

A QUANTITATIVE ANALYSIS OF INFLATIONARY TRENDS IN INDIA

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In view of the crucial role played by prices in affecting the cost of living in the society, this paper quantitatively analyses the recent trends in the Wholesale Price Index as well as the Consumer Price Index in India over the period 1993-94 to 2006-07. The purpose is to assess the extent of inflationary pressures operating in the Indian economy. The detailed graphical and statistical analysis of the relevant data over the chosen sample period testifies the high and erratic inflationary tendencies prevailing in India. An important finding of our study is that the Consumer Price Index has generally tended to rise faster than the Wholesale Price Index in India, thereby implying that the common people have to bear the major brunt of inflation in the Indian economy.

I- Introduction

The cost of living of the common people crucially depends on the level of prices prevailing in the economy as also the likely changes therein. This is largely because any upward movement in the general price level could quite conceivably erode the real purchasing power of their money incomes. Likewise, the rate of change of rising prices or 'inflation' plays a major role in shaping up the financial decisions made by economic agents. Under an inflationary regime, the rate of return on any financial investment turns out to be much lower in real terms than the corresponding nominal *i.e.* apparent return on that investment.

In addition, inflation also tends to generate certain other undesirable economic and social repercussions. For instance, a rising rate of inflation enhances inequalities in the society by benefiting the variable income groups and adversely affecting the fixed income groups. Similarly, a relatively higher rate of inflation at the domestic level *vis-à-vis* the rest of the world, *per se* discourages exports and encourages imports, thereby worsening the Balance of Payments situation of the economy under consideration.

In view of all such economically and socially undesirable outcomes, rapidly increasing prices are generally treated as a warning signal for any economy. In the context of the possible adverse consequences of inflation for the Indian economy, Patnaik (2007) observes that with a vast majority of workers being unorganised and having no wage

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indexation, even moderate rates of inflation can bring great misery. Evidently, since the Indian economy is presently experiencing such inflationary tendencies, it becomes pertinent to somehow judge the exact degree or the extent of the inflationary pressures currently operating in the Indian economy.

Towards this end, the standard analytical and graphical tools of statistics such as the *measures of central tendency, dispersion, coefficient of correlation, coefficient of determination, index numbers and line-graphs* can obviously be fruitfully employed so as to objectively assess the major price trends witnessed by the Indian economy in recent years. An added advantage of this kind of a quantitative analysis is that it tends to give suitable insights into the main factors behind the empirically observed trends in the level of prices in the economy. Against this backdrop, the objective of this Paper is to quantitatively analyse the recent trends in the Wholesale Price Index as well as the Consumer Price Index in India over the period 1993-94 through 2006-07.

II- Review of Literature

In the light of the critical significance of prices and the rate of inflation for the economy as a whole, quite a few official publications have so far attempted an analysis of the general price trends prevalent in the Indian economy. For instance, in the context of inflation, the Economic Survey 2006-07 released by the Ministry of Finance, Government of India has recently observed, "High inflation hurts the poor, and by putting pressure on interest rates, adversely affects both savings and investment. Thus, containment of inflation is high on the Government's agenda". Towards this end, the Survey goes on to add, the anti-inflationary policies of Government include strict fiscal and monetary discipline; rationalisation of excise and import duties of essential commodities to lighten the burden on the poor; effective supply-demand management of sensitive items through liberal tariff and trade policies; and strengthening the public distribution system.

As regards the recent trends in prices in the Indian economy, the Economic Survey 2006-07 notes that in terms of the Wholesale Price Index, annual point-to-point inflation was 6.11 per cent on January 20, 2007, the end of the 43rd week of the current year. The inflation rate in the corresponding week of the previous year was 4.24 per cent. Further, starting with a rate of 3.98 per cent, the inflation rate in 2006-07 has been on a general upward trend with intermittent decreases in between. While average inflation in the 52 weeks ending

inflation as observed in the current year had been surpassed in the recent past in 1998-99, 2000-01, 2003-04 and 2004-05

As regards the disaggregated patterns of price movements in India, the Economic Survey 2006-07 found that on January 20, 2007, while the inflation rate for manufactured products at 5.65 per cent was higher than 2.32 per cent recorded in the corresponding week a year ago, there was a significant deceleration in inflation in the fuel group from 7.84 per cent a year ago to 3.67 per cent. Likewise, in the current year, increase in prices of wheat, pulses, edible oils, fruits and vegetables, and condiments and spices has been the major contributor to the higher inflation rate of primary articles. Shortfall in domestic production vis-à-vis domestic demand and hardening international prices were the major causes for the increase in prices of these commodities.

