# FOOD INFLATION IN INDIA AND ITS IMPACT ON URBAN POOR

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**Doctor of Philosophy in Economics**

*By*

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## CERTIFICATE

This is to certify that the thesis entitled "**Food Inflation in India and its impact on urban poor**" is a research work carried out by Ms. Prajisha P., Research Scholar, P. G. & Research Department of Economics under the supervision and guidance of Dr. M G Mallika, Assistant Professor of Economics of this College during the period of 2014 - 2020.

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## DECLARATION

I hereby declare that the thesis entitled "**Food Inflation in India and its impact on urban poor**" is a bonafide record of research work carried out by me at P.G. & Research Department of Economics, The Zamorin's Guruvayurappan College, Kozhikode, under the guidance of Dr. M G Mallika, and no part of this thesis has been previously presented or submitted elsewhere for the award of any degree or diploma or similar title to this or any other University

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**Ms. Prajisha P**

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# CHAPTER I

# DESIGN OF THE STUDY

## 1.1 Introduction:

Food is one of the most important things as far as every creature is considered. In the successive stages of human evolution, from food gathers to settled agriculture and beyond, there is a visible change in the food system. In that time, the economy also marked a growth, like, it has changed from a barter economy to a money-driven economy, there has been an expansion of different sectors along with the agriculture sector, etc. With the growth of the economy, the commercialisation of agriculture started, which converts food as a commodity in the market from a good for subsistence, and its accessibility depends on the price and income. This led to the development of the economy with a monetary system, even in remote villages for the majority of necessary items. As money emerged as an essential element in deciding the endowment of commodities, its price became a vital factor which determines the level of consumption of different things. As far as a poor person is concerned, food is the primary item which contributes to the majority of his/her expenditure in the consumption bundle (FAO,2018). Hence the price of food is one of the crucial determinants in deciding the welfare of a person who is in the lower economic strata.

The UN General Assembly in 1948, has announced food as the fundamental right of the human being[1]. As per the estimate of World Bank (2016), about 270 million Indian people are still below the International Poverty Line (IPL)[2] with an income less than $1.9 a day, the revised poverty line. As per the calculation of the World Bank (2015), half of the world's poor lived in five countries, including India. Though India enters in the group of countries who declared food as a legal right to

[1] Under Universal Declaration of Human Rights and article 11 of International Convention on Economic Social and Cultural Rights

[2] See Ferreira et.al. (2016) for getting more details on IPL

their people on July 5, 2013, by passing National Food Security Act (NFSA), its position in Global Hunger Index 2019 is 102. As per the report of United Nations Development Programme Multidimensional Poverty Index (UNDP MPI, 2018), 27.5 per cent of India's population is still living below the poverty line, and many of them are unable to get sufficient quantity of food for a day. Even though India could attain an enhancement in the growth of overall GDP during the last decade, production in the primary sector and rural income growth have slowed down considerably. A country like India can solve the problem of hunger only if the people have enough capacity to purchase food articles. The purchasing power of a person can be increased either by increasing the income or by reducing the prices or both.

In this scenario, food inflation becomes an important issue for consideration. The upward movement of food price is commonly termed as food inflation. Food inflation, by definition, is precisely what it seems; consumers have to pay more for inflated food items. A persistent increase in food prices negatively affects the gains attained from poverty alleviation measures and thus discouraging the fight against poverty (FAO, 2002). It also erodes the purchasing power of poor people; especially the people living in extreme poverty. As a result, poor people become poorer, or in the language of poverty measurement, poverty gap will widen. Soaring food prices then increase the expenditure on food and as a result, reduce spending on health, education and other non-food items. This on the one side reduces the total welfare of the marginalized and on the other side reduces the net savings of the average income groups and thereby reduces the supply of loanable fund which directly reduces the investment in agriculture. This, in turn, negatively affects the production and push prices to a higher level, and this spiral moves on to years as like a wave.

India has experienced average food inflation at a rate of around 9 per cent, one of the highest rates of food inflation among the developing economies from 2006 to 2014 (Bhattacharya & Sen-Gupta, 2018). An essential dimension of this increase in food price fluctuation is that it reduces the welfare of a large section of the population in India, irrespective of rural-urban difference who are net buyers, and the majority of them are poor or near-poor. Poverty eradication has been the target of most of the

policies framed in India, and the removal of poverty was an important objective from the 5th five-year plan (1974-1979) onwards. Up to the seventh five-year plan, rural poverty is a significant concern where urban poverty was undermined. The attention in addressing urban poverty took place when the planning commission allocated a separate section to urban poverty in the 9th five-year plan (1997-2002), placing an unprecedented focus on development in urban area and alleviation of urban poverty. As a country where the wide urban-rural disparity is existing in the production and consumption of food items, the study of food inflation on urban poor is highly relevant. Hence the present study analyses the impact of food price inflation on urban poor in India.

## 1.2 Context of the study

The development economists started focusing on food inflation due to their realisation of the importance of the relationship between food price and economic growth (Wuyts, 2011). Since 2008, food price inflation has received considerable attention among researchers and policymakers (Gilbert and Morgan 2010; Zezza et al., 2008; Mittal, 2009; Kumar & Quisumbing 2013). Historically, though India experienced occasional spikes in food price fluctuations, after 2008, the Indian economy also experiences persistent food inflation (Bhattacharya et al., 2019).

There are a lot of empirical and theoretical literatures available which are trying to explain the supply and demand-side factors which affects food price inflation. A group of researchers (Gulati & Saini, 2013; Gokarn, 2011; Bandara, 2013; Ganguly & Gulati, 2013) who studied about the food price inflation of 2008, proposed three important variables, like the agricultural cost of production, dietary pattern of the people and the government policies which are responsible for the food price fluctuations. Mitchell (2008) argued that the major reason for food price inflation of food grains and oilseeds is due to the production of biofuel from these products. According to Timmer (2008), the export controlling measures taken by most important rice exporting countries like Vietnam constitute the major reason for global food commodity price hike. Similarly, the study of Alexandratos (2008) concluded that major rice exporting countries like India and China observed a fall in export

balance from 22 to 5 million tons from 2002 to 2007, just before the time of persistent food inflation.

There are studies which analysed the supply side factors which influence the food price inflation. Some studies (Gulati and Saini (2013); Guha and Tripathi, (2014) argued that agricultural wage hike is a major reason for the food price inflation 2008. Sonna et al. (2014) argued that minimum support price is not much influencing like agricultural wages in food price inflation. But some other studies Mishra and Roy (2012); Gaiha and Kulkarni (2005); Bhalla et al. (2011) have identified the increases in Minimum Support Price (MSP) as a major determinant of food price inflation. It is a fact that MSP always will be fixed above the equilibrium price or market-clearing price, hence any rise in Minimum Support Price (MSP) may lead to inflationary pressure in the economy. In India, due to the deregulation of fuel price fixation led to rising fuel prices and thereby increase the cost of inputs like fertilizer and transportation costs which led to an increase in food inflation (Bandara, 2013). In addition to these determinants, market imperfection and information asymmetry, which helped the rent-seeking activities of middlemen or agents in wholesale as well as retail marketing of food commodities cause food price inflation. (Chengappa et al., 2012; Lahiri & Ghosh, 2014; ASSOCHAM, 2011; Kumar et al., 2010).

Some studies had given the emphasis on the demand side factors affecting food price inflation. Kumar et al. (2010) found that an increase in demand for the food products, which are stagnant in their per capita availability, resulted in food price inflation. Likewise, Gokarn (2011), Gulati and Saini (2013) Bandara (2013) are also argued that a shift in food consumption from energy-based items to protein-rich and vitamin abundant food products, lead to a very sharp hike in the prices of these products. Anand, Kumar, and Tulin (2016), have examined demand and supply factors which influences food inflation for all India level. They found that the demand pressures in the food sector and a slow increase in the supply of food items creates pressure on the prices of food items. In their work, Bhattacharya et al. (2014) evaluate a gap between demand and supply for some important food articles and conclude that surplus demand occupied a crucial role in increasing prices of these food items.

All literatures mentioned above analysed the determinants of food price inflation by using demand and supply factors, but not studied for the later time periods. Moreover, all most all the studies had taken food inflation in terms of WPI alone. The present study tries to analyse the trend and pattern of food inflation by using WPI_F, CPI_IW_FA, and new series of CPI. Along with this, it analyses the item-wise trend and pattern of the price inflation for rural and urban areas separately, which is missing in this area.

The impact of food inflation is an area of concern for researchers over the years. According (Cardoso, 1992), food inflation reduces the real wages of the poor because the increase in money wage is lesser than the rise in food prices. This led to a reduction in the purchasing power of the households, especially in urban poor who are always buyers of food. For households in a rural area, an increase in food price, in turn, increases the income of poor who are the suppliers, though small scale, of food products (De Hoyos & Medvedev, 2009; Smith, 1998). The effects of food price fluctuations on poverty are expected to be very diverse, based on the determinants of food inflation, reasons behind the price change and the structure of the economy. Hence without analysing the item-wise inflation at the unit level, it is difficult to predict its impact on the poor (Hertel et al., 2006; Ravallion and Lokhsin, 2005). Ferreira Francisco H.G. and Alii (2011) examined the effect of the food price crisis in Brazil. Their method was focused on demand (expenditure) side, supply (income) and labour (wage). The result of the impact study suggests food price increases were to raise poverty, both at extreme poor and moderately poor.

Many scholars have also examined the impact of food inflation. There are a lot of literatures which studies the impact of food price inflation on poverty in India (Ravallion, 2000; Pons, 2011; Dessus et al., 2015; Talukdar 2015). But most of them are dealing with poor people as a whole. The present study is given the emphasis on the impact of food price inflation on the poor, mostly urban poor in India. For this purpose, QUAIDS has been used for estimating the food demand system of the poor people and also for calculating the price elasticities in order to understand the

responses of the poor people. The present study also analysed the food consumption basket of the poor people to know the item-wise share of food articles.

## 1.3 Statement of the Problem

The sharp increase in food and other commodity prices in recent years have created new and widespread apprehension among the policymakers about their impact on poor people. It is theoretically proved that persistent food price inflation reduces the growth of the economy and also destabilize the welfare of society. It is a fact that food inflation affects more on the welfare of poor people. Therefore, it is essential to analyse the trend and magnitude of food price inflation and also find out the reasons behind its changes. Item wise analysis may provide a clear idea about the food categories contribute more to food inflation. Before analysing the reasons behind food inflation, it is relevant to examine its trend and pattern.

Generally, food constitutes different types of items in which essential for some sections may be luxury for some others. Characteristics of food differ from items to items. Some may be providing energy, and some providing proteins and vitamins. The quality, quantity and types of food items vary in accordance with the type of job they are doing, the culture, religion, locality, social status, economic status and so on. Hence a disaggregated analysis is a must for analysing the impact of food inflation, especially on poor because some food items of a rich person may be a luxury or entertainment for the poor. This necessitates the disaggregated analysis of food inflation. So, it is essential to find out which item of food shows higher growth trend and which item shows a lower trend.

Food price inflation has an important effect on overall inflation and the economy as a whole since the food expenditure constitutes more than 40 per cent of total household consumption expenditure in India (NSSO, 68$^{th}$ Round). An important problem in the food price fluctuation is that majority of Indian population both in urban and rural areas comprises the net buyers, a majority of whom are poor or near-poor where towering prices hit them the hardest. Before examining to what extend the food price inflation affects poor in India, the question of how the poor people in India spend their income on various commodities need to be considered. For that, we have

to examine how they allocate their budget on different food and non-food items and also have to analyse how they allocate their food expenditure on various food items. Only after a careful examination of the share of each item in the food commodity basket, one can understand the impact separately for a price hike in each and every commodity.

Urban poverty naturally causes problems with respect to housing, water, health, sanitation, education, livelihood and social security along with particular needs of vulnerable groups like women, children and elderly people. The poor people in the urban sector are mostly engaged in informal employment activities where there is a threat of eviction, removal and absence of social security cover. Employment in the informal sector is not at all stable and poorly remunerated. The unavailability of formal employment restricts the livelihood opportunities of the urban poor. Another important thing is that the Indian economy is well known for its dualistic characteristics. The rural sector is showing feudalistic nature, whereas urban area is showing a capitalistic nature. Money and prices are more important in a capitalist society than in a feudalistic one. Consequently, price fluctuations are more important in the urban sector than in its rural counterpart. Hence, it is relevant to analyse the impact of inflation on urban and rural poor separately. For a clear understanding of inflation on the poor, it needs to analyse the impact on the urban poor. The difference in the elasticity of different food items of urban and rural poor should be analysed separately. This will help to explain the impact of the price hike on the poor by different commodities separately. It is relevant to find out whether there is any difference in the elasticity of different food items in between urban and rural area separately. Moreover, it is important to compare the elasticity of poor in Kerala with all India, because Kerala is a state which is an entirely different development pattern when compared to India. So, it is relevant to check whether the elasticity of poor in Kerala is different from poor in all India. The present study tries to find out answers for the following research questions.

- What is the trend and pattern of food price inflation in India?
- How do the prices of each food items fluctuate in India?

- What are the factors affecting food inflation in India?
- What is the allocation of income on food by the poor in India?
- How the poor allocate their food expenditure on different items in India?
- Is there any urban-rural difference in food price elasticity in India?
- Is there any urban-rural difference in food price elasticity in Kerala?

### 1.4 Objectives of the Study

- To analyse the trend and pattern of food inflation in India
- To study the budget share of the poor people devoted to food items in India
- To analyse the response of the urban poor towards food price fluctuations in India

### 1.5 Data Source and Methodology

The study used secondary data from various sources like MoSPI, Labour Bureau, RBI, NSSO and CSO for the analysis. For examining the trend and pattern of food inflation, a time series data of CPI, WPI, Money supply, Food grain Production, Minimum Support Price, etc. have been used. For analysing the household demand and elasticity, various rounds of NSSO data have been taken. The concepts and definitions of $68^{th}$ Round NSSO consumption expenditure data are also used in the study. Detailed explanations of all these are given in appendix 1.

Various methodological tools have used for the study.

1. For examining the trend of food inflation, various trend graphs have been used.

2. An Auto-Regressive Distributed Lag (ARDL) model is used for examining the long-term association between food price inflation and determining factors. For the ARDL method, the unit root test of all the time series variables that are used in the study has been done with the help of the Augmented Dickey-Fuller Test.

Steps of ARDL:

Step I: The functional form of 'Augmented Dickey-Fuller' Test (ADF) is that;

$$\Delta y_t = \beta_1 + \delta y_{t-1} + \sum_{i=1}^{m} \gamma_i \Delta y_{t-i} + u_t$$

$H_0$:$\delta = 0$and $H_1$: $\delta \neq 0$

Step II: Estimate the ARDL equation with suitable lags

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{qj} X_{j,t-i} \beta_{j,i} + \varepsilon_t$$

Where;

$\varepsilon_t$ = a random disturbance term, and it is serially independent.

The selection of suitable lag is determined by using one or more of the information criteria – AIC, SIC, so that $\varepsilon_t$ is free from autocorrelation. \

Step III: Formulate the Error Correction Model to check for the long-term relation using Bounds test.

$$\Delta y_t = \sum_{t=1}^{p-1} \gamma_i^* \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{qj-1} \Delta X_{j,t-i} \beta_{j,i}^* - \alpha - \rho y_{t-1} - \sum_{j=1}^{k} X_{j,t-1} \delta_j + \varepsilon_t$$

The test for the existence of a level of relationships is then simply a test of

$$H_0 = \rho = \delta_1 = \delta_2 = \delta_3 = \cdots = \delta_k = 0$$

The null hypothesis is tested by using F-test.

If it is rejected there is a long-term relationship between the factors taken and food price inflation.

3. The suitable model for estimating the food demand system in India is Quadratic Almost Ideal Demand System (Mittal, 2010). By using the model, own price and cross-price elasticities are calculating. Based on the estimated elasticities, we can understand the responses of urban poor towards a change

in price, compared to the rural poor in India. The general form of QUAIDS can be written as;

$$w_{ij} = \alpha_j + \sum_{n=1}^{N} \Upsilon_{jn} ln p_{in} + \beta_j ln \frac{m_i}{P(p_i)} + \frac{\lambda}{b(p_{i)}} \left[ ln \frac{m_i}{P(p_i \ )} \right]^2 + \vartheta_{ij}$$

Where '$i$' represents individual consumer,

$m_i$ is per capita expenditure,

$p_i$ is a price vector faced by $i^{th}$ consumer and

$b(p_{i)}$is the Cobb Douglas price index, which is denoted as;

$$b(p_i) \equiv \prod_{j=1}^{N} p_{ij}^{\beta_j}$$

$P(p_i)$ is a price index, which is defined as;

$$lnP(p_i) = \alpha_0 + \sum_{n=1}^{N} \alpha_n ln p_{in} + \frac{1}{2} \sum_{j=1}^{N} \Upsilon_{jn} ln p_{ij} ln p_{in}$$

Here $\frac{m_i}{P(p_i)}$ denotes a measure of real consumption of the consumer.

And $\vartheta_{ij}$is the residual term expressed as a vector of $\vartheta \ = [\vartheta_1, \vartheta_2, \ldots \vartheta_N]$, which follows a multivariate normal distribution with a covariance matrix Σ.

The responses of the poor consumers are examining with the help of elasticities, which is derived from the QUAIDS model. Analysis has been done with the help of these elasticities. The detailed methodological framework is given in the third Chapter.

## 1.6 Limitations

There are a few limitations to this study. The first one is the lack of data. The new NSSO consumption expenditure data at all India levels hasn't been released yet. So, the study used 68$^{th}$ round of NSSO data for the analysis. The new series of CPI is available only since 2011, and this has made the study to use taken WPI-F and the old

series of the consumer price index for examining long term relationships. The lack of income data in the consumption expenditure surveys forced the study to use the consumption expenditure as a proxy for income. The second one is the lack of time, which compelled the study to take elasticity method for the analysis rather than the Randomised Control Trial Method for analysing the impact of food inflation.

## 1.7 Chapter Scheme

The design of the study, including the context of the study, problem statement, objectives, data and methodology, organisation of chapters and limitations, is given in the first Chapter. For the thesis, many existing literatures have been reviewed, which are given in the second Chapter.

The entire reviewed literatures are classified into two heads, namely literatures on the determinants of food inflation and literatures analysing the impact of food inflation. A detailed discussion of the theoretical and methodological framework is given in the third Chapter. The theories associated with inflation are explained briefly, and also the methodological parts related to inflation are elucidated in the first part of the Chapter. The demand theories ranging from Engel's law to the modern theories on food demand system are described in the second part of the Chapter along with the related methodologies. In short, a detailed explanation and derivation of the methodologies are given in the Chapter.

Forth Chapter focuses on the trend and pattern of food inflation in India. The trend of WPI_Food and CPI new series have been analysed in the Chapter. The factors affecting food inflation is explored by using the Auto Regressive Distributed Lag Model. The budget share of the poor people in India was discussed in Chapter 5. In the first part, the share of food and non-food expenditure to total expenditure is being examined. The second part of the Chapter examines the expenditure share of each food item to total food expenditure has been studied.

Chapter 6 is dealing with the responses of the poor people towards a change in the prices of food items. The urban poor in Kerala were also studied in this Chapter since Kerala has unique characteristics as far as other states and the nation as a whole is concerned. 7th Chapter concludes the study with a summary and findings of the study.

# Chapter II
# LITERATURE REVIEW

# CHAPTER II

# LITERATURE REVIEW

## 2.1 Introduction

Review of literature gives an understanding of the issues involved in the topic as well as it helps to know the experiences of other researchers. Moreover, the information on the gap of experiential research offers a signal to fill those gaps to an extent and helps in conducting empirical research in a very fruitful manner. The current chapter goes through the literatures on food inflation. However, it is, of course, not possible to refer and comment in detail on all the studies conducted, but a brief review of the selected studies is given below. The entire literatures on food inflation can be divided into two- studies on the determinants of food inflation as well as studies, which are dealing with the impact of food inflation.

## 2.2 Studies on Food Inflation and its determinants

According to Friedman, "*Inflation is always and everywhere a monetary phenomenon in the sense that it is and can be produced only by a more rapid increase in the quantity of money than in output*." From the prior studies, it could be observed that there are a lot of factors that have a serious impact on food inflation. On the one hand, numerous studies can be quoted, which corroborated inter-linkages between food price fluctuations and monetary factors. On the other, we have studies which emphasized on factors such as fiscal expansion, supply-side constraints, monetary policy, and cost factors among others to explain food price fluctuations around the world (Baffes and Haniotis, 2010). A discussion of the relationship between food inflation and different macroeconomic factors has been made in this section based on the available literature in this area.

### 2.2.1 World Studies

There are many works which pointed out the spike in demand for food grain as one of the critical reasons for food inflation at a global platform. Continuously rising demand for food articles in countries like India and China due to an outpouring of their economic growth has led to a surge in food prices. Wolf (2008) found that a rise in the economic growth of China and India has changed the food consumption habits of their residents. A shift of consumption pattern in favour of non-vegetarian food items has happened in these countries, which could be primarily attributed to those factors.

