70	2.16	1.27
Urban CPI	37	44	3.48	1.41	10.58	5.39	8.31	4.02	1.93	0.91
Combined CPI	37	44	3.27	1.46	11.51	6.07	8.63	4.39	2.02	1.05
CPI for Industrial Worker	37	44	4.12	1.08	12.06	6.72	8.82	4.45	2.19	1.64
CPI for Agricultural Labour	37	44	4.63	0.8	13.43	6.69	9.36	3.47	2.68	1.55

Source: Researcher computed the results using RBI data.

Statistical analysis of data serves several major purposes. The role of descriptive statistics is that, it summarizes large mass of data into understandable and meaningful form. The reduction of data facilitates further analysis<sup>5</sup>. Since the discussion of any data begins with analyzing the descriptive statistics of the data set, the present study reported the Descriptive Statistics of

<sup>5</sup> Krishnaswami O R and Ranganatham M (2011) *Methodology of Research in Social Sciences*, Second Revised Edition, Himalaya Publishing House, Mumbai.

different forms of CPI before and after the implementation of Inflation Targeting (IT) in India in the above table 3. The study included 37 monthly observations before the implementation of IT and 44 monthly observations after the implementation of IT for all forms of CPI. The sample mean of all forms of CPI in the pre IT period was very high compare to post IT period(declined from 8-9% to 3-4%), which clearly specified that after the implementation of IT the level of inflation rate, has been stabilized in India. The sample standard deviation was also less in the post IT period compare to pre IT period, which indicates less volatility in consumer prices in the post IT period.

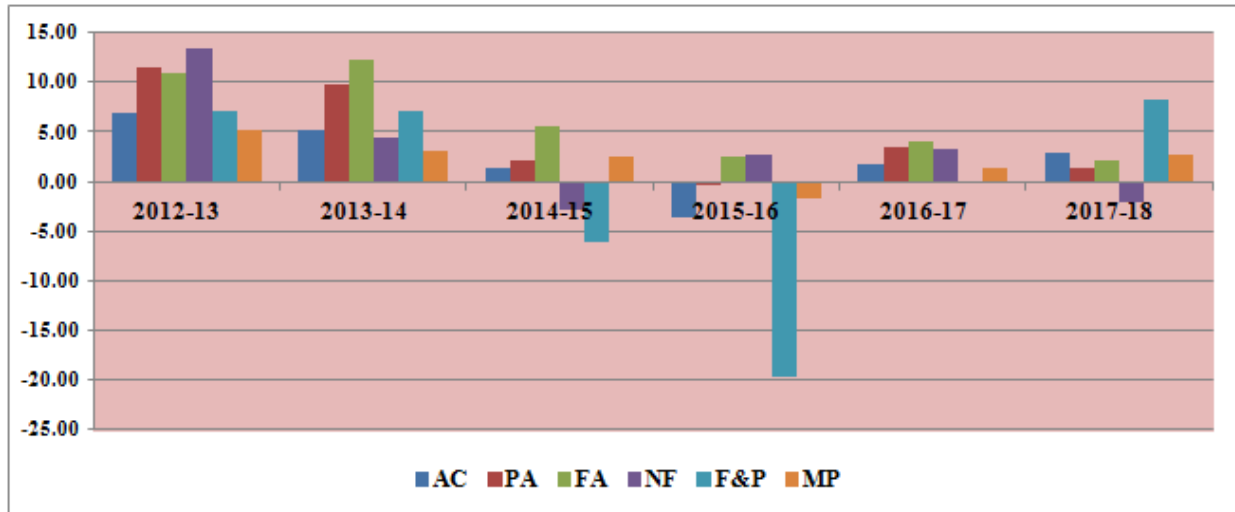
**Table 4: Trends in Wholesale Price Index**