An important observation of the Economic Survey 2006-07 in relation to recent price movements in India is that the trend of lower-than-Wholesale Price Index (WPI) inflation in the Consumer Price Index for Industrial Workers (CPI-IW) was reversed in November 2005. For, in the new series of CPI-IW, introduced from January 2006 with 2001 as the base, the food group has a weightage of 46.19 per cent – considerably higher than the corresponding 26.94 per cent (including those in the primary and manufactured subgroups) in the WPI. This greater importance of the food group together with the higher rate of inflation in the food group has resulted in CPI-IW inflation being higher than WPI inflation.

Still another important observation in this context as made by the Economic Survey 2006-07 is that in an open economy, domestic prices react to movement of prices of various commodities in the world markets. International prices of edible oils, cereals and metals witnessed sharp increases in January 2007 relative to the prices that prevailed in October-December 2005 quarter. Domestic production shortfalls in wheat and maize, and dependency on imports for metals and edible oils, transmitted the international price shocks to domestic prices.

In the context of inflationary trends in India, an earlier study entitled "Current State of the Indian Economy" that was undertaken by FICCI (2005) *i.e.* the Federation of Indian Chambers of Commerce and Industry, had focussed on commodity-specific changes in prices in India. In particular, the concerned study noted that the prices of commodities rose at a lower rate of 4.5% in April – November 2005.

– November period of 2004 were Food grains (4.3%), Fuel (10.2%), Mineral oil (14.9%), Chemical products (4.0%), Drugs and Medicines (3.9%), Cement (8.4%) and Machinery and equipment (6.2%).

An interesting finding of the concerned Study conducted by FICCI (2005) was that the commodities which had become cheaper in April – November of 2005 as compared to the same period of 2004 were ‘Primary non food articles’ (-5.3%), ‘Edible oil’ (-7.2%), and Textiles (-5.9%). Likewise, Vegetables, Minerals, Sugar – Khandsari – Gur, as also Iron and Steel registered slower growth in prices. That is to say, the prices of these commodities did not fall down in absolute terms over the reference period but the pace at which they were increasing, itself slowed down. In other words, the rate of inflation for these items declined but did not become negative over the relevant period.

Still another study on “Macroeconomic and Monetary Developments in 2005-06” issued with the Annual Policy Statement of the RBI *i.e.* Reserve Bank of India (2006) for the year 2006-07, had also discussed price situation in the Indian economy. At the very outset, the concerned study noted that in India, headline inflation and inflation expectations remained well contained during 2005-06, despite continued dominance of supply-side factors. As per this study conducted by the RBI, fiscal and monetary measures undertaken since mid-2004 to reduce the impact of imported price pressures on domestic inflation and to stabilise inflationary expectations were successful in containing inflation towards the desired trajectory during 2005-06. More specifically, the RBI study pointed out that headline inflation, based on movement in the Wholesale Price Index (WPI), was 4.0 per cent as at end-March 2006 as compared with 5.1 per cent a year ago.

There is however no ground for complacency in this respect. For, as Mohan (2006) has cautioned that although inflation in India has indeed been significantly lower since the mid-1990s compared to the 1970s and 1980s, it needs to be stressed that inflation in India still remains higher than that of 2-3 per cent prevailing in major advanced economies.

The RBI study (2006) further noted that inflation initially increased during 2005-06 to an intra-year high of 6.0 per cent on April 23, 2005 reflecting increases in prices of fruits and vegetables, iron and steel and select petroleum products such as furnace oil and naphtha.

3.3 per cent on August 27, 2005. Inflation again edged up during the third quarter of 2005-06-but remaining below 5.0 per cent- under the impact of the hike in petrol and diesel prices in early September 2005 as also a rise in vegetable and cotton prices. In a nutshell, the RBI study concluded that the inflation outcome during 2005-06. was influenced mainly by the price movements of petroleum products with Mineral oils inflation alone contributing about 41 per cent of the headline or domestic WPI inflation.

Accordingly, the year-to-year WPI inflation excluding the fuel group at 2.6 per cent remained well below the headline rate. The RBI study, however, conceded that apart from fuel prices, the prices of primary food articles posed some upward pressures on inflation during 2005-06. For, on the whole, primary articles inflation increased from 1.3 per cent at end-March 2005 to 5.3 per cent at end-March 2006.