A similar argument has been elaborated by Krugman (2008). The author found that food inflation has emerged due to multiple relevant factors. Rise of per capita income has induced a change which resulted in more non-vegetarian food consumption, thereby intensifying food price hike in the Asian region. On the other hand, the high economic growth rate has also led to high energy demand, which further surged the requirement for fossil fuel. The massive demand for fossil fuel is fulfilled at the cost of agricultural output, which ultimately resulted in a shortage of food items leading to food inflation.

On the contrary, Alexandratos (2008) observed that there is no clear evidence to prove the impact of consumption in India and China on global food prices. Moreover, growth in the use of food grain like rice and wheat has slowed down in India and China during the 2000s, and therefore, increasing demand for food items in these countries is no more a valid explanation for increasing food prices.

It was Tweeten (2006) who first attempted to explore the effect of money supply on prices of the agricultural commodity. He tried to show the impact of money supply on agricultural farming activities in the USA. He concluded that underperformance of the United States' farming activity was due primarily to cross-price effect and money supply. Furthermore, Catão and Chang (2015), in their study, highlighted the importance of monetary policy for world food prices. The outcome of the analysis confirmed the significance of formulating monetary policies in accordance with changing food prices.

Further, Kargbo (2005) analyzed the effect of monetary variables on the prices of food items in southern and eastern countries in Africa. For this analysis, the author used the data for the period 1980-1996 and applied the VAR model to find the long-run link between monetary variables and food inflation. The result of the empirical investigation demonstrated that monetary policy reform has a very pertinent role in combatting the rising food price fluctuations in Africa, and thereby assuring food security in southern and eastern Africa.

Conversely, Mpofu (2017), investigated factors causing the increase in food price in relation with non-food prices and overall prices in the economy by considering macroeconomic variables such as broad money supply and exchange rate in African markets. The empirical evidence disclosed the link between food article and comprehensive money supply for Zimbabwe only and did not hold for the other countries. Moreover, Ahmad (2011), in their study, revealed that the money supply, exchange rate and trade openness have a significant effect on the wheat prices in Pakistan. The empirical analysis used the yearly data from 1976 to 2010, and the VAR model is applied in the analysis.

Another critical work relating the macroeconomic variables and food inflation were done by Salman and Lodhi (2014). They attempted to reveal the association among macroeconomic variables like exchange rate, energy prices and money supply, and food price inflation in Pakistan. Autoregressive distributed lag (ARDL) model has been applied on the time series data for the period 1991-2013, and the empirical analysis manifested that money supply played a crucial role in raising the price of the food items.

Ziotis and Papadas (2011) have explored the connection between retail prices of food items and money supply in Greece. They used monthly data for 20 years from January 1970 to December 1990 and employed Johansen Cointegration method. The study not found substantial evidence to support the influence of monetary factors on food inflation in Greece. Also, the researchers uphold the classical view of neutrality of money based on their work.

We can also find a lot of works which attempted to explain the connection between food inflation and crude oil prices. For example, the empirical work of Campiche, et al. (2007) showed that an increase in crude oil prices together with the rushing of the agricultural production cost worsened the situation leading to a huge rise in prices of the food articles. Harri et al. (2009) found a long-term association between the cost of corn, oil and currency conversion.

The analysis of Baffes (2007 and 2013) presented ample evidence to prove significant reaction on the index of food price due to a change in the crude oil price. On the other hand, Ibrahim (2015) examined the relationships between the price of food articles, price of crude oil, and real GDP of Malaysian economies based on the annual data from 1971 to 2012 and using Non-linear Auto-Regressive Distributed Lag model for evaluating the data.

Zhang and Reed (2008), investigated the nexus between world biofuel price and food price inflation by using the monthly time series data from March 1989 through July 2008. The experimental result of the co-integration analysis showed that there is no direct relationship among the crude oil cost, biofuel and the agricultural commodities prices. Moreover, the result also revealed that no direct long-term relations exist among fuel and cost of agricultural product. Furthermore, Chen et al. (2010), examined the relationship between global food prices and the crude oil price. For this experimental analysis, the authors used weekly data from 2005 to 2008. The food categories like soybean, corn, and wheat are analyzed by applying dynamic time series modelling. The result of the study revealed that food prices respond significantly to a change in the price of crude oil.

Furthermore, Ularo (2010), examined the implications of food price fluctuations in the Malawian economy. The study used the annual data from 1978 to 2008, and the analysis was done with the help of the error correction model and looked at various factors affecting food inflation in Malawi. The result of the empirical investigation suggested that oil prices do not have a direct effect on food inflation.

Domestic food prices may respond to regional price shocks also. Hyeon-seung *et al.* (2012) in his analysis based on a set of countries in the Asia-Pacific region

observed that domestic food prices respond to regional price shocks, while world price shocks not contribute practically to explain the difference in price. The authors used two different indicators to measure prices at the world and regional levels: a composite price index for a set of commodities traded on world markets was used for international prices. In contrast, prices at the local level were a simple average of country Consumer Price Indices (CPIs), which are by construction more closely correlated to country CPIs. A different result might have emerged if a regional commodity price index had been used instead of a local CPI.

Different factors can contribute to food price fluctuations in other countries. Irz et al. (2013), in their analysis of the food price inflation and input prices of Finland, found that there is a lasting relationship between input and food markets. The main inputs consumed by the food markets were labour, agricultural raw materials and energy. In Ethiopia, food price inflation was heavily influenced by international foods and goods prices, measured in domestic currency Admassie, (2013). Large short-term deviations from the long-term trends were caused by agricultural supply shocks in Tanzania. (Raihan, 2013).

Fuel price fluctuations, which results in an increase in transportation costs, have also played a part in the food price crisis in certain countries. Olomola (2013) viewed that the prices of fuel import into Nigeria lead to sharp upsurges in the prices of agricultural inputs, significantly food articles and transportation costs. As a result, the government of Nigeria take grains from the procurement, ordered the import of half a million tons of rice to be sold at a subsidized rate and suspended the tariff on rice imports.

Baumeister et al. (2014), investigated the link between crude oil cost and retail food price fluctuations in the U.S. For this empirical analysis, the authors used the time series data for the period from 2006 to 2013, and the investigation was done by using VAR modelling approach. The observed result of the analysis revealed that retail food prices had not been significantly affected due to the shock of crude oil prices in the U.S.

Lucotte (2016) established a strong relationship between the crude oil price and the food prices fluctuations for the post-boom period while at the same time, these variables do not show any significant relationship during the pre-boom period.

Besides, Koirala (2015) studied the nexus between the energy price and the movement in the agricultural product price. The empirical result stated that agricultural product and vitality energy costs are very associated and display a positive and significant relationship.

In an analysis, Taghizadeh-Hesary et al. (2019), revealed the nexus between energy price and food security. The findings of their work manifested that there is a connection between energy and food security by considering price volatility.

Mustafa and Sivarajasingham (2019), in their study, analysed the dynamic linkages between food inflation in Sri Lanka and its instability. For that, they used the monthly data for the period from 2003M1 to 2017M12 for Sri Lanka. Here they defined food price inflation as the log difference of series of the food price index. The unpredictability of a food price inflation was measured with the help of the FIGARCH model by generating conditional variance. Granger causality test revealed that food inflation appeared to apply positive impact on inflation volatility. They could not find any indication for inflation uncertainty affecting rates of food inflation. Hence, the findings of the study supported the Friedman-Ball hypothesis in both cases of consumer food price inflation and wholesale food price inflation. This implies that previous evidence on food price fluctuations can help to predict the food price variability, but not the other way around. Their outcomes have many vital implications at policy levels like the design of monetary policy and food policy, thereby promoting macroeconomic stability.

Iddrisu et al. (2020), inspected the effects of monetary policy on food price inflation in South Africa. Though food price inflation was stabilized with monetary policy; theoretically, their empirical study found restrictive monetary policy could not stabilize food-price inflation.

### 2.2.2 Indian Studies

Along with international studies, Indian researchers have also examined the factors behind food inflation. Many structural and cyclical factors are quoted as reasons for the hike. In line with these arguments, Rakshit (2007) attributes food inflation to the structuralist characteristics of Indian economy. The argument is on the ground that food articles supplied by the agricultural sector are inadequate in comparison with high GDP growth, led by the non-agricultural sector.

Tiwari (2010), tried to disclose the relationship between money supply and food inflation in India. The empirical findings suggested that it is the narrow money supply which acts as an influential factor leading to food inflation in India and broad money is not an essential factor explaining food inflation.

Chand (2010) in his paper looked at the fluctuations in food prices, both for short-term and long- term, in its absolute and relative figures and inspects how these fluctuations in food prices are determined by changes in many factors like production. The consequence of export and import in food products on food prices and supply domestically are also examined here. The study pointed out that the main reason for an increase in prices of food articles is the supply shock as a result of the drought in 2009 and the leftover effect of the stagnant growth of food production in 2008-09. The occurrence of such type of shocks was anticipated to increase country-wide demand to have a more efficient strategy of food management to tackle the problem. It also necessitated consideration of various other possibilities for stabilising food price like preserving buffer stocks and investing more in increasing capacity of procurement for several types of food articles where the private sector can play a crucial role. Instabilities in growth also contributed to food inflation by way of making exports of certain food items followed by large scale import of the same things in some years.

Contingent and structural factors behind food inflation have also been examined by Kumar et al. (2010). The structural elements behind the upsurge in food prices appeared as the mounting gap between incomes per capita, the subsequent increase in demand for food articles and the stationary or deteriorating per capita

accessibility of these food articles. The study recommended increasing imports of food articles to attenuate food inflation.

Dasgupta, Dubey and Sathish (2011) investigated the nexus between the growth and inflation with particular reference to food inflation by using the high-frequency data and quantitative tools. Based on the empirical analysis, the authors found that lower wheat price can be used to moderate the overall food inflation in India. The rise in international food prices seems to be affecting the domestic food prices, but at the same time, these external factors can be managed by using the domestic policies such as buffer export, and so forth.

Nair et al. (2012) categorized factors affecting food inflation into demand-side factors and supply-side factors. In order to analyze demand-side factors, they checked whether rising domestic demand and the so-called secular shift to high valued agricultural products like pulses, fruits and vegetables, milk etc. have significantly contributed to the food price spiral. In the supply side, the study focused on the oil price hike, production, minimum support price etc. The study found that demand-side factors have little to offer in explaining food inflation. The supply-side factors are the major reason behind the price hike of food items like pulses products, vegetables, fruits, tea, coffee spices, sugar, meat and fish (both in-land and marine fish products).

Gulati and Saini (2013) have examined the nature and causes of food price inflation and also analysed the factors affecting food price inflation in India. It was found that the burden of price hike is comparatively more on high valued and high protein-based food items like milk and dairy products, fish, egg and meat as well as fruits and vegetables. The price fluctuations are lesser for cereals products and edible oils, particularly during the period 2004-05 to 2011-12. It usually occurs with an increase in incomes, when people shift to protein-based diets from energy-based (cereal) diets.

Rao et al. (2013) opined that inflation was a severe issue which hampered the growth of the economy of a country. The analysed statistical data suggested that the inflation in India was higher, particularly for food articles and that both demands, as well as supply-side factors, contribute towards food inflation. Food price inflation

reduced the purchasing power of people, and also the savings of the people. They explained that increase in agricultural productivity and modernisation in agriculture as well as improvements in retail industry help to protect households from inflation.

Bandara (2013) studied the reasons behind food price fluctuations in India during 2010-11. The study identified upsurge in demand for high valued protein and vitamin-based food articles along with the other determinants of food price inflation, like supply-side factors and institutional factors as the main forces leading to the food price hike. It also points the difficulty in framing proper policy response to soaring food prices, mainly due to the demand pressure, in a country like India.

Guha and Tripathi (2014), explored the link between rural wage and food inflation. The main objective of this paper is to examine the dynamic relationship between wages in rural sectors and rising food prices. For this purpose, they took a rural agricultural wage and non-agricultural wage. To analyse the long-run association of causality between food inflation and wages, they used the VEC model in the framework of the Johansen co-integration test. It looks into the possibility of a Lewisian transformation causing an increase in real rural wages. Still, the result of the analysis suggests that the rise in wages is because of an increase in bargaining power due to public works programmes, which employ unskilled rural workers—the workers' bargain for higher wages due to food price inflation.

Basu et al. (2014) noticed that India has been suffering from a lengthy period of persistently high food price inflation during the last decade. They also stressed that the domestic demand for food along with supply-side issues fortify food price fluctuations in India. Comparative food prices have occupied an important position in balancing domestic food demand and supply, given the partial responsiveness of production in the agricultural sector, predominantly in a short period. The speeding up of economic development in India observed during the last decade, go together with stationary growth in the primary sector, caused an additional demand for food, giving rise to the food price inflation. Moreover, the unnecessary buffer stock creation later in 2007-08 and the absence of a proactive selling out policy augmented average comparative food price inflation and its instability.

Anand et al. (2014), studied the role of monetary policy for controlling food price inflation in India. The objective of their study is to investigate the second-round effects of food price fluctuations in India and to examine their importance in framing monetary policy. For that, firstly they analysed, why second-round effects may have important consequences for the formation of monetary policy in developing countries. Secondly, they investigated the significance of second-round effects in India by using econometric analysis. Finally, they developed and evaluated a stochastic general equilibrium model. In order to answer these questions, they estimated an NKPC (New Keynesian Phillips Curve) in a lively open economy model. They analysed the consequences of the lagged inflation, production gap, exchange rate and expectation of inflation. The outcomes indicated that inflation in India is inactive and constant. The gap between core and headline inflation declines by about 75 per cent within a year, due to second-round effects, as core inflation reached to headline inflation. Majority of second-round results arose from so many factors, like the larger share of expenditure on food in total consumption expenditure and the role of food price inflation in making inflation expectations as well as setting up of wages. Their study recommended that so as to decrease the high rate of inflation enormously, the monetary policy wants to persist dearer for a substantial time length. Furthermore, an improvement in structural reforms to increase possible growth is dangerous to decrease the burden on monetary policy.

In their paper, Bhatacaharya et al. (2015) analyzed the factors affecting food price inflation in India. They discovered that supply, as well as demand factors, had donated to the then fluctuations in food price fluctuations in India. For examining the demand side factors, they also tested the usual proposition that diversification of diets and increasing per capita income contributed to an increase in the demand for high-priced food items. Thus, there was an increase in inflationary pressures. They proved that an increase in demand, in relation to the supply of a food item, resulted in an increased price of the particular commodity.

Additionally, the price hike in crucial inputs, increase in minimum support prices and mounting fiscal deficits were the other factors affecting food price inflation.

Increase in the wages of the agricultural sector was found to be a worldwide reason for inflation of food article. The contribution of farm wages to the price hike had increased significantly in the MNREGP years. Their analysis indicated a minimal role of fuel and international prices on food price inflation. Finally, the results of the study revealed that there was a significant transmission from food price inflation to non-food as well as headline inflation.

Anand et al. (2016), have examined both the demand and supply factors underlying food inflation. Their working paper contains five parts, each describing the aspects very vividly. They fit a trend line of CPI of both food and non-food items and found that food inflation exceeds the non-food inflation. They also examined the relationship between minimum support price and the food grains like wheat and rice. They argued that loose monetary policy was one of the leading causes of food inflation. In order to examine the household demand analysis, they used the model Quadratic Almost Ideal Demand System. For that, they used the $68^{th}$ round of NSSO data. They calculated the elasticity and emphasised that high protein food items have high elastic demand, and pulses and cereals showed a comparatively lesser elastic demand. It is fascinating to observe that fruits and vegetables have a unitary elastic demand.

Bhatacharya et al. (2019) estimated the influence of mark-up shock in food price fluctuations in India. The study used SVAR (Structural Vector Auto-Regressive) modelling. The study found that there was a medium but substantial effect of mark-up shocks in food price inflation after governing other determinants. Against the background of creating a competitive market for food items to encourage better competition and to stabilise large shocks to mark-ups, their paper made an influence towards understanding the extent to which stabilisation of mark-up shocks can lower wholesale and retail food inflation in the country.

## 2.3 Studies on the Impact of Food Inflation

Food inflation and its impact on common people through the changes in consumption expenditure is a major area of research. It is a subject matter of many scholars not only in India and also in other countries in the world. Studies have been

conducted using both primary and secondary data. Sections 2.3.1 and 2.3.2 deal with the reviews worked internationally and in Indian context analysing the impact of food inflation.

### 2.3.1 World studies

This section is dealing with studies related to the impact of food inflation. Finke et al. (1997), used the Household Nationwide Food Consumption survey (1987-88) to check whether the urban poor pay more and whether any price differences existed in low-income areas. They categorized households on the basis of income and also on race. The null hypothesis tested in this study was that the expected value of the price paid by one group is equal to that of another group. The null hypothesis was rejected, and here existed significant price differences among different categories. They concluded that low-income urban households paid a higher price compared to higher-income families. Among low-income urban households, blacks paid more than whites.

Similarly, Cardoso (1992) studied the impact of food price fluctuations on poverty and showed that inflation disturbed poor households due to a reduction of real wages and real income. De Hoyos& Medvedev (2009) studied the effect of food prices on rural people. It is Balbi (2008), who noticed that the food price index in Pakistan is over 12 per cent and has revealed no symbol of falling. The prices of necessary food articles like cereals and cereal products, vegetables and fruits, pulses and pulses products, meat and fish, milk products are very positively associated with the earlier prices. While it hurts most of the consumers, the most underprivileged sections are severely affected.

Ivanic and Martin (2008) made an effort to examine the impact of higher food price inflation on poverty. They followed a data-intensive methodology of calculating the short-run effects on income of the consumers and costs of living after the food price fluctuations by analyzing household surveys comprising no less than a thousand households in each of 9 less-developed nations. In addition, they evaluated the effect of food price fluctuations on poverty and poverty gaps.

In a similar manner, Zezza (2008) studied the impact of food price inflation across population subcategories among different developing countries. The study used eleven Living Standard Measurement Surveys. He calculated the first-order estimate of welfare variation as a result of an increase in the prices of food staples. The study also aims to recognize the causes of vulnerability of price fluctuations.

Impact of food inflation on poverty in Sub-Saharan Africa was studied by Wodon and Zaman (2008). They analysed the effect by observing the effects of food inflation on consumers from more expensive food as well as the second-round impact from the gain of the producer. They established that urban sectors are severely disturbed compared to the rural area as a result of food inflation, even though there are urban households, who are really net producers of food items along with rural families. Another finding of their study is that countries which are importing food items are more affected compared to the countries which are exporting food articles. The second-round impact can also be significant: incomes of the net buyers of food items may increase if the more considerable income accumulating to net sellers of food items "trickles down" to other households through an increase in economic activities.

Capehart and Richardson (2008) noticed from their study that, U.S. food prices increased at a rate of four per cent in 2007 and are expected to gain 3.5 per cent to 4.5percent in 2008. The leading factors behind higher food price inflation are farm commodity prices and energy costs. And they also noticed that the influence of food price hike on households in the U.S. differs on the basis of their income. The household with lower income devotes a larger share of their income on purchasing food articles, and food inflation affects them badly compared to the high-income households. Higher food expenditures influence domestic food support efforts in many ways, depending on whether benefits are indexed, enrolments are limited, or additional funds are made available. Higher food price inflation and fuel price inflation reduce the U.S. contributions of food aid under current budget constraints.

Commission of European Communities (2008) examined the effect of food price increases on consumers' expenditure on food articles. It analysed the alterations

in the structure of food expenditure. Also, it presented the outcomes of various consumption pattern of food articles among different consumers in member states of the European Union and within nations. It highlighted the effect of the food price fluctuations not only upon households with low income but also on states within the European Union, with a lower level of economic indicators. Later, it emphasised the relevance of essential and quick policy response to eradicate the consequences of unwanted price increase in future.

De Janvry and Sadoulet (2008) studied the welfare impact of the increase in the global price hike of cereals and edible oils by classifying Indian households. They found that large farmers, who have one hectare and more agricultural land, would have benefited from the price hike. The price hike was affected negatively on the poor households, both farmers and non-farmers. This is conflicting with conservative knowledge that appearances at the poor in the urban area as the foremost category to be protected from the price hike, and supposes maximum farmers to gain. These small farmers in rural sector account for about 79% of the total loss in the well-being among the poor.

Another notable work on the impact of food price inflation of 2007-08 was conducted by World Bank (2009). They examined the effect of the food price hike on poverty among households in countries like Bangladesh, Nepal and Pakistan. It relied on the conventional analytical methodology in which the net marketing position of families exclusively analyses the food price impact on poverty, that is, net buyer and net seller in these countries. It is done by measuring the "second round" influence of behavioural changes made by buyers as well as sellers in response to changes in prices. The paper analysed the food inflation and its welfare effects by classifying households on the basis of their relative position in the market. For understanding the welfare effects of food price inflation, the measure of Equivalent Variation (E.V.) has been used in the study. The outcomes of the study suggested that households in Bangladesh incurred losses in their welfare by 25 per cent when there is 50 per cent upsurge in the price of rice. The maximum welfare loss was about 6 per cent for Pakistan, which was the smallest. The Equivalent Variation (E.V.) measure was

negative for around 80 per cent of Bangladesh households, which means that there were a majority of losers compared to gainers.

