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Inflation rate and Poverty: Does Poor Become Poorer with Inflation?

Mahua Paul
Assistant Professor at Institute for Studies in Industrial Development
Vasant Kunj, New Delhi

Pooja Sharma
Phd Scholar at Energy Studies Program, SIS, JNU
Assistant Professor Department of Economics,
Daulat Ram College, University of Delhi, New Delhi,

Abstract
This paper examines the inflation rates for the period 2005–06 and 2011–12 and concludes that inflation in 2005-06 hurts the poor more since the rise in food prices was substantial in this period and food constitutes a substantial proportion of their total expenditure. The paper observes that there was a substantial rise in Inflation which was experienced in the food grains like egg, fish, and meat, while the growth of inflation rate was observed minimal in case of beverages, footwear, and edible oil. Further, the impact of inflation on poor varied not only across both rural and urban areas but also the impact was different for different time periods. The paper also depicts shifts in the pattern of inflation rate across the expenditure classes between 2005–06 and 2011–12 and establishes inverse association between inflation rate and expenditure in the year 2005-06 for both rural and urban areas while the relationship was completely distinct in case of 2011–12 for both rural and urban areas. The study clearly reveals that bottom thirty percent of the population in rural areas observes same inflation rate as their urban counterparts for the year 2005-06. Finally, the paper concludes that the impact of inflation is not only commodity specific but also decile class specific. Further, the impact of inflation is observed to be different for rural and urban areas. This establishes the role of policy and government intervention through the public distribution scheme favoring the poor section with the aim of minimizing the gap of the impact of inflation experienced by poor and rich.

Keywords: Inflation rates, Total Expenditure, Decile classes, Public Distribution Scheme.

Introduction

With the population of more than 1.2 billion, India's integration into the global economy has been accompanied by economic growth. This has launched the country amongst the global player (World Bank, 2018). Consequently, India has emerged as the world's third-largest economy in purchasing power parity. The growth rate of 7.6 % in 2015 constitutes a substantial consumer market in the world (Hindustan Times March 07, 2017). Moreover, agricultural revolution has led to a drastic transformation of the Indian economy from a chronic dependence on grain imports into an agricultural economy, a prominent net exporter of food. It is evident that India is growing at a rapid rate but this growth needs to be well complemented by the status of poverty in the country. A higher economic growth is generally transformed to rise in aggregate demand in which case inability of developing nations to meet the rising demand results in inflationary tendencies in the economy.

The consumer prices increased to 4.28 percent in March 2018. Inflation rate had reached an all-time high of 12.17 percent in November of 2013 and the lowest of 1.54 percent in June 2017. The Asian Development Bank Report of 2011 stated that the global food prices increased by more than 30 % in the first two months of 2011. A 10% increase in domestic food prices in developing Asia created around 64.4 million poor people, implying that a 30% increase in global food prices would increase the percentage of poor by 5.7%. 'According to United Nation's Millennium Development Goals (MDG) programme, almost 21.9% people out of 1.2 billion of Indians lived below the poverty line of $ 125 in 2011–2012 (Mehra, 2016)'.

Observing above statistics it is plausible that there exists a relationship between inflation and poverty. The paper attempts to explore the impact of inflation on poor, whether inflation makes poor people poorer. In order to examine this relationship, it is important to define inflation and poverty in the Indian context. Inflation is a rise in the average price level of commodities in commodity basket which is captured by consumer price index and producer price index, considered as economic indicators. These indicators capture the price fluctuations for goods and services. Though the indicators serve the same purpose, the mix of a basket of goods and services along with the prices for the specific goods and services.

Since inflation depicts rise in the average price of consumption basket, it affects the budget of the individual households of the economy, thus affecting the livelihood of the poor section of the society. The genesis of this relationship between inflation and poverty lies in the theory that the wages are sticky and takes time to move while prices fluctuate at a greater speed. The purchasing power of poor section of society can be conceptualized by defining 'Poverty'.