It is thus clear from the foregoing review of literature that different studies have tried to examine the price trends in India from different perspectives. Along with analysing the major trends in the rate of inflation the available studies, which have largely been undertaken by Government agencies, have also attempted to look into the main explanations behind the observed trends. But the main shortcoming of all these studies is that they tend to have a very short-term perspective in as much as their essential focus is on just a comparison of the inflationary trends in a particular year with the previous year concerned. Further, in terms of statistical rigour, all such studies leave much to be desired. This evidently calls for a detailed quantitative analysis of the recent price trends in India based on a comparatively larger sample period.

In view of this, the present paper tries to bridge this lacuna of existing literature by thoroughly analysing the disaggregated price trends in India with the help of time-series data spanning over a period exceeding the entire previous decade, that too employing relatively more comprehensive tools of statistical theory.

III- Methodology and Data Base

In order to quantitatively analyse the recent price trends in India, we considered two main indices viz. the Wholesale Price Index (WPI) and the Consumer Price Index (CPI) respectively. In this context, it is worth noting that though the official rate of inflation in the Indian economy as announced by the Government of India is typically calculated on the basis of the Wholesale Price Index, yet the significance of Consumer Price Index is affecting the inflation...

analysing the Wholesale Price Index of all commodities including Primary Articles, Manufactured Products and Fuel, Power, Light & Lubricants in detail, a thorough statistical investigation of the major trends relating to the Consumer Price Index for Industrial Workers, Urban Non-Manual Employees and Agricultural Labourers was also undertaken in our study for the sample period 1993-94 through 2006-07.

Apart from capturing the latest price trends in the Indian economy, the choice of this sample period was essentially dictated by the availability of the relevant data. All the requisite data relevant to our study were collected and compiled from the latest *i.e.* 2007 volume of Reserve Bank of India's annual publication "Handbook of Statistics on Indian Economy". This publication provides comprehensive data on the price indices as obtained from diverse sources ranging from the Central Statistical Organisation, Ministry of Statistics and Programme implementation to the Office of the Economic Adviser, Ministry of Commerce and Industry, as also the Labour Bureau, Ministry of Labour and Employment, Government of India.

Since these sources use different base years for different data-series, we had to carry out appropriate *splicing* and *base-shifting* so as to maintain uniformity for comparing the concerned data. The main trends in the rates of change of the chosen price indices were compared in graphical terms with the help of *line-graphs* apart from being statistically examined in terms of the appropriate measures of *central tendency* and *dispersion*. In addition, the *coefficient of correlation* and the *coefficient of determination* between the relevant data series were also worked out so as to discern the degree of conformity between various price trends in the Indian economy.

IV- Results and Their Interpretation

Let us first of all discuss the general trends in the Wholesale Price Index in India over the entire sample period of our study *i.e.* 1993-94 through 2006-07 as summarised in Table-1 in the 'Appendix' which in turn contains all the Data-Tables relevant to our study. As is clear from the table, apart from the Wholesale Price Index (WPI) of 'All Commodities', three other wholesale price indices *viz.* the WPI of 'Primary Articles', 'Fuel, Power, Light and Lubricants' and 'Manufactured Products' are considered in our study for the period 1993-94 through 2006-07 with 1993-94 as the base year. 'Primary Articles' in this context cover food articles like rice, wheat, pulses, ... also certain non-food

'Manufactured Products' include items like cotton textiles, man made fibres, chemicals and chemical products, metal and non-metallic mineral products, machinery and machine tools etc.

As is evident from a glance over Table-1, the Wholesale Price Index of all commodities in India has been continuously rising over the entire sample period meaning thereby that the rate of inflation in the Indian economy has throughout been positive over the period under consideration. To be precise, starting from the base year 1993-94 when the WPI of all commodities was 100, it shot up to a level of 206.1 by the year 2006-2007 *i.e.* a more than two-fold rise in a span of just 13 years as is clear from Table-1. What this essentially implies is that not only has the annual rate of inflation been positive over the entire sample period in India but it has been quite high too by any common standards.