Year	AC	PA	FA	NF	F&P	MP
2012-13	6.90	11.44	10.87	13.33	7.06	5.25
2013-14	5.20	9.85	12.31	4.46	7.11	3.05
<b>2014-15</b>	<b>1.26</b>	<b>2.16</b>	<b>5.62</b>	<b>-2.82</b>	<b>-6.12</b>	<b>2.55</b>
<b>2015-16</b>	<b>-3.65</b>	<b>-0.38</b>	<b>2.57</b>	<b>2.77</b>	<b>-19.65</b>	<b>-1.78</b>
<b>2016-17</b>	<b>1.73</b>	<b>3.42</b>	<b>4.03</b>	<b>3.33</b>	<b>-0.26</b>	<b>1.34</b>
<b>2017-18</b>	<b>2.86</b>	<b>1.32</b>	<b>2.03</b>	<b>-2.15</b>	<b>8.15</b>	<b>2.69</b>

Notes: 1. AC: All Commodities. 2. PA: Primary Articles. 3. FA: Food Articles.  
4. NF: Non-food Articles. 5. F&P: Fuel and Power. 6. MP: Manufactured Products.  
7. FA and NF are part of PA.

Source: Office of the Economic Adviser, Ministry of Commerce and Industry, Government of India.  
Base Year: 2011-12

**Graph 1: Trends in Wholesale Price Index**



Source: Researcher drawn the graph using Office of the Economic Adviser data.

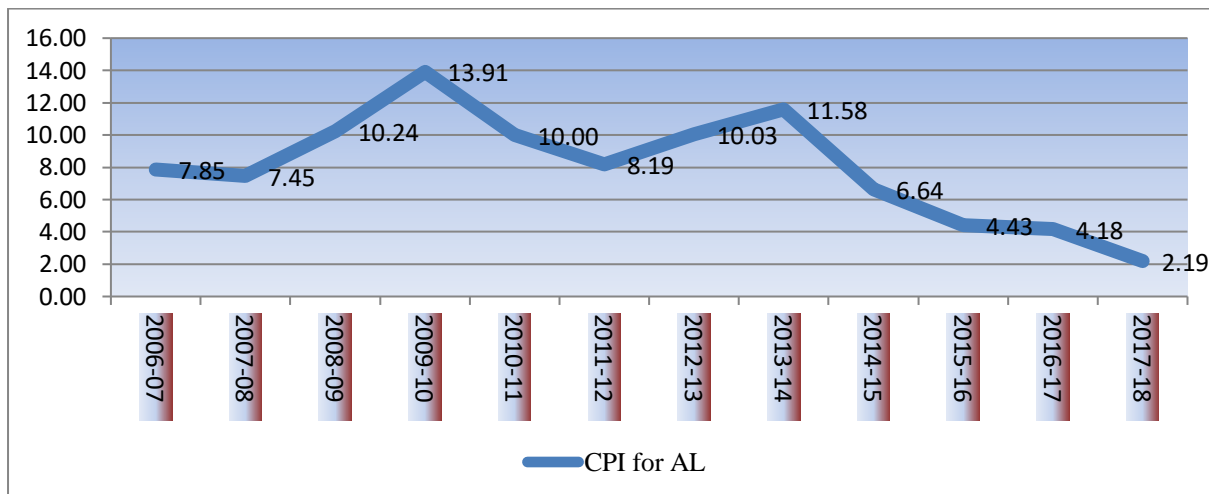
The data in table 4 and figure 1 lists the wholesale inflation rates from the financial year 2012-13 to 2017-18 across all categories of inflation calculation. There are two distinctive phases that are to be look into here are pre inflation targeting policy phase and post inflation targeting policy phase. If we compare the inflation trends in ‘All Commodities’ among these phases in the pre phase i.e. from financial year 2012-13 to 2013-14 we can see the wholesale inflation rate is very high. But after the implementation of Inflation Targeting Policy i.e. post Inflation Targeting Policy phase (2014-15 to 2017-18) the index showed the rate of wholesale inflation is very low. The index in ‘Primary Articles’ category (which includes ‘Food Articles’ and ‘Non Food Articles’) is the highest contributor to the wholesale inflation in both pre phase and post phase. In ‘Fuel and Power’ category the pre phase depicts 7% of wholesale inflation rate and in the beginning of the post phase i.e., during 2015-16 there witnesses the highest disinflation of 19.65% which turns to highest inflation of 8.15% in 2017-18. ‘Manufacturing sector’ also shows the same trends as that of ‘All Commodities’.