Poverty is defined in two different perspectives one from income method and other from a consumption point of view. Poverty is still a very significant issue and concern in India, being a developing country. In order to understand the definition of poverty which in its simplest form can be defined as lack of sufficient income needed to obtain basic minimum necessities of life. Poverty has a very wide scope of unfolding and representing economic, social and political issues and concerns. The

term poverty reflects, low-income levels, hunger, lack of assets, poor health, insecurity, social exclusion, political powerlessness.

There are two fundamental approaches to comprehend the concept of poverty. The first approach pertains to absolute poverty while the second method is the notion of relative poverty. The notion of absolute poverty pertains to the consumption expenditure considering a specified minimum standard. According to this method, all individuals whose consumption expenditure is below a specific standard are classified as poor. While the relative concept of poverty refers to a state when the level of income or consumption expenditure of a family or an individual falls below a predetermined level. The distribution of income of different fractile groups is estimated and a comparison is also carried out between the standard of living of people in both bottom and the top layer of the population in order to evaluate a relative standard of poverty. Therefore, a relative definition of poverty is more applicable for developed nations in contrast to the absolute notion of poverty which is more prevalent in case of developing nations.

The estimation of poverty is carried out by Planning Commission, the nodal agency of Government of India which estimates, the incidence of poverty at the national level and state level separately for urban and rural areas. The methodology was recommended by Expert Group chaired by Prof. D.T. Lakdawala, Dr. Tendulkar, and Dr. C. Rangarajan etc. According to the definition suggested by the expert group, the incidence of poverty is measured by poverty ratio. Poverty ratio is defined as a number of poor to the total population expressed as a percentage. This is also referred as headcount ratio. The poverty line which is quantified as per capita consumption expenditure over a month along with class distribution is used to define poverty ratio as prescribed in the survey of National Sample Survey Office (NSSO).

Inflation increases poverty, the problem of poverty is aggravated when the prices of commodities increase. Inflation is therefore considered as 'cruelest tax 'on the poor. Cardoso (1992) argued that inflation increases poverty in two ways: Inflation tax reduces disposable real income. Another reason is that when nominal wages increase less than the price of goods consumed by wage earners then automatically the worker's real wages decline. The author evidently showed that the main effect of inflation on poverty was through real wages. Increased level of inflation resulted in increased poverty. It is, therefore, crucial to examine the trends in the pattern of inflation.

The pattern of inflation in the three different time periods has been analyzed. The analysis assumes selected commodity specific inflation rates for all expenditure group as prescribed by Economic survey and thus evaluates inflation rates for each expenditure group. Having computed inflation rate for expenditure group, inflation rate expenditure function is estimated. Another crucial assumption made by the paper is fitting the Lorenz curve to the distribution of expenditure. The third assumption is that the study computes the class-specific inflation rates from the estimated inflation expenditure function.

In order to comprehend the linkage between inflation and poverty, it is crucial to acknowledge the inherent stickiness of wages. When the country faces inflationary tendencies, the general price level of commodities increases, making the basic or essential commodities unaffordable by a poor section of society mainly because the wages do not increases or catches up with the rising prices due to the stickiness of wages which lowers their purchasing power, consequently making the poorer section even poorer.

Talukdar (2012) studied the effect of inflation on poverty in developing countries. The author analysed the effect of inflation on poverty for 115 developing countries over the period from 1981 to 2008. The author deduced that inflation is generally positively correlated with poverty while income, educational attainment, and quality of governance show a negative correlation with poverty.

Cardoso (1992) highlights the regressive nature of inflation tax and the extent of impact on those individuals below the poverty line. The paper argues that inflation affects poverty mainly through the impact on real wages. The authors evidently prove that the wages increase at a much lesser rate than the prices during the times when inflation was rising in Latin America. Finally, the study highlights that the stabilization programs implemented through incomes policy have not helped poor in Latin America, implying that inflation has affected poor drastically.