On the other hand, Ulimwengu and Ramadam (2009) explored the impact of cereal price fluctuations on the welfare of households in Uganda. They emphasised the significance of considering the supply-side factors in the examination for getting optimal results. They highlighted the importance of services in the agricultural sector along with market access. The study cautioned against responses of policies concentrating on the demand side though; it would increase the welfare of the consumers but reduced the welfare of the producers.

Similarly, Cranfield and Haq (2010) analysed the impact of rising global food prices on consumer welfare. They estimated a Quadratic Almost Ideal Demand System (QUAIDS) model using data across countries with different economic development. Statistical comparison recommends the QUAIDS model over the Non-linear Almost Ideal Demand System model. The coefficients estimated in the study used to adjust an indirect utility function using QUAIDS and used the utility for analysing the welfare of the people. Hicksian compensating variation was calculated for different food articles in other countries. Per capita compensated variation increased along with per capita consumption expenditure. Though, there is a decrease in per capita compensated variation, which is expressed as a per cent of per capita expenditure, as one moved from developing countries to developed countries. Cumulative compensating variation related with food price inflation between 2005 and 2008 was projected at the U.S. $ 515 billion universally.

The impact of food price fluctuations from 2006 to 2008 on poor people in the Philippines was studied by Fujii (2011). He took several areas and checked whether the primary income source of the households was agricultural and related works or not. He considered heterogeneousness in food inflation and the patterns of consumption and production of food by taking dataset on consumption expenditure survey and price at the regional or lower level. Though the HeadCount Index was broader for households from non-agricultural activities rather than families from the agricultural sector, the reverse was right for the poverty severity measures, because

poor households from the farm sector were highly vulnerable due to food price fluctuations.

An investigation of the effect of changes in food prices on poverty was conducted by the Asian Development Bank (2011) by taking 25 nations of Asia and the Pacific region. The analysis showed that the impact of the food price hike on poor people vary across different countries and also within the states. They found that Bangladesh and India would be badly affected due to food inflation; whereas, Sri Lanka would be the least affected country. It also described that poor people from South Asia were severely affected than the other regions in Asia as a result of food price inflation.

Food inflation is very much crucial to people's welfare. To begin with, food expenditure comprised a significant portion of the total consumption expenditure of the economically backward people as the development takes place in the economy, income increases which in turn increases the demand for consumer goods like food. But the food supply has not improved, which led to the rise in the prices of food articles. Wuyts (2011) supported the argument that food price inflation has a more significant impact on the poor people, because of the relatively higher weight of food in the consumption basket. He also argued that food price inflation worsened income inequality in the labour market and badly affected the nature of employment in several parts of Sub-Saharan Africa.

Walsh et al. (2012) attempted to check whether food price inflation disturbed income inequality differently from non-food inflation. For that, they used samples from different countries and a sample of Chinese provinces. The result suggested that non-food inflation aggravated inequality in income, whereas the role of food price inflation was a mixed one. In a sample of Indian states divided into rural and urban areas, they noticed that overall inflation leads to increase income inequality in both of the sectors, despite the fact that food price inflation had a neutral effect. That means, there is a positive influence on inequality in income in rural areas and a negative impact on the urban area, going in line with the theory that rural wages might be elastic to food prices inflation.

Sekhampu and Dubihlela (2012) analysed the insights of households in a low-income community of Bophelong, in South Africa, to examine the influence of higher food price inflation. Their study was based on primary data from an extensive household survey by using questionnaires. And the socio-economic factors affecting due to food inflation has been analysed with the help of a logistic regression model. They found that a major portion of the population lived without having minimum income for performing their basic needs. They incurred higher cost for electricity and transportation. They concluded that it was female-headed households who were affected severely due to food price inflations, while married and employed household heads were not much affected. Income, family size, age, and educational status of a household did not have any significant impact on inflation.

On the other hand, Shrestha and Chaudhary (2012) examined the after-effects of food price inflation on poverty in Nepal. The study employed household consumption expenditure cross-sectional data of 'Nepal Living Standard Survey III'. They found that an increase in prices of food items at a 10 per cent rate was expected to increase the general level of poverty by 4% point. The paper also analysed the impact of food inflation at the local level and suggested appropriate policy measures to contain the food inflation and to alleviate the effect of the food price hike on the poor section of the population.

Otopea (2013) analysed how inflation from time to time influenced the standard of living of households in Ghana. For that researcher employed quantitative techniques like regression and sensitivity analyses by using the data during 1980-2012.The study established that there was a substantial inverse relationship between the price hike and the standard of living of Ghana. They also proved that living standard increased insensitivity to price rise. The analysis suggested that it was favourable to maintain a low and stable rate of inflation in Ghana. Additionally, it emphasized the necessity to make more public indicators, for example, poverty and unemployment, to give an improved hint about the welfare of individuals in Ghana.

Then again, Alem et al. (2014) analyzed the effect of food price inflation on the welfare of families in urban Ethiopia. It is a country which showed one of the

maximum rates of food price hike during 2007-08. They examined the problem by using a novel approach called Ordered Probit Regression. Panel data are used here to explore the impact of food inflation. The study shows that people are harmfully affected by a shock in food prices and significantly reduced subjective welfare of households in urban Ethiopia. However, it is the fastest-growing economy. They also find that the subjective well-being of respondents has been badly affected by relative standing. The fact that speedy growth in economic activities has to go together with decay in households' average level of satisfaction of life brings its pro-poorness into question. They also emphasized that regulating price hike in food articles and confirming that economic development trickles down to the average households in urban Ethiopia, would improve well-being significantly.

Likewise, Jacobs et al. (2014) studied rises in the cost of living for households in Australia. The study argued that inflation, as measured by considering the changes in the Consumer Price Index, exaggerated the 'actual' upsurge in the cost of living. The authors stated that this was because of several inherent theoretical differences and problems related to measurement. All the same, other measures of the cost of living had increased by a comparable amount to the CPI over the years. Measured inflation had been higher for some households and socio-economic groups than for other households. Although cost-of-living inflation has been moderate across most households, there were several explanations why some households might have perceived inflation to be higher than it actually was.

Dessus et al. (2015) examined a sample from 73 emerging economies for understanding the variations in the monetary cost of reducing poverty in the urban area as a result of an upsurge in food price fluctuations. This cost is coming closer to the alteration in poverty, that is, the discrepancy in fiscal resources mandatory to eradicate poverty under targeting. The outcome of the study displays that the cost is less than 0.1 per cent of GDP, for the majority of the economies. Nevertheless, in the most strictly affected, it may surpass 3 per cent. Therefore, in nations with effective targeting already existed, the furthermost cost-effective tactic would be to scale up such programs instead of designing tools to recognize the new poor.

Furthermore, Hildebrandt and Thomas (2015) argued that high price fluctuations in medical care make difficult in attaining price stability, but that its influence on all commodity inflation is not sufficient to prevent policymakers from tracking stability in price as a goal. The first section of the study describes recent trends in the medical-care component of the CPI and shows that medical-care prices have a relatively small weight in the overall CPI. The second section argues that medical-care prices ultimately contribute more to overall CPI inflation than would be indicated by their little weight but, nevertheless, are not so large as to impede the attainment of price stability.

Fessler and Fritzer (2016) examined the spreading of the price increase and display a robust as well as the steady indirect connection between income and rate of inflation that replicates the differences in consumption bundles along with the income distribution (2010–2012) in Australia. General price level decreased with an increase in the ranks of education. It was particularly high for manual workers and shallow for agricultural workers. It also displayed a u-shaped relationship with the age of the people. Their findings questioned the limited focus on the Consumer Price Index by economic policymakers based on an average consumption bundle in times of deviating price increases. They encouraged one-to-one care of price hike of a broader range of actual consumption bundles at household level like price rise across the complete array of household incomes. They used the Austrian Consumer Survey (2009-10) and also disaggregated data on prices to compute price inflation for certain consumption bundles at the household level.

Recently, Frempong and Stadelmann (2019), studied the effect of food inflation on child labour. According to them, most of the people in less developed countries spend almost sixty per cent of their total consumption expenditure on food, and the majority of them were farmers. Henceforth, food price fluctuations affected them both positively and negatively as revenue and spending. They used monthly local food prices and also the data from the Uganda National Panel Survey for examining the impact of food price fluctuations on child labour. The result of the study showed that an upsurge in food price was associated with an increase in the possibility

and the concentration of child labour. They concluded that the consequence of food price inflation could be lesser among households who owned land, which was reliable with the view that land-owning households could reimburse the price shocks in a better way. The results of their study suggested that infrequent surprises in food inflation might have long-term effects on economic development in developing countries through the channel of child labour.

### 2.3.2 Indian studies

Researchers and policymakers in India are also interested in studying the effects of food price fluctuations. This part reviews the recent literatures related to the influences of food inflation on poverty. Ravallion (2000), in his article, analysed the relationship between price hike in food articles, wage rates and poverty in India over more than thirty years and also checked the impact of reforms in the agricultural sector on poor people in India. Although substantiating other studies that showed price hike decreased expenditure in the rural sector, he recorded that once primary output and general price level were taken into consideration, food prices did not seem to have an independent consequence on material wages. Consequently, though households may take an instant response when there is an increase in food prices, in the more extended period, increasing productivity in the agricultural sector would affect both producers of food articles and the wage earners of the rural agricultural sector. This led to a fall in income inequality in the rural area. The study also emphasised that the effect of the food price hike on the distribution of income could be unbiased if wages for agricultural labourers change adequately.

Angus Deaton, (2003), computed CPI (consumer price index) for each of the big states in India, by taking rural areas and urban areas separately. The analysis was done for the periods 1999-2000 in relation to 1993-94 and for 1993-94 compared to 1987-88. The foremost emphasis of the article is on to clarify the methodology part fundamental to the new price indexes and to combine them into poverty lines. The result of the study is that there are differences in poverty rates among different states in India. Two important points can be noticed from his work. The first one is related to the better or superior performance of the states in southern and western India

compared to states in the north as well as east. The second point is that there is a large group of people near the poverty line in the States with large headcount ratios, so that even a modest development may have a significant effect on poverty.

Rath (2003) in his paper "Poverty by Price Indices" examined the elementary methods used by the Planning Commission of India to measure poverty lines. The logic of the usage of existing data is studied to make an assessment of poverty more transparent while using data at a unit level. Here the author used NSSO unit-level data of various levels. The study tried to find out a methodology for calculating poverty in India based on price indices. It considered problems of transparency in the use of data on price and expenditure on consumption, upholding of the uniqueness of each state and creating a relationship between consumption and prices indices of necessary articles. This may help to understand poverty in a better way in each state. It also displayed the contradiction of increasing real income and dropping nutritional intake in many states.

According to Himanshu (2007), families with middle income were strongly disposed and were confronting problematic condition in monitoring their monthly outlays strategies. As the general price level increased and coupled with inadequate wage rates and soaring prices of goods worsened the situation of the middle-class people. Moreover, the hike in the price of commodities like petroleum products has raised the burden on people. All these factors of price fluctuations made the poor as poorer.

Ravallion (2008) discussed the methodology underlying the World Bank's revised estimates of global poverty in the Indian context. In 2005 one by third of the world's poor population who consumed less than $ 1.25 a day- as per 2005 purchasing parity- lived in India, which is too much compared to other countries. The study noticed that this group constituted more than 40 per cent of India's total population. During the 1980s, 60 per cent of the population lived below the poverty line. It is clear from the article that, India's long-standing step of reduction in poverty by this measure is no more than average for third world countries, apart from China.

Chaturvedi et al. (2009) examined the inter-connections between inflation, economic growth and saving rate for south-east and southern Asia. They made use of simultaneous equation framework in panel data with the help of two-stage least squares method. The study found that inflation had a significant adverse effect on development but the optimistic impact on the rate of saving.

Praduman et al. (2010) opined that the stages of comprising food price fluctuations would help in the short period until more long-term actions to increase availability or supply of food articles were allocate in place. The measures to limit the increasing minimum support prices for essential agricultural commodities like rice and wheat, the issue of food grains from the Central pool into the common market, and modification of the buffer's norms of these items to levels suggestively below existing actual stocks, had facilitated lower cereal (rice and wheat) price inflation.

Pons, (2011), presented the effect of a replicated upsurge in prices of food articles on the welfare of the households in India with the help of 61$^{st}$ Round Consumer Expenditure data of NSSO. The study tried to recognize who was severely exposed to food inflation. To understand this, the study used elasticities and demand responses, which are calculated from the model of AIDS (Almost Ideal Demand System). The study takes into account only demand-side and neglected the supply side. The model assumed that all the other significant parameters remain constant. This study also showed that there are various effects on different groups of households, and the study found that it was the rural households who are severely exposed to food price inflation compared to urban households.

Furthermore, the households with low income are punished group, both in an urban and rural area, related to the higher-income households in India. The influence of food inflation also depends on the commodities which are subject to price fluctuations. Indeed, an upsurge in prices of cereal products affects more than the similar surge in prices of fruits.

Kumar et al. (2011), in their paper, estimated the elasticity of demand for food items in India. Here the demand is examined in the context of changing dietary pattern of Indian household. The hypothesis they checked in the paper is whether there is any

substantial diversification in the consumption pattern of households and any specific alterations in a dietary way across different income classes. The elasticity is used as the primary tool for analysing the behaviour of food. The price and cross-price elasticities of demand have been calculated by means of multi-stage budgeting framework with Quadratic Almost Ideal Demand System model and with another non-econometric model, Food Characteristics Demand System. The work found that the projected price elasticities differ across different income classes and are very low for cereals products and highest for fruits and vegetables and also for meat, egg and fish. The analysis of price and income effects based on the estimated demand system has suggested that with an increase in food price inflation, the demand for staple food (rice, wheat and sugar) may not be poorly affected but, that of high-value food articles is likely to be affected undesirably. Consequently, the analysis has warned that if food price fluctuations remain persistent for an extended period, there is an opportunity of the reverse of the trend of diversification and that of consumers returning to cereal-dominated diet, thus emphasizing under-nourishment.

Differently, Singh (2011) analysed the role of the supermarket (or FDI in multi-brand retail) in controlling food price inflation in developing or middle-income countries. This study is mainly based on the study of many literatures, which have suggested that Foreign Direct Investment in the retail sector often has an inverse effect on the price hike. The poor people in less developed countries were affected more compared to the more affluent section. The study concluded that Foreign Direct Investment could not control the food inflation in food retail and the entrance of modern hypermarkets does not stand up to analyse, given the empirical evidence from different countries.

Subbarao (2011) showed that inflation was a regressive or reverting tax and hurt the deprived very severely. He noted that the effect of food price fluctuations would be severe in countries like India with 1.2 billion people living with an income per capita below $1500 and who spend a lion share on food consumption in their total consumption basket.

Sangeetha and Divya (2014) discussed inflation generated problems faced by the common man in India. Their study found that the rate of food price inflation in India has marked a record at 8.79 per cent in 2014 January. According to them, inflation should get considerable attention because it affects the common man severely. They noted that increasing inflation had reduced consumer expenditure of the wealthy class, and they are defending inflation by the purchase of loose and unbranded food products or by the captivating benefit of bargain-basement sales. But, people with lower income are suffering from food inflation and are facing difficulty in getting their daily food items and feeding their family.

Mohanty (2014) noticed that without growth in the supply of food articles, the food price rise could donate around1.25 percentage points to overall inflation per year. Food price fluctuations in India is probable to exceed overall inflation by two to three per cent annually, assuming growth in private consumption expenditure picks up to seven per cent per year and supply of food raises at notable rates. Consequently, a long-term inflation target of four per cent, below the recently accepted framework of inflation targeting, would rest on enhancing the supply of food, agricultural market-oriented pricing, and falling price fluctuations. In the intervening, monetary policy should remain tight to control expectations on inflation at a lesser level.

Agarval et al. (2014) analyse the demand and supply of food in India in order to understand the domestic policies which are essential to control food price inflation. They studied the demand and supply projections of food items. According to them, the changing pattern of food demand with rising income is the primary cause of food inflation. For demand projections, they used double log functional form of the demand function. The estimated food demand in India by different categories, for example, cereals vegetable fruits etc. and projected it till 2025. The paper also discussed the supply-side responses to the changing pattern of food demand.

According to Bhalla (2014), spending on non-durable commodities has increased with anticipated short-run inflation. These predictable effects on non-durables spending were uncertain, that is not strong, and look as if to be driven by the behaviour of owners of the houses who did not have any debt. The results are

contradictory to the predictions of the theory that durable goods' consumption should be more elastic to the real rate of interest compared to the consumption of non-durable goods. Furthermore, sample households did not think growth in their money income to match the price rise. Consequently, an increase in anticipated price rise would create an undesirable effect on income that reduces expenditure is present as well as in future.

Rakesh and Kapur (2015) viewed that Indian cereal harvests are more compared to the global level and the differences in yields across states in India is too big. The study emphasised that in order to check food price inflation, there should be an increase in the agricultural output of essential commodities and turn, the excess demand could be met with this increased supply. The fixation of minimum support prices should be directed in line with the national as well as the international prices along with the long-standing trends while defending extreme volatility of domestic price with temporary defences.

Talukdar (2015) examined the impact of inflation on poverty in less developed economies with the help of panel dataset encompassed of 115 emerging nations during the period 1981 - 2008. The dataset includes ten samples for each nation as the data is accessible by an interval of three years. After running regressions, the author found signals for supporting the view that a general price hike is directly associated with deprivation. At the same time, educational attainment, income, and quality of governance are inversely related to poverty in most of the stipulations. In addition to the study of all the economies collectively, he distinctly examines the consequence of price hike on poverty in developing economies, countries with lower-middle-income as well as upper middle income to see whether the effect of price rises is comparable or dissimilar in nations with various levels of income. He found that even though in furthermost cases price hike shows a confident and statistically significant association with poverty, in the case of low-income countries, the relationship is inverse and statistically insignificant under some conditions.

Dev S. et al. (2015) analysed the food inflation in India with particular reference to food security and policy options. The substantial rise in the prices of food

articles tends to weaken the food security and livings of the most vulnerable groups in society. Since poor devote a large portion of their income on food articles compared to the non-poor, they cannot adapt to price rise. The study noticed that food price inflation had led to poor conditions of the economically vulnerable groups, in terms of health, education and nutrition, through four ways including influence on poverty; macroeconomic effect on employment and the social sector; effect on nutrition and social protection programs; and welfare of women and intra-household decision making. Food inflation estimated in the study based on the Whole Sale Price Index (WPI) was 6% in February 2014, which was a significant correction from 14% in December 2013. However, food inflation based on consumer price index (CPI) is still high at 10%. And the study found that the burden on food inflation was mainly due to the price rise of perishable high-value commodities, i.e., fruits, vegetables, egg, fish, meat and milk in food articles category. The fruits and vegetable inflation peaked at 53.7% in November 2013. The major contributor to the price rise in this group was vegetables, especially onions. Therefore, it is essential to ensure that such a situation of high food price fluctuations that persisted for a lengthy period since mid-2009 is averted in the future. Finally, they suggested that the policies which are required to lessen food price hike relate to "(*a) release of cereals from buffer stock for a reduction in open market prices of cereals; (b) extending minimum support price policy for other nutrient-rich foods, like fruits, vegetables, milk, meat, and fish; (c) public investment for diversification of agricultural production specifically towards high-value commodities; (d) marketing reforms especially APMC Model Act to keep fruits and vegetables out of it; (e) improvement in post-harvest handling and processing to avoid storage and post-harvest losses; (f) fiscal policies to control fiscal deficit by reducing subsidies and monetary policies geared towards reducing aggregate demand; (g) opening trade in agricultural commodities and (h) better Information system*".

## 2.4 Research Gaps

All literature mentioned in the first part of this chapter has analyzed the determinants of food price inflation by using demand and supply factors, but not studied for the later periods. Moreover, almost all the studies had taken food inflation in terms of WPI alone. The present study tries to analyse the trend and pattern of food inflation by using WPI_F, CPI_IW_FA and new series of CPI. Along with this, it analyses the item-wise trend and pattern of the price inflation for rural and urban areas separately which is missing in this area.

The impact of food inflation has also been examined in so many studies. Majority of the studies discussed in the second part of this chapter dealt with the effects of food inflation on poor people as a whole. In the present study, the researcher is emphasizing the impact of food price inflation on the poor, mostly urban poor in India. A very few literatures have examined the effect of food inflation in the Indian context. For this purpose, QUAIDS has been used for estimating the food demand system of the poor people and also for calculating the price elasticities in order to understand the responses of the poor people. The present study also analyzed the food consumption basket of the poor people to know the item-wise share of food articles.

# Chapter III

# THEORETICAL AND METHODOLOGICAL FRAMEWORK

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# THEORETICAL AND METHODOLOGICAL FRAMEWORK

## 3.1 Introduction

The theories and methodologies used for the study have been included in this chapter. The chapter discusses the objectives, hypotheses and also theoretical and methodological framework of the study. This chapter also examines the various econometric and mathematical tools used for the analysis. In the theoretical and empirical part, the significant demand theories with suitable modern empirical models are discussed.