**Table 5: CPI for Agriculture Labours (AL)**

Year	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
CPI for AL	7.85	7.45	10.24	13.91	10.00	8.19	10.03	11.58	6.64	4.43	4.18	2.19

Source: RBI, Base Year: 1986-87 = 100 for AL

**Graph 2: CPI for AL**



Source: Researcher drawn the graph using RBI data.

The above table 5 and graph 2 lists the Consumer Price Index for Agricultural Labours from 2006-07 to 2017-18. In the pre phase the inflation rate is started from 7.85 slightly decreased to 7.45 in the following year then started to increase and reached the highest inflation of 13.91 during 2009-10. Then again it decreased to 8.19 during 2011-12 and increased to 11.58 in the year before the implementation of Inflation Targeting Policy. After the implementation of Inflation Targeting Policy the trend shows constant decrease in Consumer Price Index for Agricultural Labours. If we see the overall scenario it clearly shows that the pre phase has the higher rates of inflation than the post phase. In other words after the implementation of Inflation Targeting Policy the inflation rates shows the downward trend.

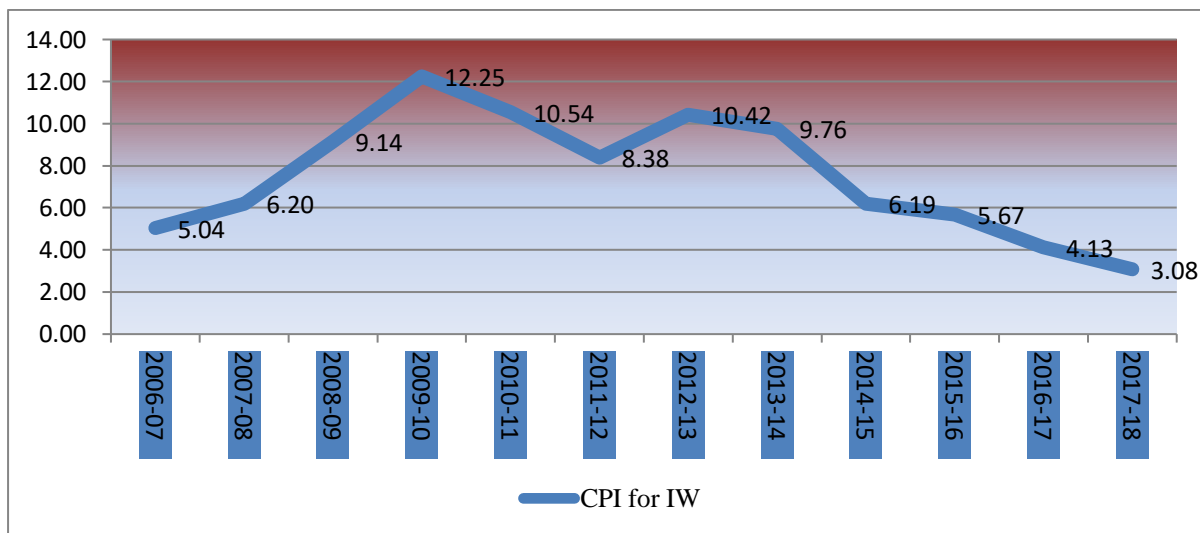


**Table 6: CPI for Industrial Workers (IW)**

Year	2006 -07	2007 -08	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	<b>2014 -15</b>	<b>2015 -16</b>	<b>2016 -17</b>	<b>2017 -18</b>
<b>CPI for IW</b>	5.04	6.2	9.14	12.25	10.54	8.38	10.42	9.76	<b>6.19</b>	<b>5.67</b>	<b>4.13</b>	<b>3.08</b>

Source: RBI, Base Year: 2001 = 100 for Industrial Workers (IW)

**Graph 3: CPI for Industrial Workers (IW)**



Source: Researcher drawn the graph using RBI data.