The decline in real wages during inflation was observed in Latin America during the last two decades while examining the period 1960–1997, observed that poverty maxima coincided with inflation maxima (Braumann, 2004). The author concluded that standard of living of poor were most hurt by macroeconomic policies that are inflationary. Ravallion (1998) examined food prices between 1959–1994 and evaluated its impact on poverty. The study concluded a strong positive correlation between higher prices and poverty. Later in 2002, Datta and Ravallion depicted that India's poor were adversely affected mainly by affecting real wage of unskilled workers.

The present paper analyses the pattern of inflation rates for 2005–06 and 2011–12 and examine whether 2011–12 inflation hurt the poor more. It involves the following steps, Firstl***y***, it evaluates inflation rates for expenditure group and estimates inflation rate expenditure function; Secondl***y***, it fits Lorenz curve to the expenditure distribution and estimates decile class specific per capita expenditure. Thirdly, decile class specific inflation rates from the estimated inflation expenditure distribution (function) are computed.

The study is organized into the following sections. Section I deals with theoretical background elaborating the model estimation and procedures. Section II analyzes the All India data for NSS round, it also displays the detailed account of equations of Lorenz curve estimation. Finally, Section III discusses results and discussions, Section IV concludes the findings.

1. *Theoretical Background: Model and Estimation Procedures*

There exist five-step estimation procedures where the relationship between inflation rate and total expenditure is established. The method will eventually help in estimating Lorenz curve.

1. *Computation of Price Index*

   The method of Laspeyres price index is adopted to generate inflation rate. The laspeyres price index for the time period t is given by

$$I_t = \frac{\sum p_{it}\, q_{it}}{\sum p_{i0}\, q_{i0}}$$

   Where q_{it} be the quantity of ith item priced at p_{it} consumed by the individual at a given level of expenditure e_t in the year t. p_{i0} and q_{i0} are the price and the quantity associated with the base year 0.

2. *Computation of Inflation rate*

   Inflation rate $\prod_t$ can be calculated by the following formula

$$\prod_t = I_t - I_{t-1} \,/\, I_{t-1}$$

   The above formula indicates the rate of increase in the value of base year commodity bundle of an individual when prices used in the valuation are changed from the period t – 1 to t.

3. *Engel Curve*

   The engel curve can be expressed as a function of total expenditure in the base year 0 represented as e_0. As a result, the relationship between inflation rate and total expenditure in the base year can be expressed as

$$\prod_t = f(e_0)$$

   The above equation represents a relationship between the rate of change in consumer price index of a consumer from one time period t-1 to another time period t , represented by $\prod_t$ and the total expenditure of the consumer for the base year 0 , represented by e_0

4. *Estimation Procedure: Model Specification.*

In order to test the relationship between inflation and total expenditure a quadratic model specification is adopted as described below:

$$\prod_t = d_0 + d_1 e_0 + d_2 e_0^2$$

The decile class specific inflation rate can be estimated by the above equation. The explanatory variable is per capita expenditure levels of decile classes in the base year. With the help of Mean per capita expenditure (e) and Lorenz curve of expenditure distribution in the base year will estimate expenditure levels of decile classes. Lorenz curve can be estimated as described in the following section Kakwani (1981).

5. *Estimating expenditure level for decile classes*

Lorenz curve can be specified as follows:

$$L(\theta) = \theta - A\,\theta^{\alpha}\,(1-\theta)^{\beta}$$

Where $L(\theta)$ is the share of the poorest θ proportion of the population in the total expenditure and A, α and β are the parameters. The expenditure level for the decile class or in other words poorest θ persons denoted by e_θ is given by

$$e_\theta = e\,L(\theta) / \theta$$

2. *Analysis of All India data*

The methodology mentioned in the above section has been applied to all India rural consumer expenditure data retrieved from 62nd and 68thNSS round and commodity specific inflation rates obtained from Office of Economic Adviser, Ministry of Commerce and Industry, Government of India (Table 1).