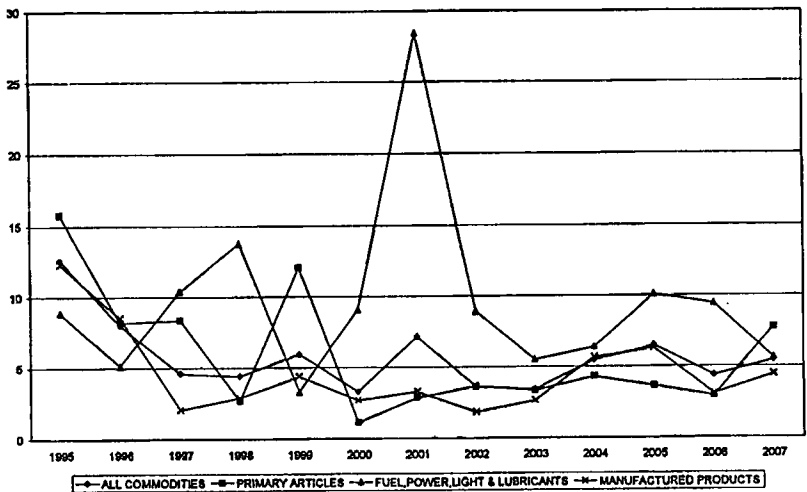
The situation is no better when we turn to take a look at the corresponding trends in the Wholesale Price Index (WPI) of any of the commodity-groups individually. For, Table-1 makes it very clear that while the WPI for Primary Articles rose slightly more from 100 in the base year 1993-94 to 208.6 in 2006-07, the rise in WPI of Fuel, Power, Light & Lubricants was much more *i.e.* to a staggering level of 323.9 from 100 over the same period. It was only in the case of the WPI of Manufactured Products that there is some respite in the sense that it increased by a considerably lower margin from 100 to 179 over the same sample period of 1993-94 through 2006-07 as shown in Table-1.

This clearly suggests that the role of the rise in the prices of manufactured products in contributing to the overall inflationary price rise in the Indian economy was relatively modest over the period 1993-94 through 2006-07. But as is also obvious from Table-1, it was actually the sharp rise in the prices of fuel, power, light and lubricants that imparted an upward thrust to the general level of prices in the Indian economy over the sample period of our study.

In order to further investigate the individual impact of price rise of various categories of commodities on the overall rate of inflation in the Indian economy, we calculated on the basis of Table-1, the rate of change of Wholesale Price Index in the case of 'All Commodities', 'Primary Articles', 'Fuel, Power, Light & Lubricants' and 'Manufactured Products' separately. Such annual rates of inflation for various commodity-groups for the period 1994-95 through 2006-07 are reported in Table-2 in the Appendix and graphically depicted

As is clear from this data table and graph, while the overall inflation rate in the Indian economy came down from a high of 12.6% per annum in 1994-95 to as low as 5.42% per annum by 2006-07, the rate of inflation pertaining to the prices of fuel, power, light and lubricants went down by a lower margin from 8.9% p.a. to 5.61% p.a. over the same period.

This *per se* bears testimony to the prominent role played by the prices of such products in causing and enhancing inflationary tendencies in the Indian economy. That inflationary pressures must have gathered momentum in India primarily on account of the rising prices of the products constituting the commodity-group 'fuel, power, light & lubricants' is amply testified and confirmed by Graph-1 wherein right since 1996-97, the rate of inflation for this commodity-group has remained the highest except for the years 1998-99 and 2006-07. In 2000-01, this rate had in fact peaked to 28.46% p.a.!



Graph-1 : Inflationary Trends in the Indian Economy

With a view to finding out the average rate of inflation and the volatility of price changes in India along with discerning the degree of conformity between various price trends in the Indian economy, we calculated certain summary statistics or measures of central tendency, dispersion and correlation on the basis of the information given in Table-2. Such summary measures relating to the rate of change of prices in the Indian economy are reported in Table-3 in the Appendix. It is worth noticing that instead of arithmetic mean, the Geometric Mean was employed to find out the average rate of inflation in Table-3 since inflation is not an absolute magnitude but

Likewise, though the 'range' *i.e.* the minimum and maximum values in any series tend to give a rough idea about the extent of dispersion in the series, yet for the sake of precision, the Standard Deviation (II) of the relevant series was also calculated and reported in Table-3. It is now clear from the table that no matter which measure of volatility we employ, the relevant data reveal that the rate of inflation has remained quite erratic over the years in the Indian economy. For, even the overall inflation rate in India has fluctuated in a range of 3.27% to 12.6% per annum, not to speak of the erratic movements in the rate of change of prices of 'fuel, power, light & lubricants' within a wide range of 3.27% p.a. to 28.46% p.a. over the period 1994-95 through 2006-07.

Even in terms of Standard Deviation (II), the dispersion in the series denoting the rate of inflation of fuel, power, light & lubricants in Table-3 is the highest *viz.* 6.31 as opposed to a 'II' of merely 2.52 for all commodities while 2.99 and 4.30 for manufactured products and primary articles respectively. This clearly indicates that the rate of growth of prices of items like mineral oils, electricity and coal etc. that essentially constitute the commodity group 'fuel, power, light & lubricants' has been fluctuating quite widely in the Indian economy over the entire sample period of our study.