## 3.2 Objectives

The major objectives of the study are

- To examine the trend and pattern of food inflation in India
- To study the budget share of the poor people devoted to food items.
- To analyse the response of the urban poor towards price fluctuations in India.

These objectives are satisfied with the help of many methods, which are explained below.

## 3.3 Theoretical and methodological frameworks

The study broadly focuses on two theoretical aspects; one is related to inflation, especially food inflation, and the other one is related to demand. Therefore, the chapter explains the important theoretical and methodological part of these two facets.

### 3.3.1 Inflation in a theoretical perspective

The term ‘inflation’ is widely interpreted as a situation of “increasing prices of commodities”. Laidler and Parkin (1975) define it as “*a process of continuously*

*rising prices, or equivalently, of continuously falling value of money"*. Pandit (2001) considers inflation as a very sensitive issue having welfare implications and argues that the most important use of price data is to measure inflation. In a similar line, Samuelson and Swamy, (1974) suggest that a good measure of inflation should be able to capture the changes in real income which in turn will facilitate to measure changes in the welfare of consumers.

Food inflation literally means that people have to pay higher or inflated prices for food articles. As per the financial stability report released by RBI (2010), *"Inflation, particularly food inflation, in India continues to rule at elevated levels reflecting in part the structural demand-supply mismatches resulting from, inter alia, rising incomes and changing consumption patterns. Non-food manufacturing inflation remains above trend. The recent upswing in food and commodity prices at the global level is also a concern for domestic inflation, going forward"*. Accordingly, it is important to go through some important theories of inflation.

The theories associated with inflation have a long history. In this section, we are going through only a brief discussion about the theories. Dwyer and Hafer (1999) emphasised that changes in the money supply were the most important factor leading to inflation. One of the early attempts at explaining this relationship was made by David Hume in 1752. After two centuries Milton Friedman supported Hume with his classic declaration that *"Inflation is always and everywhere a monetary phenomenon"*.

The classical approach to the money supply was based on the famous Quantity Theory of Money (QTM), which exhibits a positive association between money supply and level of prices. A comprehensive version of the quantity theory of money was given by Irvin Fisher with the introduction of his famous 'equation of exchange'. A modified form of the Quantity Theory of Money was presented by the Cambridge economists like Marshall, Pigou, Robertson and Hawtrey, which came to be known as the Cambridge Equation or the Cash Balance Approach. Cambridge equation was satisfactory in its capacity to explain the relationship in a more pragmatic sense.

Keynes (1936) criticised the classical view on inflation in his famous book *'The General Theory of Employment, Interest and Money'*. He argues that *"So as long as there is unemployment, employment will change in the same proportion as the quantity of money; when there is full employment; prices will change in the same proportion as the quantity of money."* That is, an increase in the supply of money will lead to inflation only in a fully employed economy. Keynes clarified his views on inflation in his renowned booklet, *'How to Pay for the War?'* In his study, Keynes examined the relationship between inflation, taxation, and the distribution of income, which will lead to an unanticipated increase in expenditures. Later, he modelled his view on inflation as the inflationary gap model. It is the gap between AD (aggregate demand) and AS (aggregate supply) in the economy.

Instead of considering actual demand and supply like Keynes, Hansen (1951) explains demand in terms of planned purchases and supply in terms of expected sales. If the intended purchases exceed expected sales, it will lead to inflation. His model is popularly known as 'double inflationary gap' model. The important point of Hansen's double gap model is that there may be inflationary equilibrium with excess demand existing both in goods and factor markets simultaneously. But Hansen's theory was criticized for the unrealistic assumptions like wage-price flexibility and a fixed quantity of labour given exogenously.

Another detailed work on inflation and employment was adopted through the Phillips Curve analysis. The theoretical basis for the Phillips curve is the labour market dynamics where an upsurge in demand for labour is followed by an increase in money wages. Since it is very difficult to get a correct measure of this demand and supply from the labour market, Phillips (1958) used unemployment level as a proxy to measure the relationship and established a negative relationship between the rate of increase in unemployment and money wages. However, the Phillips curve was also criticized because it could not explain the co-existence of high inflation and unemployment in the early period of 1970s. Major criticism on the Phillips curve was made by Friedman (1968). The major argument was that inflation unemployment trade-off is only a short-run phenomenon.

Friedman (1968) and Phelps (1967) developed another theory which is known as expectation augmented Phillips curve or Phelps – Friedman hypothesis. It was with respect to issues concerned with long-run stability of the Phillips curve and the role of price expectations. Unlike the earlier Phillips curve, they argued that the Phillips curve is perpendicular at the Non-Accelerating Inflation Rate of Unemployment (NAIRU). If the actual unemployment is less than NAIRU, then the price level will be increasing, and if the actual employment is above NAIRU, then the price level will be falling. Ball and Mankiw (2002) studied the role of the concept NAIRU in business cycle theory and applicability of NAIRU in the real world. According to them, it has less practical applicability.

From the point of view of monetarists, there are two types of inflation, one is demand-pull inflation, and the other one is cost-push inflation. The demand-pull inflation is mainly concerned with the demand side factors of explaining inflation, whereas the cost-push inflation gives importance to supply-side factors like increase in wage, taxes etc. The important point to be noted is that the above-mentioned theories are applicable only for developed countries. Whenever we are talking about the less developed or developing nations, we have to think of structuralist theories. As per structuralist view, inflation is a non-monetary phenomenon. The first formal structural theory on inflation was developed by Mexican economist, Juan Noyola Vazquez in 1956. The structuralist view emphasises the behaviour of variables in the production and the bottleneck that an economy faces during the production process.

It is believed during the 1970s were those price indices rise because of temporary noise, resulting from volatile food or fuel prices, and then revert after a short break (Cecchetti and Moessner, 2008). This led to the growth of the notion of baseline inflation or core inflation (Gordon, 1975), which is mostly indicated as the combined price fluctuations or the overall inflation apart from the food and fuel price hike (Eckstein, 1981; Blinder, 1982; Thornton, 2007; Wynne, 2008; and others). The prominence on core inflation was inspired by the fact that historically food and fuel price fluctuations have been adjusting themselves in a short period.

Conflicting to the above belief, though, a study in current years has shown that in less developed economies where food comprises a major portion of the consumption basket, food prices have become more steadfast. This not only congested the smooth working of monetary policy, but it also caused in misrepresentations in inflation predictions of monetary authorities and accordingly, the inflation prospects. Unnecessary to mention, it is essential that monetary policy should be aimed at preventing the second-round effects of higher food prices on inflation targeting and wages, and in that way control future general price hike (Cecchetti and Moessner, 2008). When the food inflation in India is analysed, all these theories are important, and after going through these theories, we get a very comprehensible picture of the main reasons behind food inflation.

### 3.3.2. Inflation in a methodological framework

#### a. Data on food inflation

The first objective of the study is to analyse the trend of food inflation and the reasons behind the trend. Many tools, econometric, as well as statistical, are used in the study for examining this objective. Before entering into the methodology, a brief description of inflation data in India should be depicted here. Price data in India has first published in the 1861as the Index of Indian Prices. There are two important types of data on inflation in India like Whole Sale Price Index and Consumer price index. The GDP deflator and also the private final consumption expenditure deflator mark implied price changes in the economy as a whole. For studying inflation, WPI and CPI are the most commonly used indices. So, the following discussion mainly concentrated on these two indices.

- **Wholesale Price Index**

Wholesale Price Index measures prices in the wholesale market in an economy by ignoring the price of services. The history of WPI in India started in 1942, with the base year of 1939. A comparatively well-structured price index was calculated just after independence which included 78 commodities with 215 individual price

quotations. It was revised in 1956 by taking 1952-53 as the base year. The new index had 112 commodities with a price quotation of 555 each. Commodities were classified based on STI classification (Standard International Trade Classification) into;

(i) Food articles

(ii) Liquor and tobacco

(iii) Fuel, power, light and lubricants,

(iv) Industrial raw materials and

(v) Manufactured products.

The next series was started in 1969 with the financial year 1961-62 as the base year. This index included 139 commodities with 774 price quotations each. To accommodate the emerging structure of Indian markets, the STIC was slightly modified under six heads, including machinery and transport equipment.

A new index was adopted in January 1977 with the base year of 1970-71. It had a wider coverage by including 360 commodities and price quotations of 1295. This index adopted the National Industrial Classification instead of SITC classification. Here commodities were divided into three- (a) primary commodities (WPI-PA) (b) power, fuel, light and lubricants (WPI-F&P) and (c) manufactured products (WPI-MP). Next revision was done on July 1989 and its base year was 1980-81. The index also included the value of unorganised and unregistered manufacturing sector. The index released in 2000 with the base year 1993-94 followed the earlier classification. The latest series of WPI is adopted with effect from 2010 by taking 2004-05 as the base year. The historical time chart of WPI index is given in the following table.

Table 3.1

*WPI series in India*

| Sl. No. | Year | Base Year | Commodities | Quotations |
|---|---|---|---|---|
| 1 | 1942 | Aug-39 | 23 | one each |
| 2 | 1945 | Aug-39 | food articles | 46 |
| 3 | 1947 | 1939 | 78 | 215 |
| 4 | 1956 | 1952-53 | 112 | 555 |
| 5 | 1969 | 1961-62 | 139 | 774 |
| 6 | 1977 | 1970-71 | 360 | 1295 |
| 7 | 1989 | 1981-82 | 477 | 2371 |
| 8 | 2000 | 1993-94 | 435 | 1918 |
| 9 | 2010 | 2004-05 | 676 | 5482 |

Source: Ministry of Commerce and Industry

The new index has some modifications over the other indices. The first one is that WPI was based on the first point of bulk sale in the domestic economy. The second modification is regarding changes in the weight of the manufactured product trade. Now the domestic trade value is calculated as 'production +import – export'. The next point is that in the new series of 2010, the items which covered 80 per cent of the trade value at the group level is represented the items in manufactured product basket. The weight of primary articles, including food items, is showing a falling trend in various years. But the story is just the opposite for manufactured products. Power, fuel, light and lubricants have weighted more or less equally across the years. The weights of WPI in different years are given in the table below.

Table 3.2

*WPI Series Weights*

| Base Year | Weight | | |
|---|---|---|---|
| | **Primary Article** | **Power, Light, Fuel and Lubricants** | **Manufactured Products** |
| 1970-71 | 41.67 | 8.46 | 49.87 |
| 1981-82 | 32.30 | 10.66 | 57.04 |
| 1993-94 | 22.05 | 14.20 | 63.75 |
| 2004-05 | 20.12 | 14.91 | 64.97 |

Source: Ministry of Commerce and Industry

The Wholesale Price Index numbers with 2004-05 as the base year was announced with effect from 14th September 2010. Since then, the Indian economy is undergoing through a number of substantial structural changes. Therefore, it became essential to change base year of Wholesale Price in India (Base 2004-05=100) and revisit a series of matters such as examination of the commodities coverage, base year, and weighting diagram etc. Thus, on May 2017, as a result of the recommendation of the Working Group for the revision of the WPI (Base 2004-05) series headed by Dr. Saumitra Chaudhuri, the 2004-05 WPI series has been shifted to a new base year of 2011-12, besides adding a new WPI food index for capturing the food price inflation. A commodity basket 697 items has been selected, and the suitable method of weighting structure adopted for the new series, which is consistent with the behaviour of the economy for the year 2011-12. A comparative statement of weights and number of commodities between the old series with a base 2004-05 and a revised series with a base 2011-12 is given for the major groups in table 3.3.

Table 3.3

*Comparison between the last two base years of WPI*

| Group | Weight | | Items | | Quotations | |
|---|---|---|---|---|---|---|
| | 2004-05 | 2011-12 | 2004-05 | 2011-12 | 2004-05 | 2011-12 |
| All commodities | 100 | 100 | 676 | 697 | 5482 | 8831 |
| Primary articles | 20.12 | 22.62 | 102 | 117 | 579 | 983 |
| Fuel and power | 14.91 | 13.15 | 19 | 16 | 72 | 442 |
| Manufactured products | 64.97 | 64.23 | 555 | 564 | 4831 | 6906 |

Source: Ministry of Commerce and Industry

The number of items in the updated item basket (2011-12), based on the structure of the economy, has been changed from 676 to 697. Here in the new series, 199 new items have been added and instead of dropping 146 old items. In the new series of Wholesale price index, so as to eliminate the influence of fiscal policy, prices used for compilation, do not contain indirect taxes. This is in line with the worldwide method and for making the new WPI theoretically related to 'Producer Price Index'. The rate of food price inflation can be captured with the help of this new "WPI Food Index". Seasonal nature of vegetables and fruits has been reorganized to account for more months and are available for a longer duration. Geometric Mean (GM) is used for calculating the item-wise aggregates for new WPI, and this is also used for the gathering of All India CPI.

From 2011-12, the Indian economy has been witnessed a number of structural changes. Hence, it is essential to examine the handling of commodities, weighting diagram and connected problems affecting the present series of Wholesale Price Index. Therefore, Government of India has formed a Working Group under Chairmanship of Dr. Ramesh Chand, a member of NITI Aayog in June 2019, in order to revise the present series of Wholesale Price Index (Base 2011-12).

- **Consumer Price Index**

The Consumer Price index is the next important index to measure price change. It captures the price of not only goods but also the services that consumers

paid in the retail market. The first step in the construction of CPI was done in association with the collection of family Living Surveys in 1920s conducted in some parts of the country. Next development was given by Rau Court of Enquiry committee report published in 1941 and introduced the Cost-of-Living Index (COLI) for cities, urban and the rural areas. As per the Manual of Consumer Price Index (2010), it is noted that *"In order to promote understanding of the nature and uses of indices of retail prices charged to a particular group, the term 'Cost-of-Living Index' should be replaced, in appropriate circumstances, by the term 'Price-of-Living Index', 'Cost-of-Living Price Index' or 'Consumer Price Index"*.

Earlier CPI was divided into four- Consumer Price Index for Industrial Workers (CPI-IW), CPI for Agricultural labourers (CPI-AL), CPI for Rural Labourers (CPI-RL) and CPI for Urban Non-Manual Employers (CPI UNME). But one of the major drawbacks of this classification was that these indices could not represent the entire nation. And another problem associated with this was that the base years were twenty to thirty years behind the current year, that is, the base year of CPIAL and CPIRL was 1986-87, CPI IW was 2001, and CPI UNME was 1984-85. Reddy (1999) argues that if the base year is not updated regularly, it can't accommodate the structural changes in the economy. Subbarao (2012), Nair and Eapen (2012), Gulati and Saini (2013) argued that this food sector in India undergoes structural changes so the existing CPI can't accommodate the structural changes. To incorporate these changes in the economic system, a revision of the CPI became an important issue. For that purpose, a committee was formed under the leadership of Urjith Patel and the committee in 2013 recommended a new index of CPI to measure inflation.

A new CPI was created from 2012 by taking 2010 as the base year by Central Statistical Organisation on a monthly basis. It has three measures- CPI Urban, CPI Rural and Combined CPI. With this classification, the index can represent the entire nation. CPI Urban stood for the people in the entire urban area, whereas the CPI Rural represented the rural population of India. All India inflation is shown by the combined CPI by adding rural and urban CPI. RBI has decided to move to the new series of CPI (both urban and rural) and revised the base year from 2010 to 2011-2012. The items

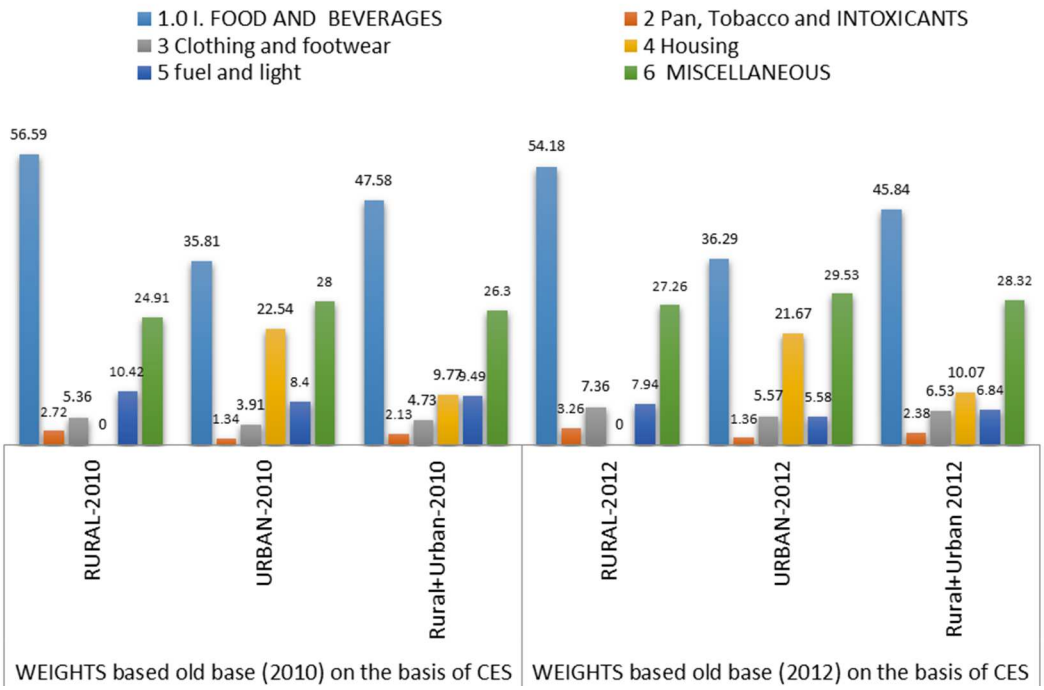
and weights in new CPI series are given in the table3.4 and a comparison of the weights in old and new base is shown in the figure 3.1.

Table 3.4

*New CPI- WEIGHTS (the base year 2012)*

| Sl. No. | Items | Weights | | |
|---|---|---|---|---|
| | | Rural | Urban | Rural+Urban |
| 1 | FOOD AND BEVERAGES | 54.18 | 36.29 | 45.84 |
| 1.1 | *Cereals and products* | 12.35 | 6.59 | 9.67 |
| 1.2 | *Meat and fish* | 4.38 | 2.73 | 3.61 |
| 1.3 | *Egg* | 0.49 | 0.36 | 0.43 |
| 1.4 | *Milk and milk products* | 7.72 | 5.33 | 6.61 |
| 1.5 | *Oils and fats* | 4.21 | 2.81 | 3.56 |
| 1.6 | *Fruits* | 2.88 | 2.9 | 2.89 |
| 1.7 | *Vegetables* | 7.46 | 4.41 | 6.04 |
| 1.8 | *Pulses and products* | 2.95 | 1.73 | 2.38 |
| 1.9 | *Sugar* | 1.7 | 0.97 | 1.36 |
| 1.1 0 | *Spices* | 3.11 | 1.79 | 2.5 |
| 1.1 1 | *Non alchoholic beverages* | 1.37 | 1.13 | 1.26 |
| 1. 12 | *Prepared meals* | 5.56 | 5.54 | 5.55 |
| 2 | PAN, TOBACCO AND INTOXICANTS | 3.26 | 1.36 | 2.38 |
| 3 | CLOTHING AND FOOTWEAR | 7.36 | 5.57 | 6.53 |
| 4 | HOUSING | 0 | 21.67 | 10.07 |
| 5 | FUEL AND LIGHT | 7.94 | 5.58 | 6.84 |
| 6 | MISCELLANEOUS | 27.26 | 29.53 | 28.32 |
| | ALL GROUPS | 100 | 100 | 100 |

Source: Ministry of Statistics and Program Implementation




Source: MoSPI

*Figure 3.1*: Comparison between Old and New Series

Regarding the weights, it can be seen that the highest weightage in the CPI (Combined) with 2012 base, has been assigned to the “Food and Beverage” category (45.86%), followed by Miscellaneous category (28.32%) and Housing category (10.07%). There is a decline in the weights of food and beverages and fuel and light when moving from 2010 series to 2012 series. But for all the other commodity groups, the weights have been increased.

There are three major types of indices to compute price level- Laspeyres (1871), Paasche's (1874), and Fisher’s index numbers formulated in 1922. The Laspeyres index calculates the relative change in the price of a group of commodities initially bought in the base year. But, Paasche's index is taken the current quantity as weights. Though Paasche index can analyze the changes in the consumption pattern, it necessitates the use of current year quantity as weights for each of the time period, which is practically difficult. That is why Allen (1975), preferred Laspeyres to Paasche index. Since Fishers index is the geometrical mean of Laspeyres and Paasche index, it also confronted the problems faced by the Paasche index.

Consequently, there was no change in the method of calculation of the index in the revised series. It is calculated according to the Laspeyres formula, which has a fixed base-year weighting diagram functioning through the whole life span of the series.

**b. The methodological part of Inflation**

For analysing the first objective, we have to examine the trend of food inflation for various commodities. After finding trend values, the next step is to check whether food inflation has any long-run relationship with other variables like overall inflation, production, Minimum Support Price, oil price fluctuation and money supply. In order to find out this long-run relation, Auto Regressive Distributed Lag Model has been used. The steps for this model are explained as follows.