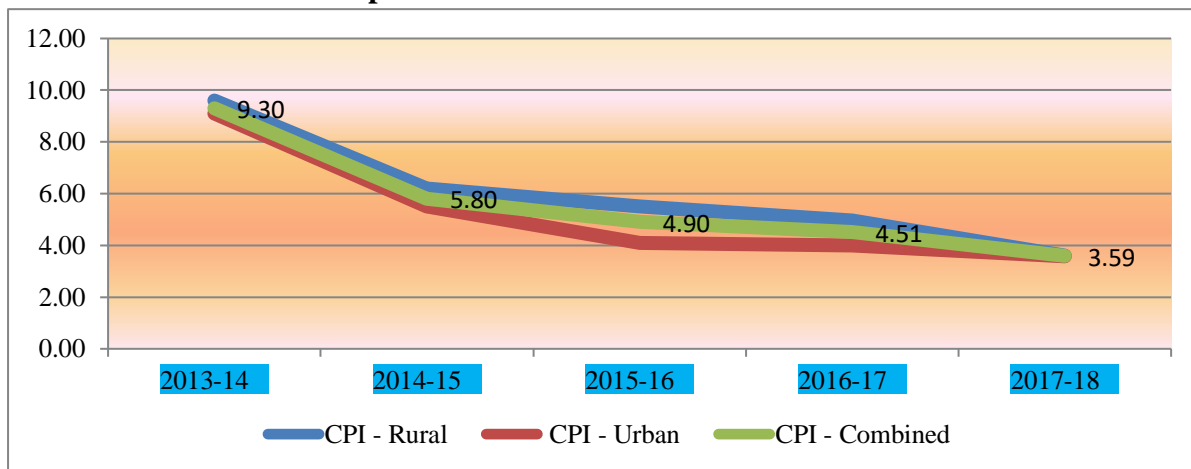
Table 6 and graph 3 lists the Consumer Price Index for Industrial Workers from the year 2006-07 to 2017-18. The trend shows the similar pattern that of CPI for Agricultural Labours. As the table 6 shown started with the lowest inflation rate of 5.04% among pre phase years and increased to the highest of 12.25% during 2009-10. Then it decreased to 8.38% during 2011-12, increased to 10.42% during 2012-13, then again decreased to 9.76% during 2013-14. The post IT phase saw the beginning with 6.19% during 2014-15 then as noted earlier started to decrease all the way to 3.08%.

**Table 7: Trends in Consumer Price Index**

Year	CPI - Rural	CPI - Urban	CPI - Combined
2013-14	9.60	9.10	9.30
2014-15	6.20	5.50	5.80
<b>2015-16</b>	<b>5.50</b>	<b>4.10</b>	<b>4.90</b>
<b>2016-17</b>	<b>4.96</b>	<b>3.99</b>	<b>4.51</b>
<b>2017-18</b>	<b>3.60</b>	<b>3.58</b>	<b>3.59</b>