That this is happening when the average annual inflation for these items as revealed by the Geometric Mean of the concerned series in Table-3 *viz.* 8.33% is also the highest and much higher than the overall average inflation rate in the Indian economy of the order of 5.35% per annum, makes it a serious area of concern.

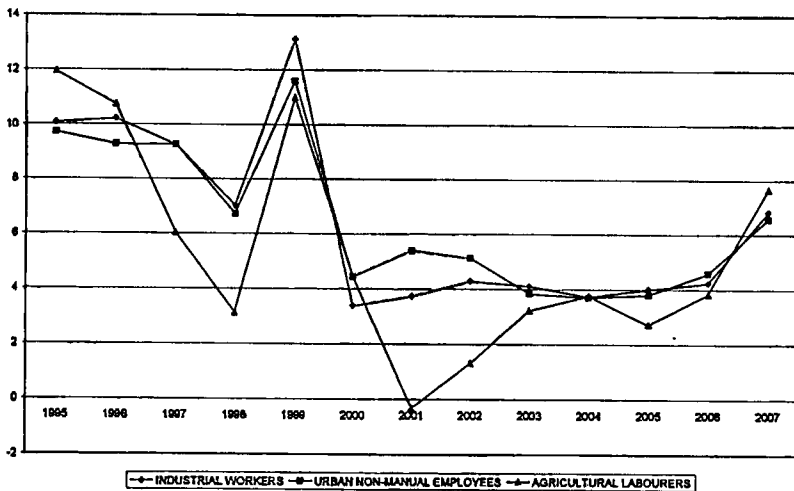
What these kinds of data trends seem to suggest is that apart from imposing a serious strain on the general level of prices in the Indian economy, the large and erratic rates of change in the prices of items like coal, minerals and electricity must have in a large measure contributed to the volatility in the rate of inflation for all products in India. The coefficient of correlation between the inflation rates of 'all commodities' on the one hand and 'fuel, power, light & lubricants' on the other is, however, not very high as revealed by a low value of just 0.10 in Table-3. Thus it follows that *de facto*, the volatility in the growth rates of prices of products such as coal, minerals and electricity have not been in a position to significantly affect the rate of inflation of all commodities in India and the two inflation rates have moved practically *independently* of each other over the period 1994-95 through 2006-07.

the inflation rate of all commodities as revealed by a correlation coefficient of the order of 0.92 between them as shown in Table-3. Evidently, the *coefficient of determination* between them is $(0.92)^2 = 0.85$ approximately, meaning thereby that almost 85% of the variation in the overall rate of inflation in the Indian economy could be explained in terms of the variations in the prices of manufactured products.

All the price trends in India statistically analysed so far in our study were in terms of the Wholesale Price Index (WPI) whether of 'all commodities' or instead of some specific group of commodities such as 'primary articles', 'fuel, power, light & lubricants' and 'manufactured products'. There is no denying the fact that as the rate of inflation is officially calculated on the basis of WPI in India, all such data trends were significant in their own right. But from the perspective of the common people, what is more crucial in affecting their living standards is the Consumer Price Index (CPI) that directly determines their cost of living. Let us, therefore, now focus our attention on the analogous trends in the CPI in India over the same sample period of 1993-94 through 2006-07.

In this connection, it is worth noting that all the relevant trends in the Consumer Price Index for 'Industrial Workers', 'Urban Non-Manual Employees' and 'Agricultural Labourers' in the Indian economy are amply summarised in Table-4 in the Appendix. As is clear from a comparison of this data table with that for the Wholesale Price Index (WPI) viz. Table-1, the rise in CPI in India over the period 1993-94 through 2006-07 has been even higher than that in the WPI. For, while the WPI for all commodities in the Indian economy had gone up from 100 in 1993-94 to 206.1 in 2006-07, the various CPI indices respectively rose from 100 to 224.4, 224.9 and 195.1 over the same period. This clearly implies that the Consumer Price Index, in general, has been rising even sharper than the Wholesale Price Index in India over the period 1993-94 through 2006-07.

In order to closely examine the underlying inflationary trends, we calculated the rate of change in all types of consumer price indices in India separately. The concerned results are reported in Table-5 and in turn represented with the help of line-graphs in Graph-2.