Table 1: Commodity – specific Inflation rates

NSS Item	Inflation Rate (%)			
	2005-06	2006-07	2009-10	2011-12
Cereal	6.0	16.7	61.2	76.2
Pulses & Pulse Products	7.8	30.2	56.4	65.3
Milk & Milk Products	0.8	8.5	45.3	90.7
Edible Oil	-5.9	2.5	14.4	35.7

Egg, Fish & Meat	6.3	12.8	51.5	114.3
Vegetables	13.7	14.3	61.8	79.3
Fruits (Fresh)	3.3	9.7	36.2	86.4
Fruits (Dry)	3.3	9.7	61.8	79.3
Sugar	8.8	7.4	61.9	67.7
Salt	4.4	22.7	70.2	76.2
Spices	-5.5	36.7	82.7	137.5
Beverages, etc.	2.5	3.0	18.2	41.3
Fuel & Light	13.6	20.9	32.1	69.0
Clothing	0.6	7.1	30.8	70.5
Footwear	7.8	14.5	34.7	43.8

Notes:

The prices of essential commodities registered a high rate of inflation in 2011-12. The spices and food items like egg, fish, and meat have exhibited a very high growth rate from 2005-06 to 2011-12. The products like milk and milk products, fresh fruits along with vegetables and dry fruits have reasonably shown an excessive rise in growth rates. While on the other hand, food commodities like cereal, pulses and pulse products, sugar and salt have shown an average growth rate in the inflation rate. It is observed that inflation rate of fuel and lighting, as well as clothing, has also observed an average rise in inflation rates. The commodities like beverages, footwear, and edible oil have also shown a rise in inflation rate but at a substantially less rate as compared to other commodities.

Further, it is observed that inflation rate of vegetables, fuel, and light (energy) was maximum in 2005-06 while egg, fish, meat, and spices were the main drivers of inflation for the year 2011-12. This clearly reveals that for the year 2005-06, the pattern of inflation rate across decile classes is expected to be similar or in other words, the relationship between inflation and decile class is expected to be same. This deduction is subjected to the fact that the inflation in 2005-06 is driven mainly by the essential food items like vegetables and necessary commodities like fuel and light which are essential commodities for consumption both for rural and urban areas.

However, in case of the year 2011-12, since the inflation is mainly driven by food items like egg, fish, meat, and spices which are consumed comparatively more by the people belonging to higher decile group, it is expected that rural and urban areas will witness a different relationship between inflation rate and total expenditure.

Table 2: Inflation Expenditure Equations (2005-06 and 2011-12)

Rural			
2005-06	r=7.35	-0.00536 θ	+2.66E-06 θ^2 R^2=0.99
2011-12	r=10.38	-0.000995 θ	-1.12E-06 θ^2 R^2=0.95
Urban			
2005-06	r=6.74	-0.0024 θ	+7.87e-07 θ^2 R^2=0.98
2011-12	r=10.65	-0.0037 θ	-1.77E-07 θ^2 R^2=0.97

The equation of Lorenz Curve: $L(\theta) = \theta - A\,\theta^{\alpha}(1-\theta)^{\beta}$

Parameters of Lorenz curve were estimated from NSS data on Consumption Expenditure by regressing

$$\log(\theta - L(\theta)) \text{ on } \log\theta \text{ and } \log(1-\theta),$$

Where L(θ) is the share of the poorest p pro-portion of the population in the total expenditure and A, α and ß are parameters.

Estimated Lorenz function is given in the table below.