Source: RBI, Base Year: 2012 = 100

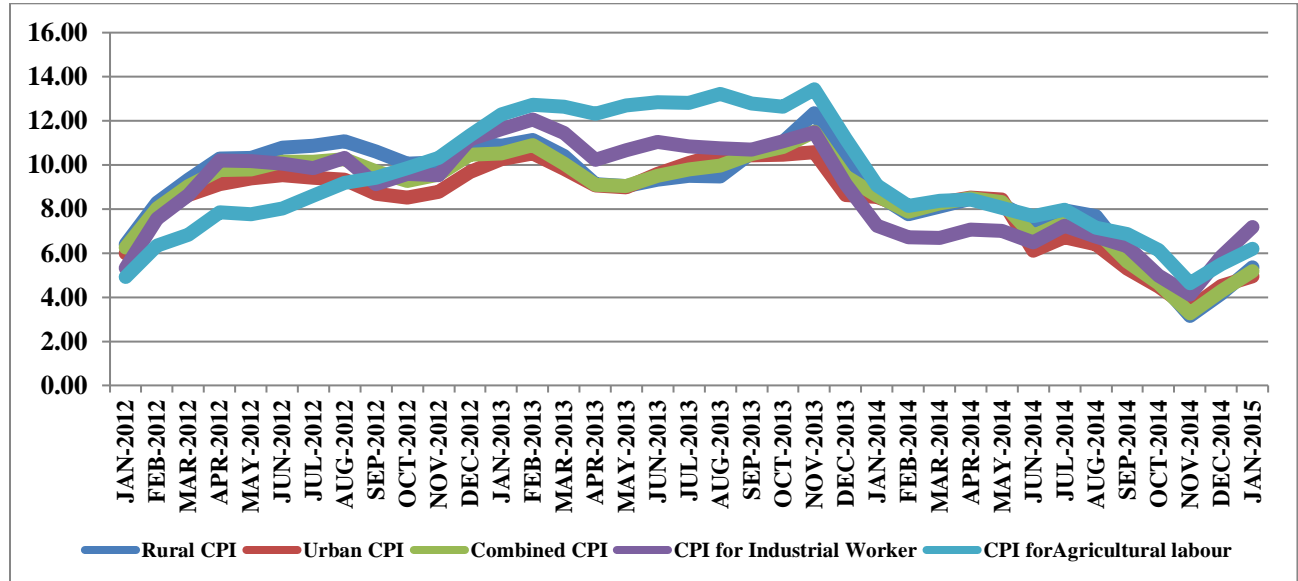
**Graph 4: Trends in Consumer Price Index**



Source: Researcher drawn the graph using RBI data.

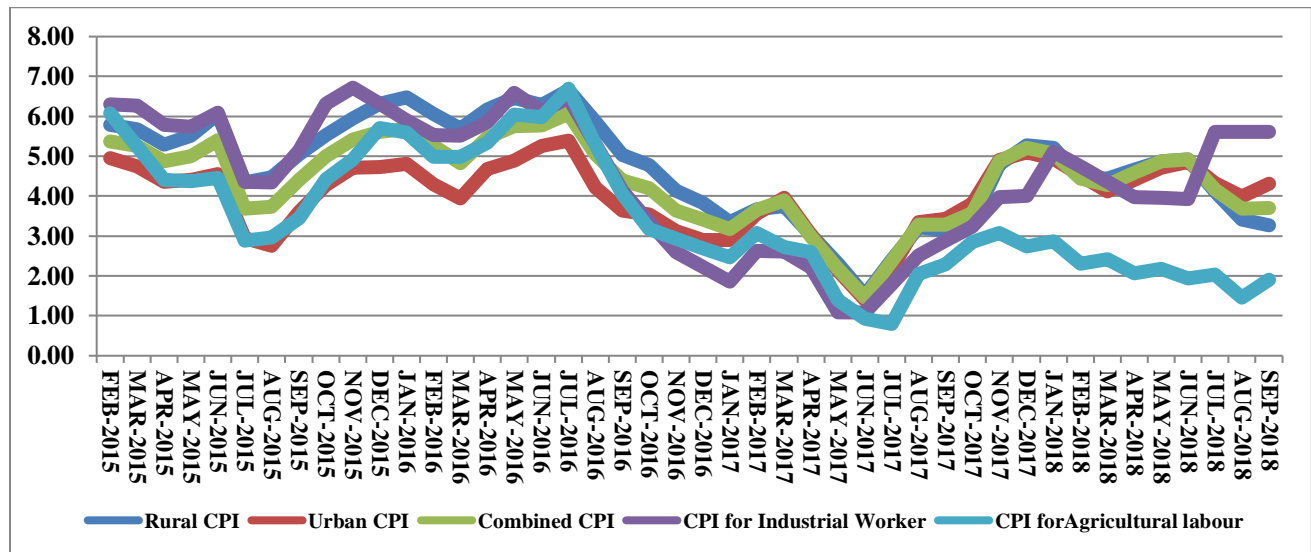
The above table 7 and graph 4 lists the Consumer Price Index for ‘Urban’ areas, ‘Rural’ areas and ‘Combined’ data. All the categories here show the similar trends of declining inflation rates from 9.30(Combined), 9.60(Rural) and 9.10(Urban) to 3.59(Combined), 3.60(Rural) and 3.58(Urban). It can ascertain that after the 2014-15 the Inflation Targeting Policy clearly has greater role in reigning in the inflation rates.