Graph-2 : Trends in the Rate of Change of Consumer Price Index in the Indian Economy

As is evident from these data-table and graph respectively, the rate of inflation calculated on the basis of the Consumer Price Index for Agricultural Labourers in India has even been negative in the year 2000-01. Owing to this negative observation, the Geometric Mean for the concerned series was not defined. But for the remaining categories of Consumer Price Index, we could work out the average annual rates of inflation in terms of the Geometric Mean which are reported along with other summary statistics in Table-6 in the Appendix. As is clear from this table, the average annual rates of inflation for 'industrial workers' and 'urban non-manual employees' in India respectively remained as high as 5.8% and 6% over the period 1994-95 through 2006-07.

These inflation rates are considerably higher than the corresponding average overall rate of inflation of 5.35% per annum in the Indian economy calculated in Table-3 on the basis of the Wholesale Price Index for all commodities over the same sample period of our study. This reinforces faith in our earlier assertion following from the observed movements in the CPI that the Consumer Price Index has generally been rising even sharper than the Wholesale Price Index in India. That is to say, the average annual rate of inflation following from the Consumer Price Index in India has in general tended to be higher than the one calculated on the basis of the Wholesale Price Index for all commodities over the period 1993-94 through 2006-07.

Another distinguishing feature of the price trends derived from the data series had to be the original

decline in the absolute level of prices for the agricultural labourers in the Indian economy during 2000-01 when the rate of growth in the CPI for 'Agricultural Labourers' was in fact -0.33% as is clear from Table-5. This is in sharp contrast to the high annual inflation rates of the order of 11.94% and 10.99% experienced by the same in the years 1994-95 and 1998-99 respectively. This goes on to highlight the extreme volatility in the rate of change of CPI for agricultural labourers in India as is evident even from a glance at Graph-2.

The fact of the matter is that even the Consumer Price Index for 'Industrial Workers' on the one hand and 'Urban Non-Manual Employees' on the other have also exhibited tremendous volatility over the entire sample period in India. This is well testified by Table-6 which reports on the high dispersion in terms of standard deviations of the order of 3.23 and 2.66 respectively for the series of the rates of inflation calculated on the basis of the CPI for industrial workers and urban non-manual employees in India over the period 1994-95 through 2006-07. The corresponding figure of the Standard Deviation (σ) for the inflation rates following from the Consumer Price Index for agricultural labourers in the Indian economy over the same sample period was 3.88 as is clear from Table-6. This again bears testimony to the high volatility in the Consumer Price Index for Agricultural Labourers in India over the sample period 1994-95 through 2006-07.

Of late, however, especially since the year 2002-03, the rates of inflation calculated on the basis of all the relevant indices of CPI in India seem to be 'converging' so much so as that during 2003-04 they were almost coinciding as is clear from Table-5 and Graph-2. Further, the coefficient of correlation between the rates of change of CPI for 'Industrial Workers' and 'Urban Non-Manual Employees' is as high as 0.98 as shown in Table-6. This evidently signifies a 'conformity' of trend in as much as the annual rates of inflation for industrial workers and urban non-manual employees have tended to move in the same direction in the Indian economy over the period 1994-95 through 2006-07.

With a high coefficient of correlation between the inflation rates for industrial workers and urban non-manual employees, obviously the 'coefficient of determination' which is nothing but the square of the correlation coefficient between them is bound to be quite high. More specifically, as per the results obtained in our study, the coefficient of determination between the rates of inflation for 'industrial workers' and 'urban non-manual employees' in India was $(0.98)^2 = 0.96$. What

inflation for industrial workers in India was explainable in terms of the changes in the consumer price index for urban non-manual employees in the Indian economy over the sample period of our study viz. 1994-95 through 2006-07.

The extent of association between the rates of inflation for 'agricultural labourers' on the one hand and that for 'industrial workers' and 'urban non-manual employees' on the other is, however, not very strong. This is revealed by the respective coefficients of correlation of the order of 0.86 and 0.81 between the concerned inflation rates as reported in Table-6. Thus it follows that the degree of conformity in the inflation trends for agricultural labourers and industrial workers or for that matter between agricultural labourers and urban non-manual employees in India has not been found to be as high in our study as the extent of unison between the rates of inflation for industrial workers and urban non-manual employees in the Indian economy over the period 1994-95 through 2006-07.

V- Conclusion

The present study was undertaken with a view to quantitatively analysing the recent price trends in India so as to objectively discern the overall extent of inflationary tendencies prevailing in the Indian economy. Towards this end, apart from carrying out a detailed statistical analysis of the major trends emerging out of the changes in Wholesale Price Index in India, we also conducted a thorough quantitative analysis of the data relating to the Consumer Price Index in the Indian economy over the relatively recent sample period of 1993-94 through 2006-07. For, the Consumer Price Index tends to play a direct role in affecting the costs of living of the people at large in the society.