Table 3: Parameters of Lorenz curves (2004-05)

Rural			
Log (θ -L(θ))	0.51	2.10Log(θ)	0.71Log(1- θ) R^2=0.98
Urban			
Log (θ -L(θ))=	-0.21	1.21Log(θ)	0.38Log(1- θ) R^2=0.99

The fit is good, we have estimated expenditure level of the rural and urban decile classes using an equation -

$$e_{\theta} = e\,L(\theta) / \theta$$

The above Table2 represents the inflation expenditure function for the period 2005–06 and 2011–12. The results of estimated inflation – expenditure function indicate that inflation has equally affected adversely rural and urban areas in both the years 2005–06 and 2011–12. In 2005–06 the inflation affected rural areas more than the urban areas while in 2011-12 the adverse effect of inflation was more in the year 2005–06. High values of coefficient of determination R^2 reveals that the regression

equation of inflation expenditure is a good fit both for rural and urban areas and also that the quadratic equation is able to explain a substantial proportion of inflation rate over the previous round (62nd) NSS expenditure groups.

The parameters of Lorenz function curve were estimated for 2005–06 and 2011–12 NSS rounds(62nd and 68th) by regressing Log (θ -L(θ)) on Log(θ) and Log(1- θ) as depicted in Table 3 above. The estimated Lorenz curve is well depicted in Table 3. The results reveal that the estimated Lorenz function or equation is a good fit indicated by the high coefficient of determination.

Table 4: Decile Class Specific Expenditure Levels (2004–05)

Decile classes	*Per capita expenditure (Rs per month)*	
	Rural	*Urban*
I	49.04	55.6
II	84.73	100.34
III	109.94	144.4
IV	128.8	191.95
V	146.35	246.13
VI	168.16	310.35
VII	203.34	390.08
VIII	260.6	492.9
IX	357	638.5
X	558.78	1052.36

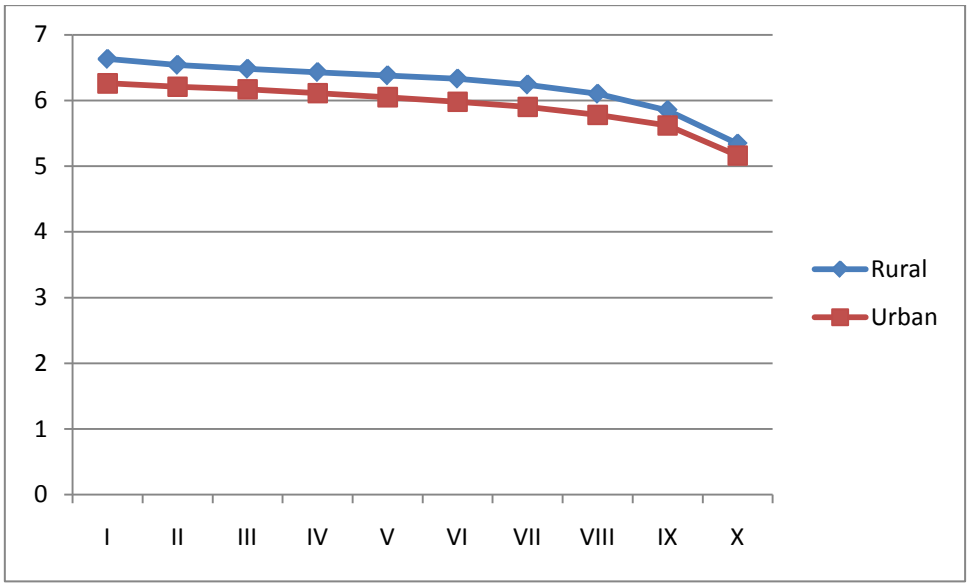
Using estimated inflation expenditure function and mean expenditure level of the decile classes, decile class specific inflation rates are computed

Table 5: Inflation rates for decile classes for 2005-06 and 2011-12

Decile classes	***Rural***		***Urban***	
	2005-06	***2011-12***	***2005-06***	***2011-12***
I	6.63	10.44	6.26	10.63
II	6.54	10.47	6.21	10.62
III	6.48	10.5	6.17	10.6
IV	6.43	10.52	6.11	10.58
V	6.38	10.53	6.05	10.56
VI	6.33	10.56	5.98	10.54
VII	6.24	10.59	5.9	10.51
VIII	6.10	10.65	5.78	10.47
IX	5.85	10.74	5.62	10.42
X	5.34	10.94	5.16	10.27