Graph 5: Trends in CPI pre IT period



Source: Researcher drawn the graph using RBI data, Base Year: 2012 = 100.

Graph 6: Trends in CPI Post IT period

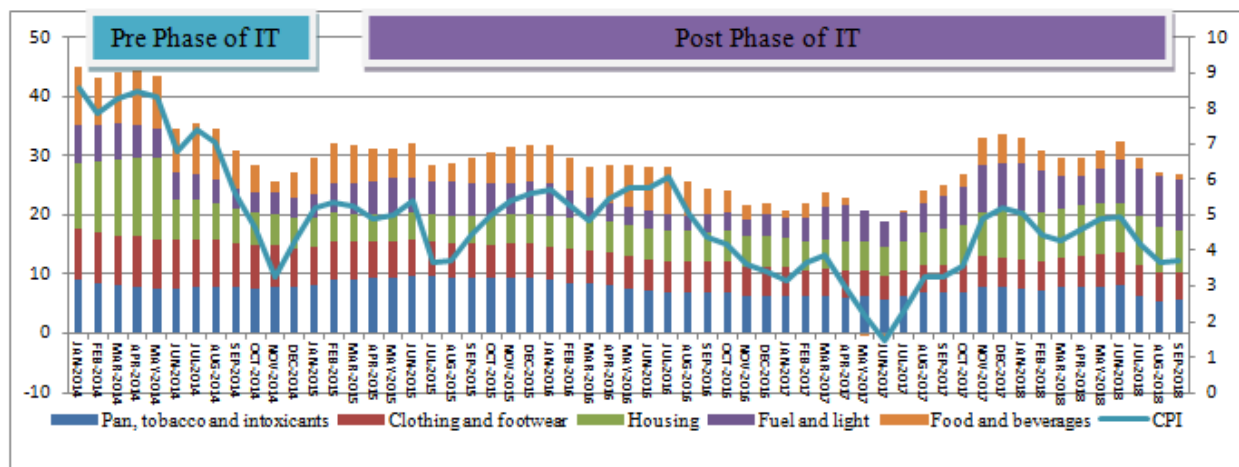


Source: Researcher drawn the graph using RBI data, Base Year: 2012 = 100.

The above two graphs 5 and 6 shows the trends in CPI across all categories on monthly basis, pre Inflation Targeting Policy phase and Post Inflation Targeting Policy phase. In the pre phase all the indices peak in November 2013. On an average Agricultural CPI Index trend shows on

higher margin continuously from November 2012 to December 2013 and on extreme lower margin from January 2012 to August 2012. This Phase shows more or less stable trends comparing to the other phase. The post phase shows more volatile trends as depicted from the more spikes being seen visibly in the latter graph. But the more distinguished difference is all the indices never crossed the 7% mark in the post phase. In this phase also CPI for agricultural labour shows the extreme trends of highest and lowest of 6.69 and 0.82 respectively. This comparison of two trends also established the fact that the inflation being more on the lower spectrum after the implementation of Inflation Targeting Policy.

**Graph 7: Consumer Inflation with its components**



Source: Researcher drawn the graph using MoSPI data, Base Year: 2012 = 100.

The Graph 7 shows the trends in consumer inflation with all the components from January 2014 to September 2018. We can see the general trend is being a decrease from high to low also this decrease accentuated after the implementation of IT Policy. In the pre phase the contribution of Pan, tobacco and intoxicants for inflation is more or less constant. Clothing and footwear and Fuel and light sector’s contribution is decreasing in the pre phase. But the more discernable change is from Food and beverages which has become lowest contributor for the inflation in the latter half of pre phase. In the post phase also this trend of food and beverages sector’s contribution towards inflation is same as the pre phase – lowest. But the highest contributor is Fuel and light and second is Pan, tobacco in the post phase.