Step 1: check for the order of integration of variables/stationarity checking

- For that Augmented Dickey Fuller test has been used. The functional form of ADF is that;

$$\Delta y_t = \beta_1 + \delta y_{t-1} + \sum_{i=1}^{m} \gamma_i \Delta y_{t-i} + u_t$$

$$H_0 : \delta = 0 \text{and } H_1 : \delta \neq 0$$

After seeing some variables are I(1) and some others are I(0), the ARDL model has been used.

Step II: Estimate the ARDL equation with suitable lags

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{qj} X_{j,t-i} \beta_{j,i} + \varepsilon_t$$

Where $\varepsilon_t =$ random disturbance term, and it is serially independent

The selection of suitable lag is determined by using one or more of the information criteria – AIC, SIC, so that $\varepsilon_t$ is free from autocorrelation.

Step III: Formulate the Error Correction Model to check for the long-term relation using Bounds test.

$$\Delta y_t = \sum_{t=1}^{p-1} \gamma_i^* \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{qj-1} \Delta X_{j,t-i} \beta_{j,i}^* - \alpha - \rho y_{t-1} - \sum_{j=1}^{k} X_{j,t-1} \delta_j + \varepsilon_t$$

The test for the existence of level of relationships is then simply a test of

$$H_0 = \rho = \delta_1 = \delta_2 = \delta_3 = \cdots = \delta_k = 0$$

The null hypothesis is tested for using F test.

If the null hypothesis is rejected, there may have a significant long-term relationship between the independent variables with the dependent variable and its lagged values.

### 3.3.3. Demand Theories and Methodologies

Consumption demand is considered to be the most important component of aggregate demand. Consumption is influenced by a composite set of, cultural, religious, ecological factors and also by socio-economic factors. There have been numerous efforts to describe the changes in the pattern of consumption and to analyse the changes attributed to the different variables. The factors influencing consumer demand and the means of measuring it are extensively covered in the discussions related to demand analysis. The demand analysis is most closely connected with price and its elasticity. Price is considered as the most important determinant of demand. So, the fluctuations in price have made some effect on the living standard of the people, especially poor. This study checks whether there is an increasing trend in the price of food articles.

There are two associated, but separable methods can be celebrated in the history of demand analysis. One approach is evolved from the studies of economists attentive in the formulation of general laws related to the market operations, predominantly agrarian market; and another group comes from the preliminary works of statisticians, which has come to be called consumer preferences. Brown and Deaton

(1972) hold the view that this dichotomy still continues to describe the nature of the subject. At a recent time, both the economists and mathematicians have developed more advances techniques of estimation which help to know the multifaceted nature of pure mathematics of preference relation of the consumers. These interactions between theory and practicability have been more productive in the analysis of demand than in any other branch of economics.

Like many of the theories, the consumption/demand theory also started its history during the period of Classicals. It was Adam Smith (1776), father of Economics, who classified the value of utility into two- value in use and value in exchange. With the water diamond paradox, he argued that '*Price varies directly as the quantity demanded, which also depend on prices; and inversely as the quantity supplied, which also depend on price.*' The leader of utilitarianism, Jeremy Bentham (1788), advocated the utility in its original sense. In 1844, Dupuit, constructed a well-known theory of maximising utility and introduced a new concept called consumer surplus. In his study, Veblen (1899), argued that consumption is a social phenomenon.

Engel (1857) has made an important contribution to the theory of demand, which came to be known as a very strong empirical law showing the relationship between consumption expenditure and income of the consumers. According to Engel "*the poorer a family, the greater the proportion of its total expenditure, that must be devoted to the provision of food"*. This was the initial attempt for generalizing from budget data. Engel also stated that the wealthier nations spend less on food items compared to non-food items.

In the eve of 19$^{th}$ century, the amalgamation between theoretical and empirical methods in the literatures of Marshall (1890) perhaps represented as the substance which encouraged the economists to use the recently developed techniques of correlation in the examination of single markets. He advocated the cardinal utility approach, which stated that utility could be measured cardinally. Though Marshall's analysis was a partial equilibrium analysis and depended mostly on some assumptions like an independent utility, additive utility etc., he marked a breakthrough in the history of consumer demand. The elasticity of demand was the great contribution of

Alfred Marshall, which acted as a very useful tool for studying market characteristics by using numerical measurement. The present study also depends on various tools of elasticity. Considerable development in the econometric study of demand was offered by economists in the United States, beginning with the effort of Moore (1929) who published many significant studies during the period 1914 and 1929.

Keynes (1936) presented the consumption from a macro point of view. According to him, consumption depends on the income of the consumer. He defined the fundamental psychological law as, *"upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience is that men (and women, too) are disposed, as a rule and on an average to increase their consumption as their income increases, but not by as much as the increase in their income"*. He emphasised the role of effective demand by consumers for the growth of an economy. The Relative Income Hypothesis of Dusenberry (1949), Permanent Income Hypothesis of Milton Friedman (1957) and Life Cycle Hypothesis of Modigliani (1949), are the other macro theories of consumption.

Hicks and Allen (1934) reconstructed the theory of consumer demand with the help of indifference curve analysis. Their theory was based on ordinal utility analysis. By 1939, the majority of the techniques of these demand analyses still in usage had been discovered. It may be characterised the Classical approach as the application of differences in least-square single equation method, to cross-section as well as time-series data, of market models based on the theoretical contributions of Slutsky (1915), Hicks and Allen (1934) and Hicks (1936). Slutsky and Hicks explained the decomposition of price effect into income effect and substitution effect separately. They conceptualised this decomposition with the help of compensating variation in income from a different perspective. Slutsky has expressed his compensating variation in such a way that it would enable a consumer at the original preferences if he decided to buy his initial bundle of commodities. On the other hand, Hicks has observed that it is identical with a change in money income which enables a consumer to prefer his initial level of utility if he wishes so. The 'substitution effect' has been given two

versions in economic literature (Mahajan, 1980) based on the concept of compensating variation in income.

Another important contribution to the theory of consumer demand was given by Paul A Samuelson (1938) in the introduction to Revealed Preference Theory. The revealed preference theory does not depend on cardinal measurability of utility or satisfaction as the Marshallian approach, nor does it make use of the concept of indifference as the Hicksian approach. The matter is that it has completely knocked out the subjective or psychological basis of the theory of consumer's behaviour. On the contrary, this theory relies exclusively on the observed market behaviour of the consumer to know about his preferences with regard to the various combinations for the two commodities, by keeping a close watch on the reactions and responses of the markets.

A household production approach to consumer behaviour was introduced by Becker (1965). He argued that the household purchase commodities from the market, which have no direct utility, only after having value addition from household works. Lancaster (1966), in his characteristic approach, says that a commodity is demanded because of the characteristics possessed by that good. Gorman and Pollack (1967), theorised the role of habit formation in demand analysis. Brown (1972) noticed that there is a continuous influence of habit formation on consumption. All these theories of consumer behaviour suggest that an understanding of consumer behaviour is a complex one.

The theoretical and empirical contributions to the static demand model were consolidated by Schultz (1938), Wold and Jureen (1952) and Stone (1953) in the first half of 20$^{th}$ century. Then onwards there have been a lot of expansions in the theory of consumer demand. Classical approach mainly addressed the questions like, "what is the price elasticity of a particular commodity? How the consumers' demand changes when there is an increase or decrease in income and price of related commodities?". The research on demand analysis after half of the 19$^{th}$century started to solve more fundamental problems, which are mainly focused on methodological issues. Instead of questions on calculating elasticity, the demand analysis trying to

answer the questions like, ‘how should demand function be specified?’, ‘What are the finest means of permitting changes in prices?’. These questions are dealing with the methodological part, rather finding numerical values of coefficients. In this context, some tools of empirical investigation are found by Angus Deaton (1974). Although serious econometric work related to consumer behaviour started in the 1930s (Stigler, 1954), in India hardly any attempt was made prior to 1950s. Some of the major works are explained in the following part.

- **Linear Expenditure System**

It was Stone (1954), who introduced a new demand system with numerous empirical applications in the demand analysis, which is known as the Linear Expenditure System (LES). He has derived the system from a linear demand equation. A general form of LES can be written as

$$p_1 q_1 = p_1 c_1 + b_i(y - \sum_{j=1}^{n} p_j c_j); \qquad \text{i=1,2,...n} \qquad \text{...3.1}$$

Where; $q_1$,$q_2$...$q_n$ is the vector of quantities purchased by consumers

$p_1$,$p_2$ etc. are corresponding prices.

It is understood that initially, the consumer distributes his total income for the minimum purchases of necessary commodities consistent with parameters $c$ at respective prices $(\sum_{j=1}^{n} p_j c_j)$. The consumer then assigns the leftover amount $\left(y - \sum_{j=1}^{n} p_j c_j\right)$ to all other commodities in the percentage share of $b_i$ to the i$^{th}$ item. Subsequent to this understanding the expenditure on any item can be seen as comprising of two types- one is subsistence or committed expenditure, $p_1 c_1$and the other is a portion of supernumerary or uncommitted expenditure, that is,$b_i(y - \sum_{j=1}^{n} p_j c_j)$. The parameter $C_j$ is called 'committed quantity' for the i-th commodity. It is important to note that equation 3.1, satisfies homogeneity restrictions and also have the adding up property. A linear Engel curve can be derived from this LES model.

The Stone-Geary utility function, which is the direct utility function of the LES, can be written as;

$$u(q) = \pi_{i=1}^{n} (q_i - {}^{\gamma}{}_i)^{\beta_i} \quad \text{...(3.2)}$$

By maximising equation 3.2 subject to the budget constraints gives us the Marshallian demand function. It can be confirmed that $c_i = \gamma_i$ and $b_i = \beta_i / \sum_{k=1}^{n} \beta k$ and without loss of generality, assume that, $\sum_{i=1}^{n} bi = 1$.

There are some variants of LES- LES with variable parameters and Nasse Expenditure system. The Linear Expenditure System can be used with high flexibility by incorporating changes in parameters as a result of changes in income level, specification of urban and rural area, changing behaviour associated with earlier consumption, demographic features, changes in taste & preferences of consumers etc. by permitting its parameters to vary with respective determinant(s). In all these situations, the marginal budget shares and devoted quantities can be assumed to depend on dummy variables on behalf of particular income groups. Urban or rural sectors or even continuous variables are relating to household characteristics like family size, the number of members etc.

The Nasse Expenditure System (NES) deals with a non-additive function, and also permits substitution between each commodity groups. Following the suggestion of Stone (1954), the '*committed quantity'* parameter for each good is hypothesized to depend on all price ratios in a particular way. Another modification of the LES, which is comparable to the NES, is known as Simple Non-Additive Model (SNAM). A modified SNAM has been developed by Coondoo and Majumdar (1987).

- **Almost Ideal Demand System**[1]

Though several studies have used the Linear Expenditure System (LES) for calculating demand elasticities, it has some drawbacks. Because of its additive preferences, LES is very much restrictive and therefore, it cannot be used for practical purposes involving disaggregate things of consumption. Analysis of inferior goods is not allowed because of the existence of additive preferences. Due to these limitations,

[1] The discussions are based on the works of Deaton and Muellbaur (1980); Bank et.al (1997); Poi (2012)

another method for estimating demand function and elasticities is proposed by Deaton and Muellbaur (1980), which is known as Almost Ideal System (AIDS).

This model has been trying to overcome the limitations of the Linear Expenditure System, and that's why it is called "*almost ideal*". The AIDS model is the best example of a first-order approximation to any demand system. The superiorities of the model are;

(i) It fulfils the axioms of choice,

(ii) The functional form of this model is dependable with the household budget data

(iii) It is simple to estimate

(iv) largely avoiding the need for non-linear estimation and

(v) It can be used to estimate the restrictions of symmetry and homogeneity through restrictions on fixed parameters.

The model Almost Ideal Demand System is a time series generalization of PIGLOG (Price Independent Generalized Logarithmic) Engel function introduced by Leser (1963), that is

$$w_i = \beta_i + LogY$$

Where Y is household total expenditure and $w_i$is the budget share on the i$^{th}$ item.

Price should be included explicitly in the time series generalisation of the model. This can be attained by creating the parameters α and β functions of prices in numerous ways. The AIDS model is one of the examples of this. The general form of PIGLOG function is as follows;

$$LogC(U,P) = (1-U)Log\{a(P)\} + ULog\{b(P)\}$$

where U is a specified level of utility, a(P) and b(P) is the direct linear homogeneous functions of prices. They are understood as the costs of survival and bliss, respectively.

The following form of a(P) and b(P) has been used by Deaton and Muellbauer (1980).

$$Loga(P) = \alpha_0 + \sum \alpha_i LogPi + \frac{1}{2}\sum \quad \sum \gamma_{ij}\, LogP_i LogP_j$$

$$Logb(P) = Loga(P) + \beta_0 \prod_{j=1}^{n} P_j^{\beta_i}$$

Therefore, the AIDS cost function will be;

$$LogC(U,P) = \alpha_0 + \sum \alpha_i LogPi + \tfrac{1}{2}\sum \quad \sum \gamma_{ij}\, LogP_i LogP_j + U\beta_0 \textstyle\prod_{j=1}^{n} P_j^{\beta_i} \qquad ...3.3$$

Where

α, β and γ are treated as parameters.

From equation (3.3), we can directly derive the Hicksian demand functions by using Sheppard's Lemma.

$$w_i = \alpha_0 + \textstyle\sum_{j=1}^{n} \gamma_{ij}\, LogP_i LogP_j + \beta_i U\beta_0 \prod_{j=1}^{n} P_j^{\beta_i} \qquad ...3.4$$

Where $\gamma_{ij} = \frac{1}{2}(\gamma_{ij}^{*} + \gamma_{ji}{}^{*})$

For maximizing utility, total expenditure is considered as the cost and using this relation we can delete U from equation 3.4 to get AIDS model.

$$w_i = \alpha_i + \sum \gamma_{ij}\, LogP_i + \beta_i \log\left(\frac{Y}{P}\right) (i = 1,2 \dots \dots n) \qquad ...3.5$$

Where,

$$LogP = \alpha_0 + \sum \alpha_i LogPi + \tfrac{1}{2}\sum \quad \sum \gamma_{ij}\, LogP_i LogP_j \qquad ...3.6$$

Equation (3.5) can be regarded as a first-order estimation to an unidentified relation between budget share, income and prices. The theoretical limitations on (3.3) interpret themselves into restrictions on the parameters of equation (3.5). The underlying restrictions are;

- Additivity or adding up that is $\sum_{i=1}^{n} \alpha_i = 1, \sum_{i=1}^{n} \beta_i = 0$, and $\sum_{i=1}^{n} \gamma_{ij} = 0$, ...3.7
- Homogeneity - $\sum_{j=1}^{n} \gamma_{ij} = 0$, ...3.8
- Symmetry -$\gamma_{ij}$=$\gamma_{ji}$ for i≠j ...3.9

For the AIDS model, the elasticities, both price elasticity and expenditure elasticity are given by,

$$\pi_{i0} = 1 + \frac{\beta_i}{w_i}$$

$$\pi_{ij} = \frac{\gamma_{ij}}{\overline{w}_i} - \beta_i \frac{\overline{w}_j}{\overline{w}_i} - \delta_{ij}$$

$$\delta_{ij} = 1 \; for i = j \text{ and } \delta_{ij} = 0 \; for \text{i} \neq \text{j}$$

From the econometric point of view, the most interesting point is that equation (3.5) is very near to being linear. Apart from the expression P in equation (3.5), the parameters can be estimated equation by Ordinary Least Squares. With regard to P, the restrictions on the parameters α and γ ensure that (3.6) defines P as a linearly homogenous function of the individual prices. In many practical circumstances, where prices are linear, P may be approximated by an exogenous price index, for example as that used by Stone.

$$\sum_{j=1}^{n} w_j \, Log P_j$$

The model based on this specification is known as LA-AIDS (Linearly Approximated Almost Ideal Demand System). The other models similar to the above discussing models, which satisfy all restrictions of demand theory, are Normalized

Quadratic Demand System (NQDS) and Transcendental Logarithmic Demand System (TLDS), developed by Swamy and Binswanger (1983). It is important to note that these models permit the calculation of cross-price elasticities within a group of related products (close substitutes or complements), and do not assume the condition of additivity. These models also include linear and squared income terms which allow more flexibility in the response of consumer items to changes in income.

- **Quadratic Almost Ideal Demand System**[2]

A modified version of Almost Ideal Demand System (AIDS), of Deaton and Muellbauer (1980), is known as QUAIDS (Quadratic Almost Ideal Demand System). In order to show the non-linearity of the Engel curve, a quadratic expenditure term is included in QUAIDS. In the empirical studies of demand, the AIDS-based approaches have been preferred to other methods, because of their reliability with consumer demand theory, simplicity in the estimation process and precise properties of aggregation. QUAIDS extension provides a clear picture of the behaviour of the consumers among various income groups and also has recognized as a very useful model for studying food demand systems of consumers, including in India (Mittal, 2010; Anand et al.,2016).

The general form of QUAIDS as follows;

Shares of consumer expenditure across different categories are defined as;

$$w_{ij} = \frac{p_{ij}q_{ij}}{m_i} \quad \text{...3.9}$$

$$\sum_{j=1}^{N} w_{ij} = 1 \quad \text{...3.10}$$

Where P = price,

q = quantity,

$w_{ij}$ = expenditure weight on item j for individual i,

$m_i$ = the $i^{th}$ individual's total expenditure across all related product, $j = \overline{1, N}$.

[2] The discussions are based on the works of Deaton and Muellbaur (1980); Bank et.al (1997); Mittal (2010); Poi (2012); Anand et. Al (2016);

QUAIDS usually presented in a two-stage budgeting framework. In the present study, the first stage of consumer budgeting choice $w_{ij}$divides the consumer's total expenditure to the shares of expenditure on food and shares of expenditure on non-food categories. In the second stage, $w_{ij}$ denotes as the spending on particular food products within the total budget devoted to food. As a result, a general econometric specification given by QUAIDS for expenditure weights captures in the form:

$$w_{ij} = \alpha_j + \sum_{n=1}^{N} \Upsilon_{jn} lnp_{in} + \beta_j ln\frac{m_i}{P(p_i)} + \frac{\lambda}{b(p_{i)}}\left[ln\frac{m_i}{P(p_i\ )}\right]^2 + \vartheta_{ij} \quad ...3.11$$

Where i represents individual consumer, $m_i$ is per capita expenditure, $p_i$ is price vector faced by $i^{th}$ consumer and $b(p_{i)}$is the Cobb Douglas price index, which is denoted as;

$$b(p_i) \equiv \prod_{j=1}^{N} p_{ij}^{\beta_j} \quad ...3.12$$

Where $P(p_i)$ is a price index, which is defined as;

$$lnP(p_i) = \alpha_0 + \sum_{n=1}^{N} \alpha_n lnp_{in} + \frac{1}{2}\sum_{j=1}^{N} \Upsilon_{jn} lnp_{ij} lnp_{in} \quad ...3.13$$

Here $\frac{m_i}{P(p_i)}$ denotes a measure of real consumption of the consumer.

And $\vartheta_{ij}$is the residual term expressed as a vector of $\vartheta\ = [\vartheta_1, \vartheta_2, \ldots \vartheta_N]$, which follows a multivariate normal distribution with a covariance matrix Σ.

The non-linearity of the consumption with respect to the total expenditure of the product is expressed with the quadratic term for the logarithm of consumption. The adding up condition as per equation (3.10) that the sum of expenditure shares is equal to one suggests that Σ is singular and necessitates more limitations on the coefficients;

- $\sum_{j=1}^{N} \alpha_j = 1$
- $\sum_{j=1}^{N} \beta_j = 0$
- $\sum_{j=1}^{N} \lambda_j = 0$

- $\sum_{j=1}^{N} \Upsilon_{jn} = 0 \; \forall j$

The other two conditions are also imposed to guarantee reliability with the theory of consumer demand.

- Demand function homogeneity of degree zero in prices and income $\sum_{j=1}^{N} \Upsilon_{jn} = 0 \; \forall j$
- Slutsky symmetry; $\Upsilon_{jn} = \Upsilon_{nj}$

As mentioned above the QUAIDS is analysed here with a two-stage budgeting framework. In the first stage, the budgeting framework, equation of aggregate of demand for food articles is estimated related to the demand for non-food items. The 'adding up' condition, mentioned above, indicating that demand for the consumers can be predictable in a single equation econometric specification. Adding more conditions based on economic theory on demand specification of consumers, the general form of Quadratic Almost Ideal Demand System equation (3.11) can be modified as the following equation of demand for food, which can be assessed with the help of least squares:

$$\frac{m_i^f}{Y_i} = \alpha_i + \Upsilon_{ff}\left(lnP_i^f - lnP_i^{nf}\right) + \beta_f ln\frac{Y_i}{P(p_i)} + \frac{\lambda_f}{b(p_i)}\left(\frac{Y_i}{\mathrm{P(pi)}}\right)^2 + \varepsilon_t \qquad \ldots 3.14$$

Where, $m_i^f$ = the per capita expenditure on food,

$P^f$ = aggregate price index for food

$P^{nf}$ = aggregate price index for non-food.