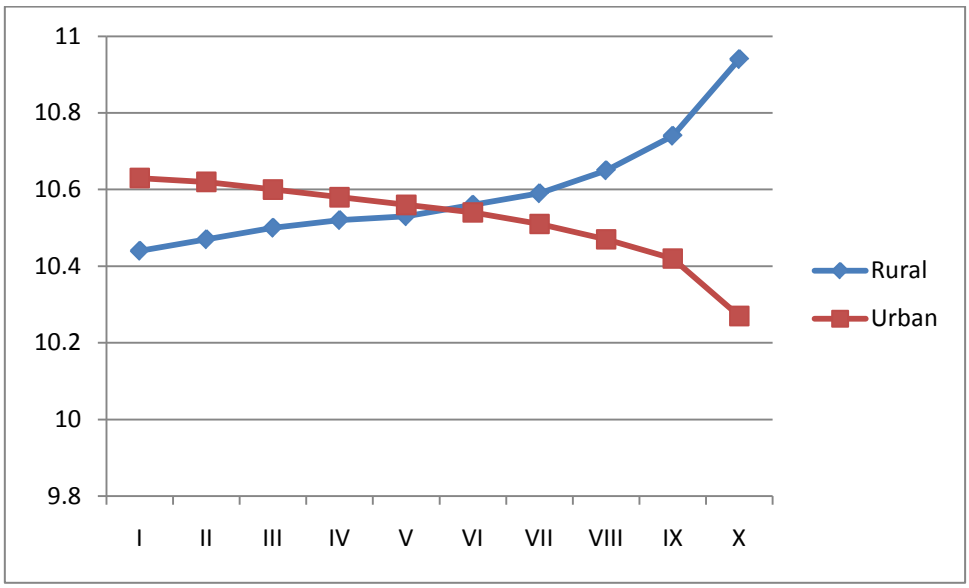
Inflation rates varied significantly across classes in both the periods. There has been a shift in the pattern of inflation across decile classes; inflation rates tend to be positively related to total expenditure in 2005-06 and negatively related in 2011-12. The empirical results also show that in contrast to 2005-06, both rural and urban classes experience a higher order of inflation. Rural-Urban differences, as well as inter-class differences,, are less in magnitude.

Figure 1: Inflation rates by Decile classes 2005-06



Source: Author's Calculation

Figure 2: Inflation rates by Decile classes 2011-12



Source: Author's Calculation

3. Results and Discussion

The estimated inflation – expenditure function and the mean expenditure levels of decile classes as shown in Table 4 are further used to compute the decile class specific inflation rates given in Table 5. The variability of inflation rates across classes is evidently reflected in both the selected periods. The above figures, figure 1 and figure 2 reveal that inflation rate tends to be inversely related to total expenditure in 2005-06 for both rural and urban areas. This is attributed to the fact that inflation is driven by the essential commodities like vegetables, fuel, and light which are equally consumed both in rural as well as urban areas. This reflects the rationale that with the rise of inflation the total expenditure also declines across the decile classes, suggesting an inverse relationship or in other words, a poor section of population experience higher inflation as compared to higher section and this difference is higher for rural areas as compared to urban areas. In 2005-06, rural areas get affected by the inflation rate more than the urban areas. This pattern of inflation rate is justified rationally since food grain account for larger share of in the budget of rural consumers. Another unique feature observed is that rural-urban differences are similar in magnitude compared to inter-class differences.