**Table 8: Results of Dummy Variable Regression Model**

Different forms of CPI	Coefficient	Std Error	Sig.	t Value	R Square	F Value
Rural CPI	-4.215	0.386	0.000***	-10.900	0.601	118.98***
Urban CPI	-4.297	0.326	0.000***	-13.169	0.687	173.42***
Combined CPI	-4.245	0.350	0.000***	-12.130	0.651	147.15***
CPI for Industrial Worker	-4.369	0.426	0.000***	-10.253	0.571	105.12***
CPI for Agricultural Labour	-5.885	0.477	0.000***	-12.328	0.658	151.98***

Predictor: Time Dummy

Source: Estimated by the Researcher using RBI data.

Note: \*\*\* Indicates the result is statistically significant at 1% level of significance.

As noted in methodology part, to compare the level of inflation rate before and after the implementation of Inflation Targeting (IT) in India, the dummy variable regression model has been used. The results of the model have shown in the above table 8.

### **Rural and Urban CPI**

The results revealed that the consumer inflation rate has declined in rural areas after the implementation of IT and which is also statistically significant at 1% level of significance. The estimated value of the co-efficient is -4.22 which means that on the average the rural consumer inflation rate has declined during the IT period by an amount of 4.22%. The goodness of fit of the model is 0.60 and ‘t’ value is -10.90 which is statistically significant at 1% level of significance.

The similar trend in consumer inflation rate is also observed in urban area which has been declined by an amount of 4.30%. The goodness of fit of this model is 0.68 and ‘t’ value is -13.16 which is also statistically significant at 1% level of significance.

### **Combined CPI**

The combined CPI on the average has been declined to an extent of 4.24% during IT period compare to the pre IT period. The goodness of fit of this model is 0.65 and ‘t’ value is -12.13 which is statistically significant at 1% level of significance.

### **CPI for Industrial Workers and Agricultural Labours**

The CPI for Industrial workers and CPI for agricultural labours have also been declined by an amount of 4.36% and 5.88% respectively. The R square value for CPI for Industrial workers is

0.57 and for CPI for Agricultural labours is 0.65. The t values for CPI for Industrial workers and for CPI for Agricultural labours are -10.25 and -12.32 respectively, which are significant at 1% level of significance.

The F values of all the models are statistically significant at 1% level of significance. This implies that all the models are adequate to explain and test the difference in the consumer inflation rate before and after IT period.

## **7. CONCLUSION AND FINDINGS**

The present study examined the level of inflation in the pre and post phase of Inflation Targeting in India. The study reveals that in the pre phase of IT the average level of inflation was very high and also more volatile compare to post phase period.

‘Primary Articles’ category is the highest contributor to the wholesale inflation in both pre phase and post phase. In ‘Fuel and Power’ category in the beginning of the post phase i.e., during 2015-16 there witnesses the highest disinflation of 19.65% which turns to highest inflation of 8.15% in 2017-18.

If we see the overall scenario of CPI for agricultural labour, CPI for industrial worker, consumer inflation in rural and urban areas and combined CPI, it clearly shows that the pre phase has the higher rates of inflation than the post phase. In other words after the implementation of Inflation Targeting Policy the inflation rates shows the downward trend.

Food and beverages component has become lowest contributor for the consumer inflation in the latter half of pre phase. In the post phase also this trend of food and beverages sector’s contribution towards inflation is same as the pre phase – lowest. But the highest contributor is Fuel and light and second is Pan, tobacco in the post phase. From the Dummy variable Regression analysis it is observed that all the forms of consumer inflation rate have shown a declined trend during the IT period. The overall conclusion emerging from the analysis is that Inflation Targeting policy appeared to be more suited to dealing with high inflation rates in India.

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