More specifically, for the sake of statistical analysis in our study, we considered the Wholesale Price Index (WPI) of all commodities including Primary Articles, Manufactured Products and Fuel, Power, Light & Lubricants in addition to the Consumer Price Index (CPI) for Industrial Workers, Urban Non-Manual Employees and Agricultural Labourers in India for the sample period 1993-94 through 2006-07. All the data series relevant to our study were collected and compiled from the latest *i.e.* 2007 volume of Reserve Bank of India's annual publication "Handbook of Statistics on Indian Economy". In order to maintain uniformity for comparison of the trends relating to WPI and CPI, however, appropriate *splicing* and *base-shifting* of the original

The main trends in the rates of change of the chosen price indices were compared in graphical terms with the help of *line-graphs* apart from being statistically examined in terms of the appropriate measures of *central tendency* and *dispersion*. To be specific, Geometric Mean was employed to calculate the average annual rates of inflation following from various price indices. Likewise, in addition to range, the volatility in the rates of change of prices was ascertained with the help of Standard Deviation (0). Further, the *coefficient of correlation* and the *coefficient of determination* between the relevant data series were also worked out so as to discern the degree of conformity between various price trends in the Indian economy over the sample period.

As regards the general price trends prevalent in India, the statistical results obtained in our study have clearly established that throughout the sample period, the annual rate of inflation in the Indian economy has remained positive and relatively high by common standards, apart from being quite erratic over the years. For, leaving aside a slight 'deflation' *i.e.* negative rate of inflation or an actual downfall observed in the case of the Consumer Price Index for Agricultural Labourers during the year 2000-01, the prices in India have typically been rising so much so that the Indian economy has exhibited an overall average inflation rate of the order of 5.35% per annum over the period 1994-95 through 2006-07. Further, at the disaggregated level we have also found that such sharp increases in the general price level in India are essentially attributable to the steep rise in the prices of 'fuel, power, light and lubricants' whereas the role of increases in the prices of 'manufactured products' or for that matter even 'primary articles' has been relatively modest in this respect. In addition, the findings of our study also signify a 'conformity' of price trends in as much as the annual rates of inflation for industrial workers and urban non-manual employees have tended to move in the same direction in the Indian economy over the period 1994-95 through 2006-07.

As far as the erratic behaviour of the rate of inflation is concerned, we have found that the overall inflation rate in India calculated on the basis of the Wholesale Price Index of all commodities has fluctuated in a wide range of 3.27% per annum to 12.6% per annum over the period 1994-95 through 2006-07. The movements in the rate of change of prices of 'fuel, power, light & lubricants' have been still more 'erratic' in the sense that the rate of inflation of such products in India has fluctuated within an even wider range of 3.27% p.a. to 28.46% p.a. over the same period. Further, our statistical results also bear testimony to the fact that the rate of change of Consumer Price

extreme volatility. Another important finding of our study is that the Consumer Price Index, in general, has tended to rise faster than the Wholesale Price Index in India over the sample period. In the light of these price trends as observed in the case of Indian economy, it can be reasonably concluded that *the common people have to bear the brunt of the prevailing acute inflationary tendencies in terms of a higher cost of living apart from the uncertainties generated from their erratic behaviour.*

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APPENDIX : DATA TABLES

Table- 1
Annual Average Wholesale Price Index in India
 (Base: 1993-94 = 100)

	Wholesale Price Index of All Commodities	Wholesale Price Index of Primary Articles	Wholesale Price Index of Fuel, Power, Light & Lubricants	Wholesale Price Index of Manufactured Products
1993-94	100.0	100.0	100.0	100.0
1994-95	112.6	115.8	108.9	112.3
1995-96	121.6	125.3	114.5	121.9
1996-97	127.2	135.8	126.4	124.4
1997-98	132.8	139.4	143.8	128.0
1998-99	140.7	156.2	148.5	133.6
1999-00	145.3	158.0	162.0	137.2
2000-01	155.7	162.5	208.1	141.7
2001-02	161.3	168.4	226.7	144.3
2002-03	166.8	174.0	239.2	148.1
2003-04	175.9	181.5	254.5	156.5
2004-05	187.3	188.1	280.2	166.3
2005-06	195.5	193.6	306.7	171.4
2006-07	206.1	208.6	323.9	179.0

Source: Reserve Bank of India, Handbook of Statistics on Indian Economy 2007.