Y = the per capita total consumption expenditure

ε = error term.

The specific aggregate price indices, $b(p_i)$ and $P(p_i)$ in equations 3.12 and 3.13, can be written in reduced form after imposing above restrictions, as follows;

$$lnb(p_i) = \beta_f\left(lnP_i^f - lnP_i^{nf}\right) \qquad \ldots 3.15$$

$$lnP(p_i) = \alpha_0 + \alpha_f\left(lnP_i^f - lnP_i^{nf}\right) + lnP_i^{nf} + \frac{1}{2}\Upsilon_{ff}\left(lnP_i^f - lnP_i^{nf}\right)^2 \qquad \ldots 3.16$$

By substituting 3.15 and 3.16 in 3.14 demand function for food can be estimated with the help of non-linear least squares. In order to calculate the price indices used here, consumer-specific food price indices and non-food price indices are approximated by using Stone index (Blanciforti and Green, 1983).

$$\ln P_i = \sum_{j=1}^{N} w_{ij} ln P_{ij} \quad ...3.17$$

In the second stage of the QUAIDS system, an individual allocates total food expenditure among different categories of food items. Here, in the first stage, the value of total expenditure on food out of the aggregate consumption expenditure is estimated. In the second stage QUAIDS specification, we estimated the consumer choice over multiple food items, by using iterated feasible generalized least squares.

The coefficients in the QUAIDS model are usually interpreted subsequently to the basic transformation of the projected underdone coefficients of equation (3.11). Banks et al. (1997), derived the elasticities, both compensated and uncompensated elasticities by differentiating the shares of expenditure in the demand equations with respect to the logarithm of total expenditure ($\ln m$) and prices. These can be expressed as;

$$\mu_j = \frac{\partial w_j}{\partial \ln m} = \beta_j + \frac{2\lambda_j}{b(p)} ln \frac{m}{P(p)} \quad ...3.18$$

$$\mu_{jn} = \frac{\partial w_j}{\partial \ln p_n} = \Upsilon_{jn} - \mu_j(\alpha_n + \sum_{k=1}^{N} \Upsilon_{nk} ln P_k) - \frac{\lambda_j \beta_n}{b(p)} \left[ ln \frac{m}{P(p)} \right]^2 \quad ...3.19$$

Likewise, the expenditure elasticity can be computed as;

$$e_j = \frac{\mu_j}{w_j} + 1 \quad ...3.20$$

Where $e_j$ = expenditure elasticity.

Here $e_j$ is the expenditure elasticity, indicating the nature of food article and also shows that how consumers understand the importance of particular commodity with respect to total food expenditure. The value of $e_j > 1, for\ a\ normal\ good$. If it lies in between zero and one, then the commodity falls under the group of normal necessities. If it is less than one, then the commodity is an inferior one.

In the QUAIDS model, elasticity can be estimated in two different ways. The two types of elasticities- both compensated and uncompensated – can be derived from the model. The Uncompensated or Marshallian price elasticity equation can be calculated by maximizing utility subject to budget constraint of consumers, and the compensated or Hicksian price elasticity of demand is obtained by minimising the expenditure on commodities while keeping the utility constant. The uncompensated price elasticity of Marshall is expressed as follows;

$$e_{jn}^{u} = \frac{\mu_{jn}}{w_j} - d_{jn}$$

where $d_{jn}$ represents the Kronecker's delta ($d_{jn} = 1$ for $j = n$ and $d_{jn} = 0$for j≠1).

The Hicksian elasticities can be obtained by using the following formula:

$$e_{jn}^{c} = e_{jn}^{u} + e_j w_j$$

From analysing these elasticities, we can understand the behaviour of consumers towards a change in price. Here in the model instead of price data, the unit value of Deaton and Muellbauer (1980) has been used. It can be calculated by dividing the total expenditure on a particular item by the respective quantity of that commodity purchased. The present study uses the QUAIDS model for estimating food demand system of the urban and rural poor in India and also calculating the respective elasticities for comparing their responsiveness towards price change.

## 3.4 Conclusion

The chapter is explaining the theoretical and methodological framework of the present analysis. In order to check the long-run relationship with determinants of food price inflation, Auto Regressive Distributed Lag model has been used. Various simple statistical and mathematical tools have been used in examining the budget share of the poor people. For understanding the responses of the poor people, especially the urban poor, the tools of elasticity are used with the help of Quadratic Almost Ideal Demand System.

# Chapter IV
# TREND AND PATTERN OF FOOD INFLATION

# CHAPTER IV

# TREND AND PATTERN OF FOOD INFLATION

## 4.1 Introduction

An increase in the overall inflation has been with humankind from the time when we migrated from an economy with barter system to an economy which uses the medium of exchange, such as precious metals, paper money or even cigarettes, as occurred in a war camp during the World War II (Radford, 1945). Although we do not have a complete idea about its origin, we have formed many techniques and policy intervention that can regulate it. At the beginning of 1970s, the rate of inflation had decreased and "*full employment without inflation"* was once more a sensible promise but not rather a truth (Hathaway D E, Houthakker H S, and Schnittker J A, 1974). Inflation actually, has become a very complicated and multifaceted problem in an emerging economy like India (Deshpande and Sarkar, 1995). And it has been developed by the diversity of reasons that are associated with a complicated manner (Patra & Partha, 2010).

A generally whispered belief in the 1970s was that price indices increase because of temporary noise, resulting from unstable food and fuel prices, and then returned after a short interval (Cecchetti and Moessner, 2008). This led to the expansion of the concept of core inflation or baseline inflation (Gordon, 1975). But suddenly the policymakers were met with a novel situation, which was occurred in the late 1960s and blew up in 1972 and 1973. It was for the first period; meanwhile, the Korean War, prices of farm and food products started to contribute considerably to the burden of general piece rise in the economy. Prices of Food articles have implication even beyond the 25 per cent of the cost of the living index they symbolize (Gordon, 1975). Food items are a more sensitive commodity in the index they represent because most of the individuals purchase food items more commonly and frequently compared to services and non-food items. Thus, from then onwards

economic advisors and policymakers were more concerned about food inflation along with general price rise.

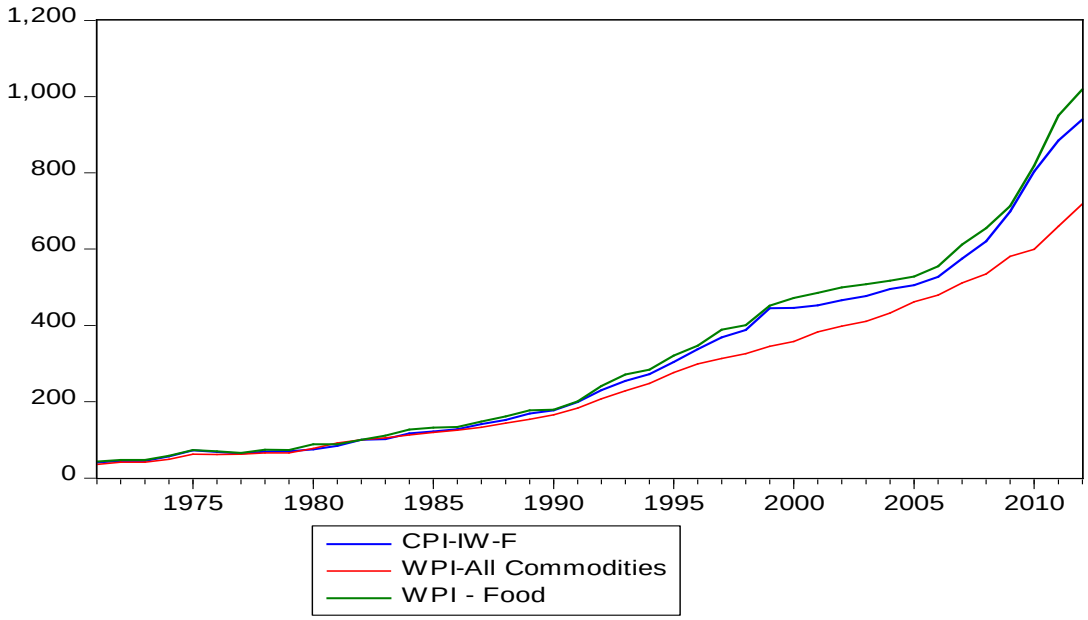
Food inflation and its influencing factors have significant macroeconomic implications for overall inflation and economic growth; besides, food price inflation powerfully affects well-being, particularly for the poorer sections of the population (Sekhar et al., 2017). If the spread of food price inflation into non-food prices is robust, as it is in many less developed countries, the influence on headline inflation can be significant. Walsh (2011) found that food price hike is usually higher and more persistent than non-food inflation in many economies. This finding is of particular concern to developing countries such as India. It has severe implications for food security because food occupies a large share of the consumption basket in these countries. In India, food price fluctuations have been continuously high over the last many years, predominantly afterwards, the famine in 2009. Initially, this high food inflation was credited to the poor performance of agricultural sector due to drought and its carryover effects, along with inappropriate trade policy (Chand 2010; Nair and Eapen 2012; Nair 2013). Mohanty (2014) identifies some common threads that are seen all through the episodes of high inflation in India. According to him the causes usually include one or mixture of the drought, war, and commodity price shocks, mostly those relating to oil.

The present chapter aims to examine the nature, trend and pattern of food price fluctuations in India in the years and analyse the aspects which are responsible for the food price fluctuations. The main question of this part is to check, to what extent the price hike in food articles is growing in an economy like India. The first segment of the present chapter describes the trend and magnitude of food price hike in India. It makes econometric analysis using Time Series data on CPI and WPI, to give clarifications for the upsurge of prices of food articles in the country. The next section deals with the factors driving to food inflation in India. The arguments and related details discussed in this chapter are completely based on the information and data released by various official agencies like CSO, RBI, MOSPI etc.

## 4.2 A timeline of Food inflation in India

A chronological picture of food inflation in India has been extensively researched and documented (Gokarn, 2011). This part divides the period of food inflation into two- from 1972 to 2011 and the period after 2011. Up to 2011, we didn't have a combined CPI to measure overall food inflation. That is why; WPI-FA[1] and CPI-IW_F[2] were used to measure fluctuations in food price.

The trend and extent of food price fluctuations, before 2011, has shown in figure 4.1. It is exciting to note that food price inflation, which is expressed by using both WPI_FA and CPI_IW_F, is considerably higher than overall inflation denoted by WPI_AC[3]. Even though the wholesale price index for all commodities (base 1981-82 = 100) touched 719.16 in the year 2011-12, the index for food articles has risen to 1019.16 in the same period.




Source: Economic Survey of India, 2013-14, and Handbook of Statistics on the Indian Economy, Reserve Bank of India

*Figure 4.1*: Trend of food inflation from 1971 to 2011

[1] Wholesale Price Index of Food articles;

[2] Consumer Price Index (industrial workers) for food

[3] WPI_AC is Wholesale price Index for all commodity

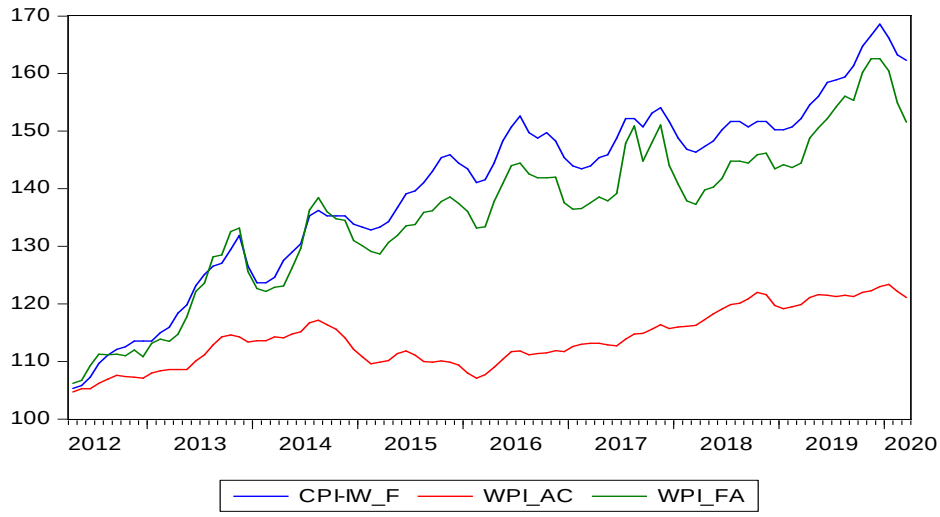
Figure 4.1 shows that food price fluctuations in India were mild until 1990. Typically, it was either an international oil price causing a general spout in prices or drought conditions leading to a shortage in the availability of food and raw materials (Pattnaik and Samantaraya, 2006). The chapter of food inflation was short term and less powerful throughout the 1980s and 1990s due to a set of policy interventions like the Green Revolution. Such interferences, that combined agricultural subsidies, price inducements, technological development and investments in infrastructure, (chiefly in irrigation) and, very notably, buffer stocks, helped to increase and stabilize the efficiency of cereal cultivation, as well as other harvests (Gokarn, 2011).

After 1991, the price indices for food articles started increasing suddenly. It may be due to the new economic reforms after 1991. It was in 1997 the government adopted a targeted public distribution system, through which government stepped back from market intervention. During the period of 1990s and 2000s, supply growth of agricultural products decelerated, and be an average of around 3.5 per cent per annum; whereas production of cereal raised by only 1.5 per cent per year in the 2000s. Against hardening food demand, fading buffer stocks facilitated to encompass food price fluctuations during the early 2000s, as the development of Minimum Support Price was watered-down (Anand et al., 2016).

It is important to note that, from 2005 onwards price hike has kept on disturbingly high. It is shown in Figure 4.1 that, the upsurge of WPI- FA was more than the rise of CPI_WI_F. It is perhaps because of the fact that CPI_IW_F does not contain various high-value commodities like milk, meat and fruits, etc. that have revealed food price hike in those years (Nair et al., 2012). The Indian Government's reply to a hike in global food prices beginning in 2007-08, helped limit the impact on domestic food prices (OECD, 2009). However, buffer stocks continued to fall, in due course falling substantially below recognized standards. For instance, about the middle of 2007, the supply of wheat in the Central Pool accounted to only about half of the actual norms of buffer stock (Anand et al., 2016).

The trend and magnitude of food price inflation, after 2011 by taking WPI_FA and CPI_IW_F, has shown in figure 4.2. Both WPI_FA and CPI_IW_F are converted

to the base year 2011-12. For comparing food price inflation with the all commodity inflation, the Wholesale Price Index of All Commodities is also taken along with Consumer price Index of food for industrial workers and Wholesale Price Index of food articles.




Source: Government of India and Handbook of Statistics on the Indian Economy, Reserve Bank of India.

*Figure 4.2*: Trend of food inflation from 2011 onwards

Figure 4.2 displays the time magnitude and trend of food price inflation from 2011 onwards. From the model, it is clear that food inflation is higher than all commodity inflation. Up to 2014 both the CPI_IW_F and WPI_FA move together. But after that, the CPI_IW_F lies above the WPI_F. Though the CPI_IW_F lies above WPI_FA, after 2014, we can see that both are showing similar kind of fluctuations. A more detailed examination of food price inflation can be done with the help of the new series of Consumer Price Index in the following section.

### 4.3 Trend of CPI -New series as a measure of food inflation

The index numbers related to price are the indicators of the average price fluctuations overtime of a pre-determined consumption basket of commodities and services. There are so many indices, which help to quantify the rate of inflation commonly named as Wholesale Price Index (WPI), Consumer Price Index (CPI) and the GDP Deflator. These are the important indices used in India. According to

Subbarao (2010)[4], "*In India, we have one wholesale price index and four consumer price indices. There are ongoing efforts at a technical level to reduce the number of consumer price indices, and I believe the technical issues are not insurmountable. But that still will not give us a single representative inflation rate for an emerging market economy with market imperfections, diverse geography and 1.2 billion people*." But, for a large country like India, with different sectors, different classes of people, a variety of consumption habits, etc., it is not easy to formulate a single index, which can be used to calculate inflation, however broad that index may be.

While all the other economies were calculating inflation with the help of the Consumer Price Index, India selected the Wholesale Price Index for the same, because of its countrywide exposure and timeliness of the publication. It is only in April 2014 that Government of India has decided to move from WPI to the CPI in order to calculate the rate of inflation. Up to 2011, Reserve Bank of India adopted WPI over CPI for two reasons.

- Till 2011, there was no single Consumer Price Index, representing the entire nation. Before 2011, India has three or four consumer price indices representing different segments of people separately.

- Another notable point is that the Wholesale Price Index was accessible with a small-time lag of two weeks related to the Consumer Price Index, which was published with a comparatively longer time lag of two months. Nowadays, a new series of CPI is released as monthly data.

The theoretical aspects of adopting a new series of Consumer Price Index based on two arguments.

- Firstly, WPI does not take into account the prices of some important services, including healthcare, education, and rents, which are accounted for more than 60 per cent of our GDP. On the other hand, the new series of Consumer Price Index allots approximately 36percent weightage on these services and

[4] The Former Governor of Reserve Bank of India (RBI), in a 2010 speech at the Peterson Institute for International Economics in Washington DC,

comprises price fluctuations in education, healthcare, housing, personal care and entertainment and also transport and communication. Consequently, the new Consumer Price Index, is an improved indicator of demand-side burdens in the economy, compared to the WPI.

- Secondly, the Wholesale Price Index allocates approximately 10.7 percentage and 15 percentage weights respectively, for the metal and metal products group and fuel group. Any change in universal prices of metals and fuels, then, lead to more variations in Wholesale Price Index.

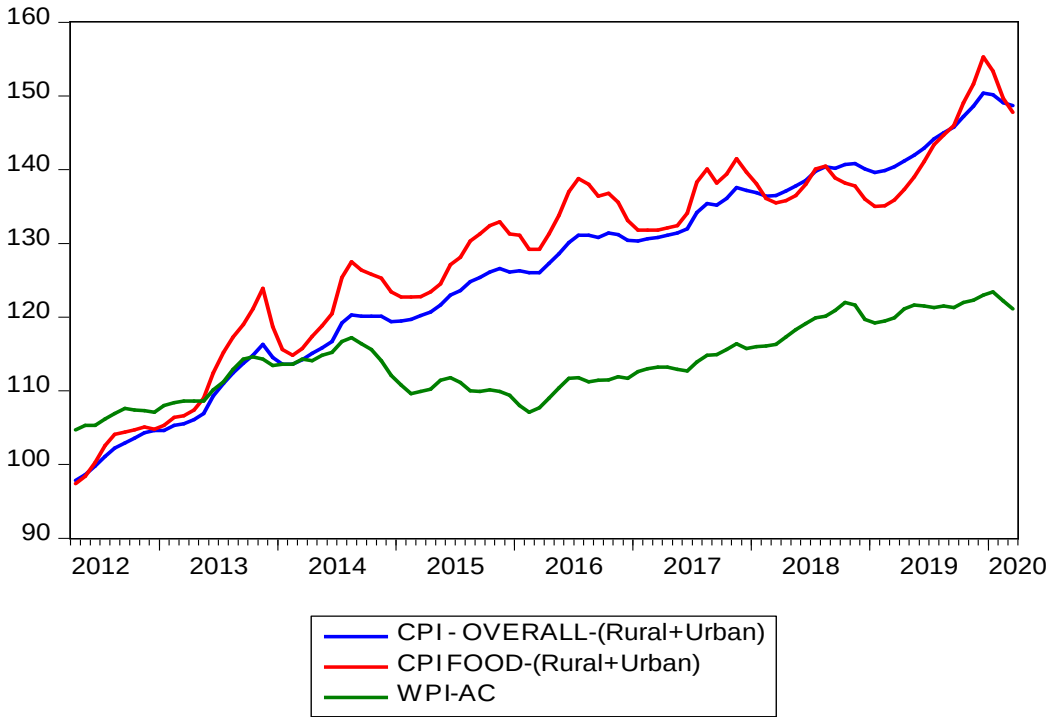
Therefore, the Reserve Bank of India has adopted a new series of Consumer Price Index and then updated the base year from 2010-11 to 2011-12. It is a comprehensive measure compared to the Wholesale Price Index. The WPI turn out to be an unproductive measure also because it is powerfully affected by the variation in international prices of tradable commodities and the existing money variations. A detailed discussion of all the indices is given in Chapter III.

### 4.3.1 The trend of CPI and WPI

Fluctuations in the level of prices of consumer goods as well as services bought by consumers can be measured with the help of Consumer price index (CPI). While variations in the price level of merchandises subsequently they leave plant premises, that is at the wholesale level, are measured with Wholesale Price Index. WPI comprises broadly three product groups, namely, Primary Articles, Fuel and Power and also Manufactured Goods. Each of these product categories is given different weights. The product group of the Consumer Price Index is very much diverse from that of the WPI. The product group of the Consumer Price Index is similar to our basket for shopping. The new series of CPI has six products groups, including Food and Beverages, which are explained in Chapter III.