However, in 2011-12, the inflation rate is negatively related to total expenditure in urban areas while positively related to rural areas. This indicates that the pattern of inflation is distinct in both rural and urban areas in the year 2011-12. Inflation rates are negatively related to total expenditure indicating that poor population in urban areas experience high inflation as compared to people belonging to upper decile class group. However, in rural areas, there exists a positive relation between inflation rate and total expenditure. This reflects that in rural areas higher decile population experiences high inflation. This result is attributed to the fact that the inflation rate in the year 2011-12 is mainly driven by food items like egg, fish, meat, and spices which are mainly consumed by the upper decile class of the population. Therefore it is plausible to observe that for the bottom 60 percent of population inflation rate for urban areas is more than their rural counterparts since in urban areas this section of the population must be consuming above mentioned food items more than their rural counterparts.

However, inflation rate experienced by the upper 70 % of the population in rural areas is much more than experienced by their urban counterparts. As the rise in the price of given food items made the rural upper decile class suffer much more than their urban counterparts considering that upper 70 % of the population is consuming the above mentioned food items.

It is further observed that bottom 30 percent rural population experienced an inflation rate of 10.5 percent while bottom 30 percent urban population experienced an inflation rate of 10.6 percent in the year 2011-12. This clearly reflects the phenomenal success of Public distribution system (PDS) which made sure the impact of inflation being equal for both rural and urban areas for bottom 30% of the population. However, bottom 30 percent of the rural population experienced 6.5 % of Inflation rate as compared to the bottom 30 percent of the urban population that experienced 6.2 percent of inflation rate which reflects that rise in food grain prices

has affected poor people of rural areas slightly more than the bottom poor people of urban areas.

The inference from the above analysis clearly entails that if the rise in nominal expenditure of bottom classes can neutralize the effect of inflation on their real standard of living. But this conclusion is uncertain as the data on expenditure distribution in the year 2005-06 is not available. But it is expected that nominal expenditure of poor would have increased sufficiently to neutralize the effect of inflation since the wages of casual labor are not indexed.

4. Conclusion

The study examines the impact of inflation rate in both rural and urban areas selecting two distinct periods 2005–06 and 2011–12. By analyzing the commodity-specific inflation rates from the period 2005–06 to 2011–12 for both rural and urban areas, it is observed that the spices and food items like egg, fish, and meat have exhibited a very high growth rate from 2005–06 to 2011–12. The products like milk and milk products, fresh fruits along with vegetables and dry fruits have reasonably shown an excessive rise in growth rates. The commodities like beverages, footwear, and edible oil have also shown a rise in inflation rate but at a substantially less rate as compared to other commodities. Analysing the inflation rate across commodities it is evident that inflation rate for essential commodities is quite high for the year 2005-06 while the commodities consumed by upper decile class of population depicted a substantial rise in the inflation rate in 2011-12.

The inflation expenditure function for the period 2005–06 and 2011–12 is estimated indicating that inflation has equally and adversely affected rural and urban areas in both the years. In 2005–06, the inflation affected rural areas more than the urban areas while in 2011– 12, the adverse effect of inflation was more in the year 2005–06. A substantially high value of the coefficient of determination signifies the estimated Lorenz curve.

The paper establishes an inverse association between inflation rate and expenditure in the year 2005-06 both for rural and urban areas while the relationship was completely distinct for rural and urban areas for the year 2011–12. The study clearly reveals that bottom thirty percent of the population in rural areas observes same inflation rate as their urban counterparts for the year 2005–06. Finally, the paper concludes that the impact of inflation is not only commodity specific but also decile class specific. The results also reveal that the bottom 30% of the population experience almost similar impact of inflation in 2005–06 but in 2011–12, the impact of inflation on 30 % of the population was adverse for rural areas as compared to urban areas. An efficient Public distribution scheme would be effective enough to reduce the gap between the rural and urban areas when it comes to assessing the impact of inflation rate on poor. The paper, therefore, recommends policies to reduce the impact of inflation on the poor. The paper opens further scope of analyzing the nominal expenditure data of poor people who actually get affected by inflation and

examine if the rise in nominal expenditure offsets the inflation rate resulting in a neutral effect on real expenditure.

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