Table- 2
Average Annual Rate of Inflation in the Indian Economy

	Rate of Inflation of All Commodities	Rate of Inflation of Primary Articles	Rate of Inflation of Fuel, Power, Light & Lubricants	Rate of Inflation of Manufactured Products
1994-95	12.60%	15.80%	8.90%	12.30%
1995-96	7.99%	8.20%	5.14%	8.55%
1996-97	4.61%	8.38%	10.39%	2.05%
1997-98	4.40%	2.65%	13.77%	2.89%
1998-99	5.95%	12.05%	3.27%	4.38%
1999-00	3.27%	1.15%	9.09%	2.70%
2000-01	7.16%	2.85%	28.46%	3.28%
2001-02	3.60%	3.63%	8.94%	1.84%
2002-03	3.41%	3.33%	5.51%	2.63%
2003-04	5.46%	4.31%	6.40%	5.67%
2004-05	6.48%	3.64%	10.10%	6.26%
2005-06	4.38%	2.92%	9.46%	3.07%
2006-07	5.42%	7.75%	5.61%	4.43%

Table-3
Summary Statistics Relating to the Rate of Inflation in the
Indian Economy over the period 1994/95 – 2006/07

	Rate of Inflation of All Commodities	Rate of Inflation of Primary Articles	Rate of Inflation of Fuel, Power, Light & Lubricants	Rate of Inflation of Manufactured Products
Geometric Mean	5.35%	4.66%	8.33%	3.95%
Maximum	12.60%	15.80%	28.46%	12.30%
Minimum	3.27%	1.15%	3.27%	1.84%
Standard Deviation (σ)	2.52	4.30	6.31	2.99
Coefficient of Correlation with the Rate of Inflation of All Commodities	1.00	0.74	0.10	0.92

Table-4
Annual Average Consumer Price Index in India

	Consumer Price Index for Industrial Workers	Consumer Price Index for Urban Non-Manual Employees	Consumer Price Index for Agricultural Labourers
1993-94	100	100	100
1994-95	110.1	109.7	111.9
1995-96	121.3	119.9	124
1996-97	132.6	131.0	131.5
1997-98	141.9	139.8	135.6
1998-99	160.5	156.0	150.5
1999-00	165.9	163	157.1
2000-01	172.1	171.8	156.6
2001-02	179.5	180.6	158.7
2002-			163.8

2003-04	193.8	194.4	170
2004-05	201.6	201.9	174.6
2005-06	210.1	211.1	181.3
2006-07	224.4	224.9	195.1

Source: Reserve Bank of India, Handbook of Statistics on Indian Economy 2007.

Note: For the sake of comparison with Wholesale Price Index, all the relevant data series on the Consumer Price Index for various categories of workers were obtained through appropriate splicing and base-shifting of the original data series.

Table- 5
Average Annual Rate of Change of Consumer Price Index in the Indian Economy

	Rate of Change of Consumer Price Index for Industrial Workers	Rate of Change of Consumer Price Index for Urban Non-Manual Employees	Rate of Change of Consumer Price Index for Agricultural Labourers
1994-95	10.08%	9.72%	11.94%
1995-96	10.21%	9.28%	10.75%
1996-97	9.27%	9.27%	6.03%
1997-98	7.02%	6.71%	3.13%
1998-99	13.12%	11.59%	10.99%
1999-00	3.38%	4.45%	4.44%
2000-01	3.74%	5.40%	-0.33%
2001-02	4.28%	5.12%	1.31%
2002-03	4.10%	3.85%	3.24%
2003-04	3.73%	3.70%	3.76%
2004-05	4.00%	3.81%	2.72%
2005-06	4.23%	4.59%	3.82%
2006-07			

Table- 6
Summary Statistics Relating to the Rate of Change of Consumer Price Index in India over the Period 1994/95- 2006/07

	Inflation Rate for Industrial Workers	Inflation Rate for Urban Non-Manual Employees	Inflation Rate for Agricultural Labourers
Geometric Mean	5.80%	6.00%	*
Maximum	13.12%	11.59%	11.94%
Minimum	3.38%	3.70%	-0.33%*
Standard Deviation (σ)	3.23	2.66	3.88
Coefficient of Correlation with the Inflation Rate for Industrial Workers	1.00	0.98	0.86
Coefficient of Correlation with the Inflation Rate for Urban Non-Manual Employees	0.98	1.00	0.81
Coefficient of Correlation with the Inflation Rate for Agricultural Labourers	0.86	0.81	1.00

** Due to one of the observations being negative, the Geometric Mean for the relevant Data Series is not defined.*