There are some common products in the baskets of both the Wholesale Price Index and Consumer Price Index —for example, food articles and fuel. But, the structure and weights of these two indices are that for CPI food is the commodity with higher weightage, manufactured products have a higher weightage in the Wholesale

Price Index. The Food items' weightage in the Consumer Price Index is 45.86 in relation to the Wholesale Price Index is around 25 percentage. Accordingly, the Consumer Price Index is more disposed to fluctuations in food prices than the Wholesale Price Index. Yet again, for the product group, Fuel and Power the weightage is 6.84 per cent in new series CPI while it is 14.91 in WPI. Therefore, the Wholesale Price Index is more responsive to variations in fuel prices. In order to compare the trend of food price with the price of all commodities, that is WPI and CPI, are examined with the help of a graph.




Source: MoSPI

*Figure 4.3*: Trends of CPI and WPI

From figure 4.3, it can be understood that WPI-AC is less than CPI overall and CPI food. When we are looking at the growth rate of WPI and CPI, in most of the years' CPI exceeds the growth of WPI. Since a higher weight is given to food in CPI, higher growth of CPI shows an increase in food prices.

Table 4.1

*Growth of CPI and WPI*

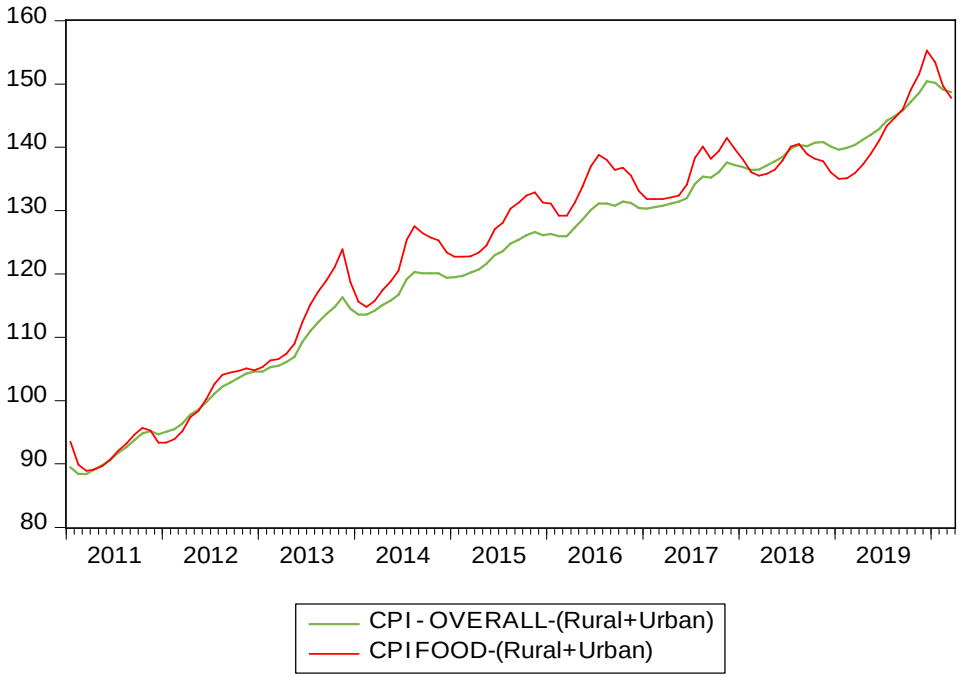
| Month & Year | Growth of WPI | Growth of CPI |
|---|---|---|
| Jan-12 | | |
| Jan-13 | 3.152 | 6.95 |
| Jan-14 | 5.185 | 8.60 |
| Jan-15 | -2.465 | 5.19 |
| Jan-16 | -2.527 | 5.69 |
| Jan-17 | 4.259 | 3.17 |
| Jan-18 | 3.020 | 5.07 |
| Jan-19 | 2.759 | 1.97 |
| Jan-20 | 3.523 | 7.59 |

Source: Author's own calculation

The higher growth rates can be seen in January 2014 and January 2020. In 2014, the prices of pulses were hiked tremendously due to many reasons, including bad weather condition, low production etc. The reason behind the hike in food price in 2020 may be as a result of Pandemic COVID 19.

### 4.3.2 CPI overall v/s CPI food

CPI is considered as a central measure of price fluctuations. In terms of CPI, general price rise denotes as an overall upsurge in the Consumer Price Index (CPI), which is the weighted average of different products' prices. The group of commodities that constitute the index rest on which are considered demonstrative of a common basket of consumer foods. Till 2011, there was no single Consumer Price Index, representing the entire economy. But, from 2011 onwards we have a single measure of inflation with additional disaggregation to see how prices in rural and urban sectors in India are varying. In this section, we are comparing the trend of the new series of overall Consumer Price Index and Consumer Price Index for food items, for understanding how the food prices and general prices moving over time.




Source: MoSPI

*Figure 4.4*: Trend of CPI-overall V/S CPI (Food)

From figure 4.4, it is clear that both CPI and CPI food are generally showing an upward trend. In most of the years, they are moving together. This is mainly because; food is a commodity with the highest weightage in CPI. In 2011-12 and in 2018-19, general CPI exceeds CPI of food articles.

Table 4.2

*The growth rate of CPI food and CPI overall*

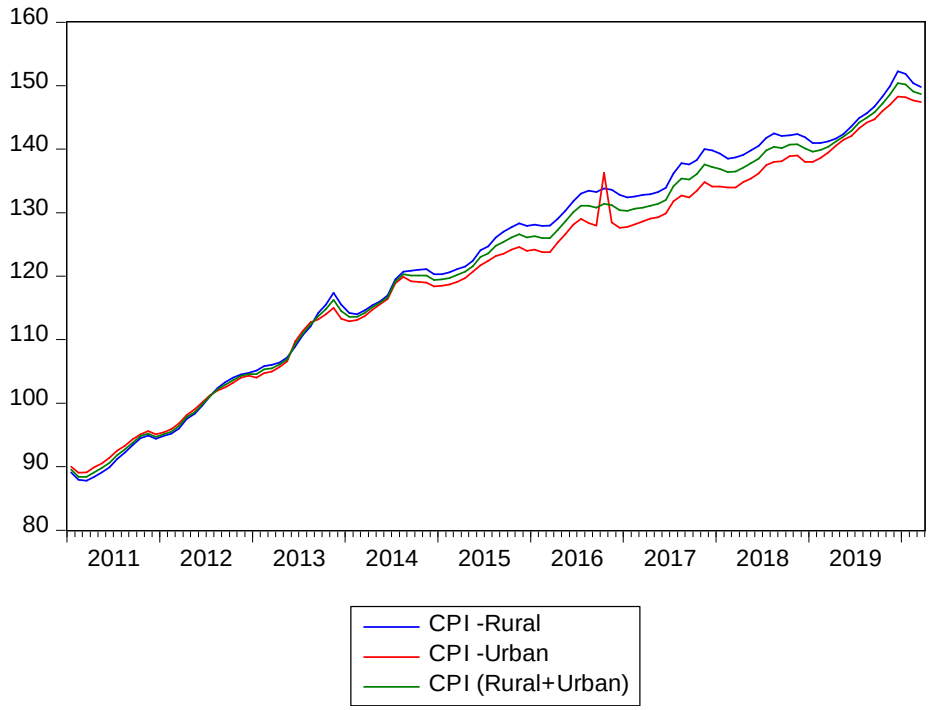
| | CPI FOOD | OVERALL CPI |
|---|---|---|
| Jan-11 | | |
| Jan-12 | -0.11 | 6.26 |
| Jan-13 | 12.74 | 9.99 |
| Jan-14 | 9.78 | 8.60 |
| Jan-15 | 6.14 | 5.19 |
| Jan-16 | 6.85 | 5.69 |
| Jan-17 | 0.53 | 3.17 |
| Jan-18 | 4.78 | 5.07 |
| Jan-19 | -2.24 | 1.97 |
| Jan-20 | 13.63 | 7.59 |

Source: Calculated from data from MoSPI

Table 4.2 measures the annual growth rate of the Consumer Price Index for Food and overall Consumer Price Index. When the growth rate of CPI overall and CPI food are considered, CPI food fluctuating much more, in 2013 and 2014 CPI (food) marked a high growth of around 12.74 and 9.78 respectively. It is a part of persistent food price inflation of the last decade. After that, it is showing a lesser growth up to 2018-19 periods. In December 2019 and in January 2020, food inflation marked a high growth rate that is around 14 per cent. This has occurred largely due to the surge in the price of vegetables like onion.

### 4.3.3 CPI Rural and Urban

The new series of CPI provides data on price indices for the urban area, price indices for rural area and combined price indices for both rural and urban areas (urban +rural). The general CPI includes six broad categories – food articles, tobacco and intoxicants, pan, fuel and lighting, clothing and footwear, housing and miscellaneous. All the types are again subdivided and given adequate weights for each CPI. Unlike the earlier measure of inflation, the new series calculate inflation for different sectors also. Here in the following section, the trend of urban and rural CPI is depicted.



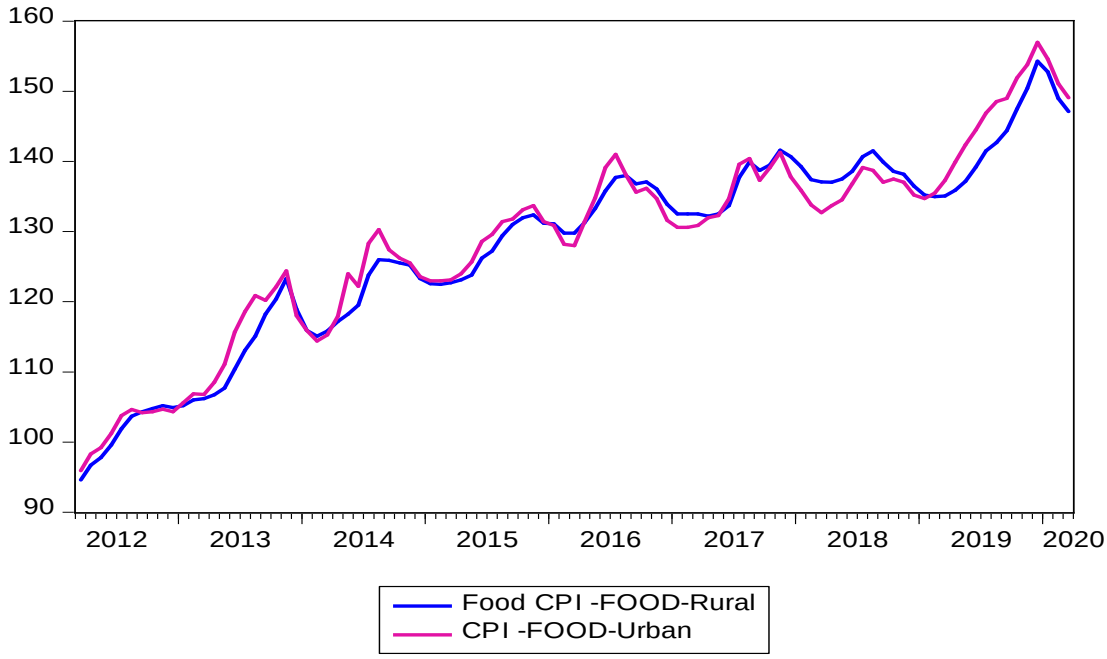

Source: MoSPI

*Figure 4.5*: Trend of Urban and Rural CPI

Figure 4.5 shows the trend of CPI-Rural, CPI-Urban and combined CPI. Up to 2014, all the three moves together. But after that CPI rural lies above CPI urban. Here in the graph, we can see a spike in 2016-17 for the urban CPI. This may be because of the fluctuations in the prices of housing. And after that, all the three are fluctuating similarly. As we noted above, food price fluctuation is higher than other inflation. Weight for food items is 37.15 in urban CPI, and it is 59.31 in rural CPI. That is why the CPI-Rural lies above CPI-Urban. So, when the price of food articles grows sharply, rural CPI can be more than urban CPI.

### 4.3.4 The trend of CPI_food-urban and CPI_food-rural

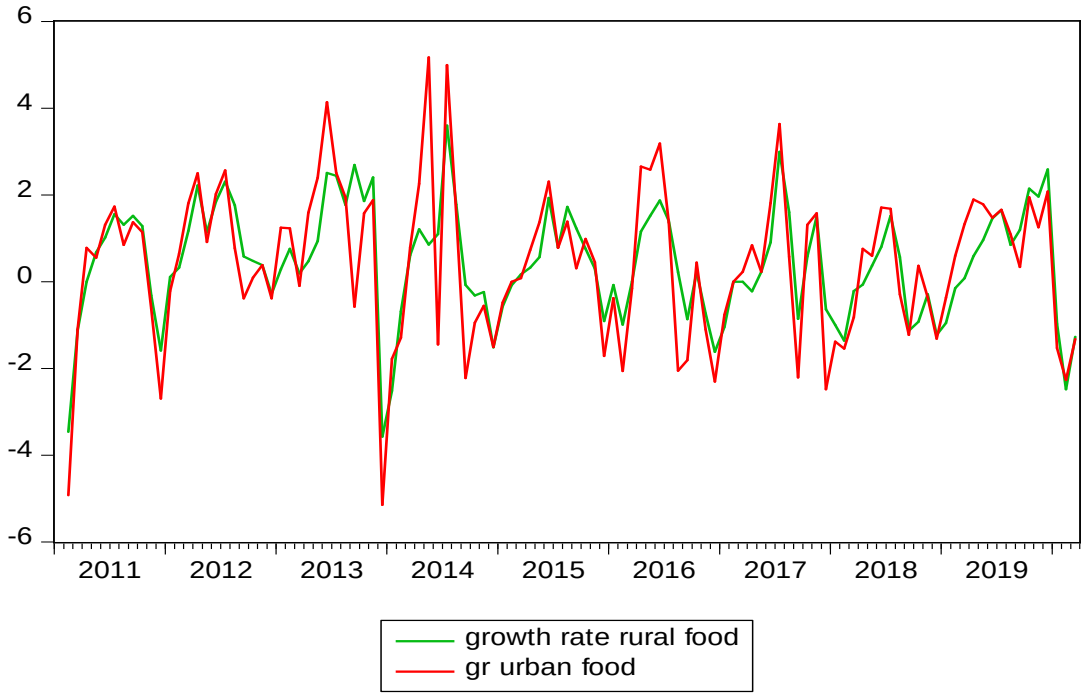
In the previous section, the overall CPI in both urban and rural area is examined. From that, we can see that the food is the item with the highest weightage in the Consumer Price Index. And the present study focused on food inflation and its impact on the urban poor. Therefore, it is significant to examine the trend of CPI_food both in the urban area and also in the rural area. The trend of the Consumer Price Index of food for rural and urban sectors are displayed in figure 4.6.




Source: MoSPI

*Figure 4.6*: Trend of urban and rural CPI for food

By examining the above trend, it is noted that both rural and urban CPI for food move together in most of the years, unlike overall urban and rural CPI. By examining the growth rate, we can understand that in which area food inflation is higher.




Source: MoSPI

*Figure 4.7*: Growth of urban and rural CPI for food

From figure 4.7, it is clear that the food price fluctuations in the urban area are more than that of the rural area. The reason may be that agriculture production is mainly concentrated in the rural area and so usually food price is more in urban area.

### 4.3.5 Commodity Wise Analysis

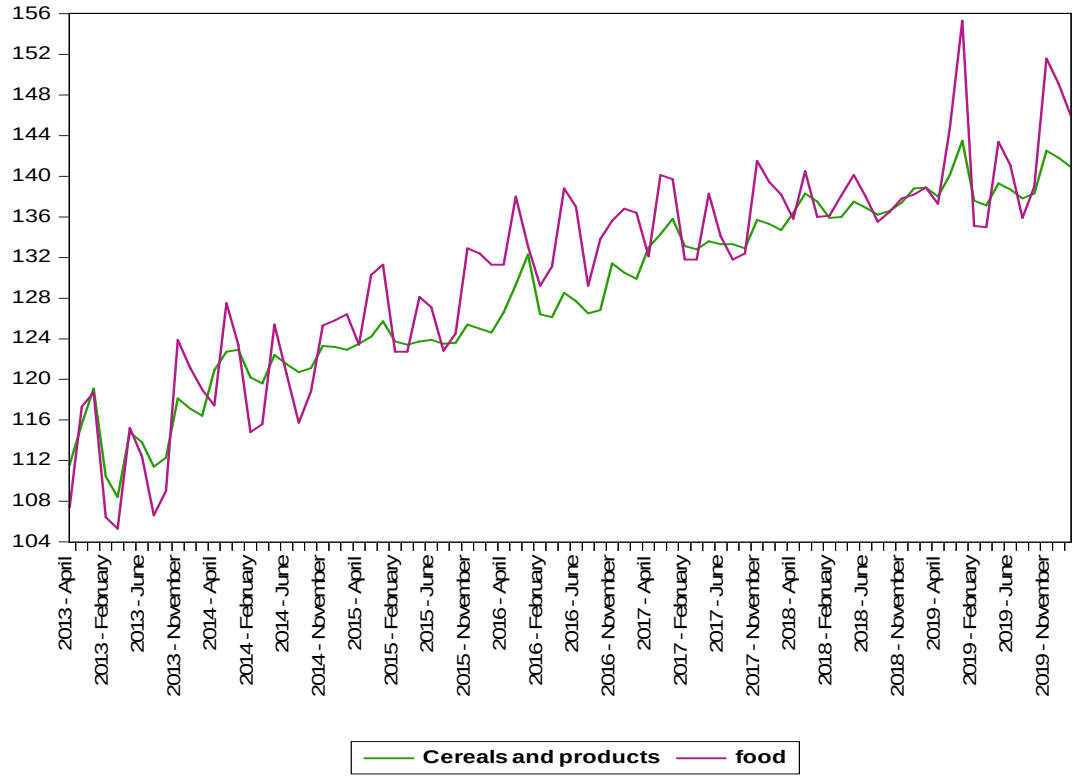
Consumer Price Index includes many food items. The study mainly concentrated on cereal and cereal products, fish and meat, egg, fruits, vegetables, spices, pulses and milk and milk products. By examining the movement of item wise Consumer Price Index, we can understand which commodity is subject to food price inflation. For the purpose, the Consumer Price Index of new series has been used, which includes twelve subcategories of food items with different weights. Each

commodity group is explained in the subsequent sections, along with their price fluctuations.

- **Cereals and cereal products**

Cereals and cereal products are an essential food item as far as Indians are considered. It is a type of food article which comprises many types of grain in the edible form. Cereal grains are the food items which provide energy and are grown extensively worldwide than any other kind of crop. Along with a source of energy, it also gives nutrition like vitamins, minerals, carbohydrates, fats, and protein. Usually, cereals are slightly processed food item. The overall weights given to cereal products in CPI-new series is 9.67 for combined CPI. And a weight of 12.35 and 6.59 is provided to Consumer Price Index for rural and urban sectors respectively. Conferring on to the data of Ministry of Statistics and Programme Implementation, the major cereal with their weight in total Consumer Price Index are Rice, Paddy (1.4 %), Wheat (1.028 %), Bajra (0.867%), Maize (0.189 %), Jowar (0.067 %) Barley (0.014 %), and Ragi (0.007 %).

The movement of the Consumer Price Index for cereals and cereal products are explained in two sections- in the first part the movement of overall Consumer Price Index of both food and cereal products are examined, and in the second part, the Consumer Price Index of cereal products both in rural and urban area are analysed.



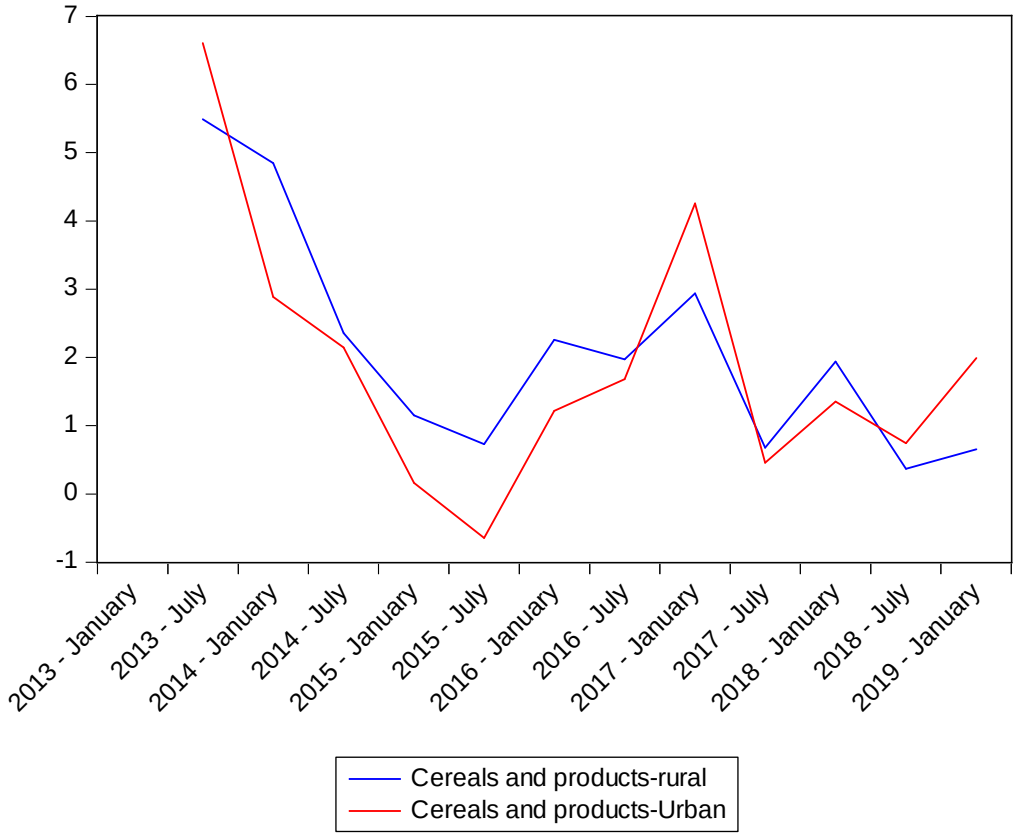

Source: MoSPI

*Figure 4.8*: CPI-FOOD and CPI-cereal products

Cereal products are the main food items of Indians. Figure 4.8 depicts the trend of CPI food and CPI cereal products. In most of the years, cereal prices lie below overall food prices, though both of them show an increasing trend. After the implementation of the green revolution, the production of cereal products like wheat and rice show steady growth. As a result, India not only becomes self-sufficient but a net exporter of food grains and the largest export of rice in the world. The cereal products are distributed through the Public Distribution System at a lower price.

Consequently, the market price can be controlled by the government. Therefore, it cannot contribute much to the food price inflation like other commodities. From this, we can conclude that other food products are major contributors to food price inflation.

It is very significant to examine the Consumer Price Index of cereals and cereal products in a rural and urban area since it is considered as an important food item in both the sectors.




Source: MoSPI

*Figure 4.9*: Fluctuations in cereals prices in the urban and rural area

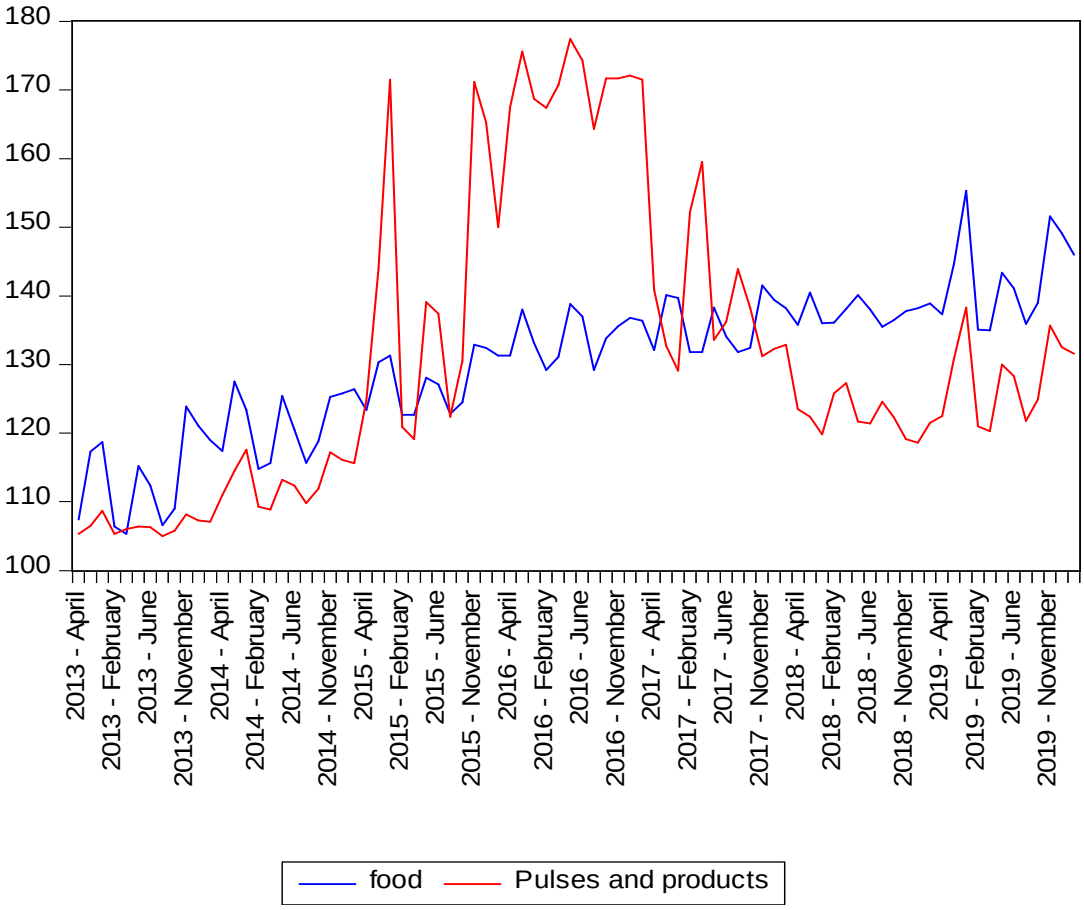
Figure 4.9 shows the half-yearly growth of prices of cereal products both in rural and in the urban area. Here we can see that the fluctuations in cereal prices are higher in an urban area compared to its rural counterparts.

- **Pulses-**

The eatable seeds of plants are commonly termed as pulses. The United Nations Food and Agriculture Organization (FAO) distinguishes pulses as 11 types: which comprises dry beans, broad dry beans, dry peas, lentils, cowpeas, chickpeas, pigeon peas, vetches, Bambara beans, lupins, and plusses8. Pluses are considered one of the prominent sources of protein. Usually, cereals are also marginally processed like removing of skin. The year 2016[5] was renowned as "*the international year of pulses*", for highlighting the nutritional benefits of pulses. According to the data of

[5] By 68th UN General Assembly (A/RES/68/231)

MOSPI the prominent pulses with weight CPI index are Gram (0.26%), Arhar (0.129%), Moong (0.078%), Masur (0.052%), Urad (0.091%), Peas/Chawali (0.024%), and Rajma (0.005%). The following section discusses the trend of CPI pulses and overall food.



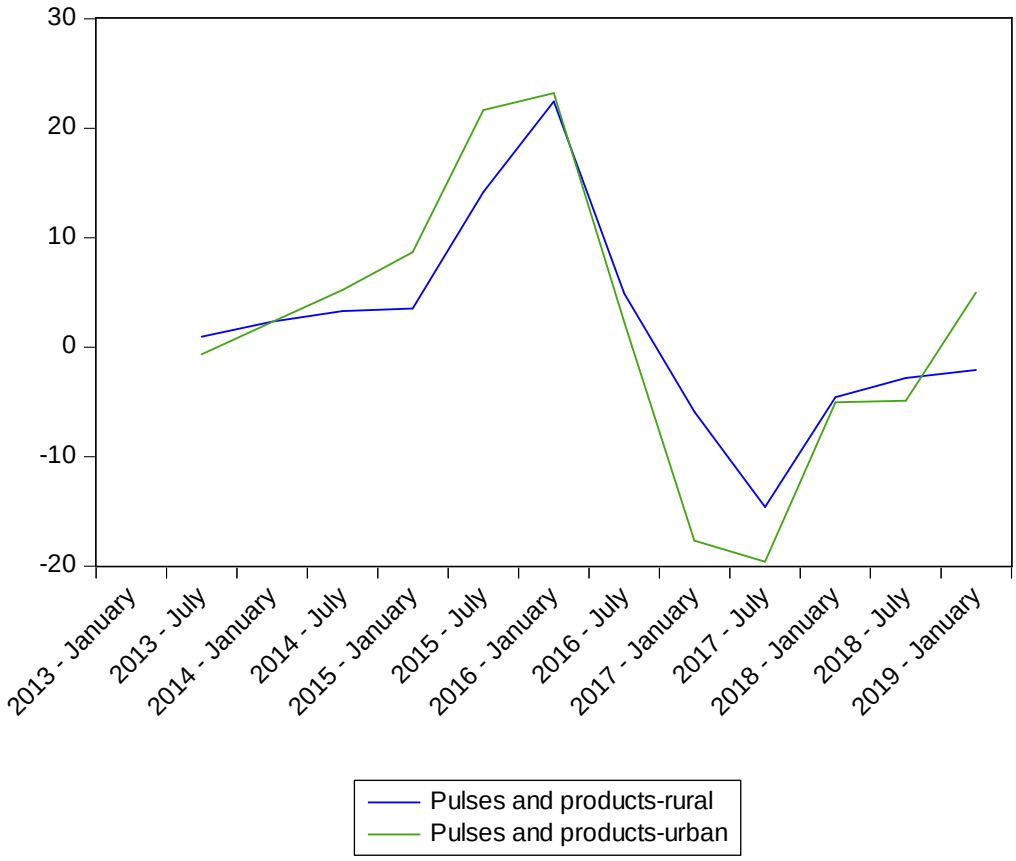

Source: MoSPI

*Figure 4.10*: CPI-food v/s CPI pulses

Figure 4. displays the trend of CPI food and CPI Pulses. Consumer Price Index for pulses not showing a particular trend. It lies below overall CPI food up to 2014, and after that, it lies above overall CPI (food). Then after 2017 again it fell below the overall CPI (food). India bagged the first rank in the production of pulses in the world (FAO, Stat, 2017).

Though there is a gap between total production and consumption of pulses, this excess demand met through import of pulses. In 2012, the price of pulses fell down and then began to increase steadily after 2013 October and peaked at around 46 per cent in 2015 November. The rise in prices of pulses is prompted by numerous

aspects, for example, supply constraints, artificial shortage, increase in transportation cost and due to hoarding and black marketing and adverse weather conditions. In 2017 the country experienced good monsoon which led to record production of pulses, and the price of pulses began to fall. After 2017, the price index of pulses remains less than overall food CPI.




Source: MoSPI

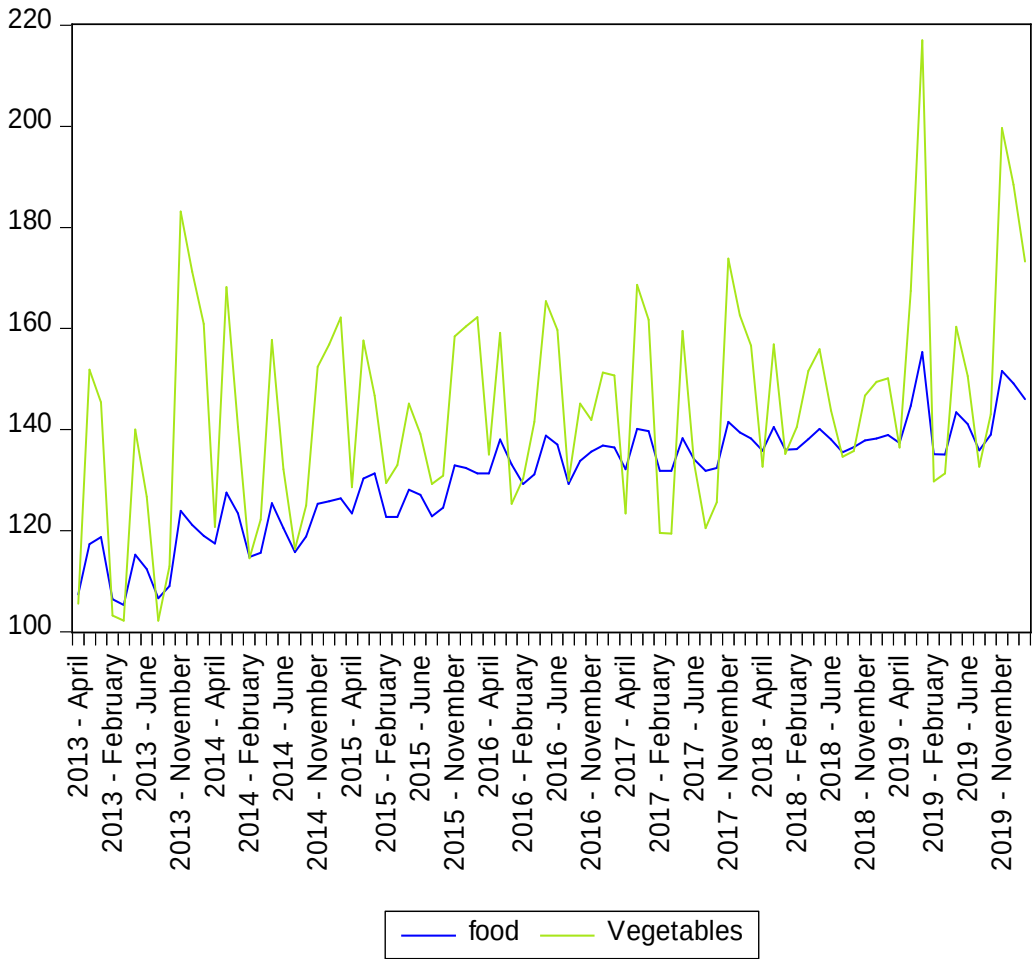
*Figure 4.11*: Price fluctuations of pulses in the rural and urban area

Figure 4.11 shows the half-yearly growth rate of CPI of pulses for both rural and urban area. The new CPI series give a weight of 2.95 to pulses in rural index and 1.73to the pulses in the urban index. Like cereal products here also the prices are fluctuating more in the urban area.

- Vegetables

Vegetables are the yield of plants and trees that are consumed as food. Vegetables are regarded as a vital source of nutrition like vitamin and minerals.

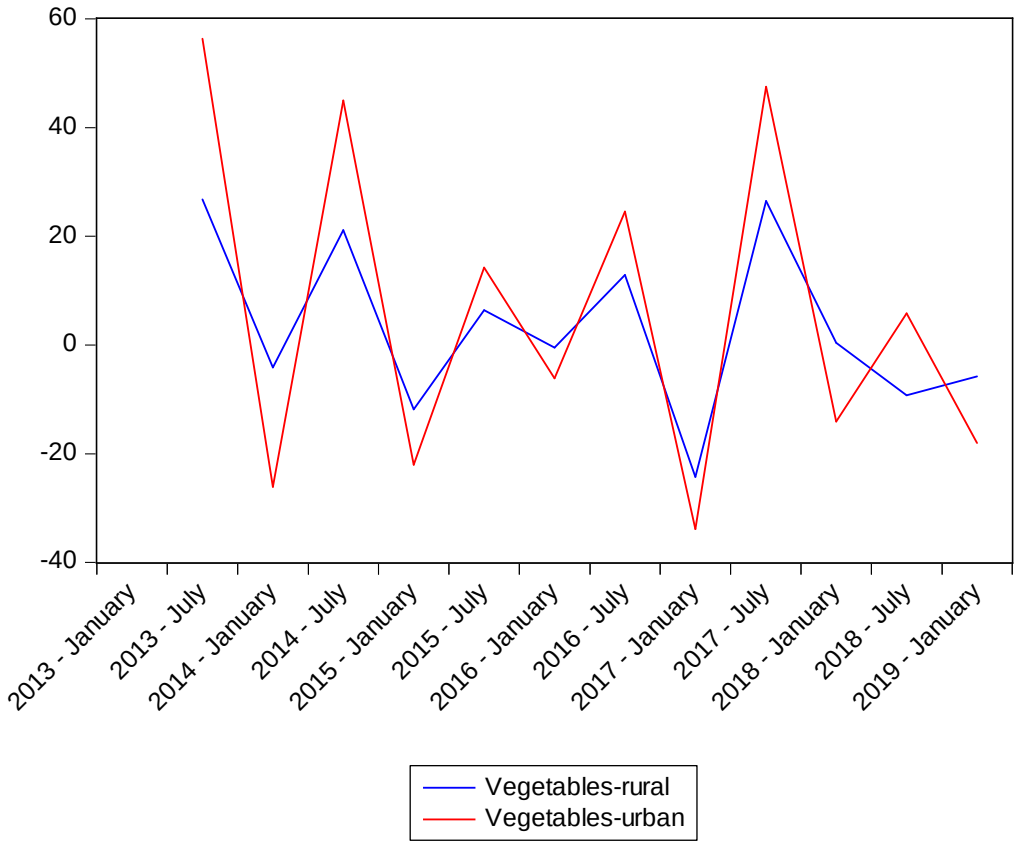
According to the National Horticulture Database 2015-16, issued by National Horticulture Board, India produced 169.1 million metric tonnes of vegetables. The cultivation area of vegetables was 10.1 million hectares. The various types of vegetables such as Onions, Okra, Bitter Gourd, Green Chillies, Mushrooms, and Potatoes contribute largely to the vegetable export basket. According to the data of MOSPI the prominent vegetables with their weight in total CPI index are Potato (0.27%), Sweet Potato (0.02%), Onion (0.164%), Ginger (Fresh) (0.021%), Peas (0.136%), Tomato (0.28%), Cauliflower (0.166%), Brinjal (0.241%), Okra (0.145%), Cabbage (0.122%), Carrot (0.0187%), Cucumber (0.009%), Pointed gourd (0.002%), Bitter gourd (0.022%), Beans (0.083%), Pumpkin (0.004%), and Drumstick (0.01%). The following section is discussing the trend of the Consumer Price Index of vegetables and price trend of food items as a whole.




Source: MoSPI

*Figure 4.12*: CPI - Vegetables

Here, in figure 4.12, we can see that vegetable prices are highly fluctuating in nature. In many years the prices of vegetables were higher than the overall food price. Onion, potato, cauliflower, tomato etc. are main vegetables which led to an increase in vegetable prices. The primary reasons behind these fluctuated vegetable prices are the problems of storage and transportation and the consequent post-harvest losses, pose a challenge to marketing the produce. Consumers, therefore, are subject to wide price fluctuations in the market. The fluctuations are also subject to the harvesting seasons. From the figure, it can be recognized that the vegetable prices are higher in June to December period.




Source: MoSPI

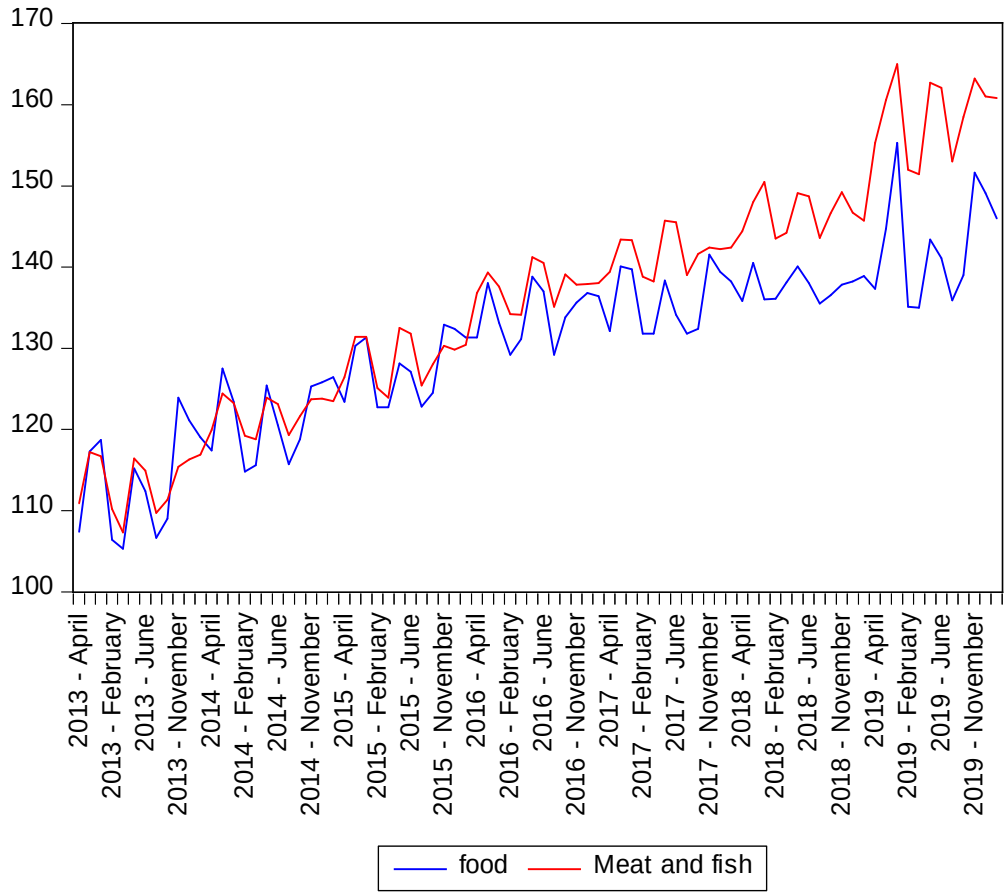
*Figure 4.13*: Price fluctuations of vegetables in the rural and urban area

Figure 4.13 displays the price fluctuations of vegetables in the urban and rural area. For that, the half-yearly growth rate is examined here. A weight of 7.46 is given to the Consumer Price Index of vegetables in the rural area, and a weight of 4.41 is

given to the urban area. It can be seen from the figure that prices of vegetables are fluctuating extremely in an urban area compared to its rural counterpart.

- Egg, Fish and Meat

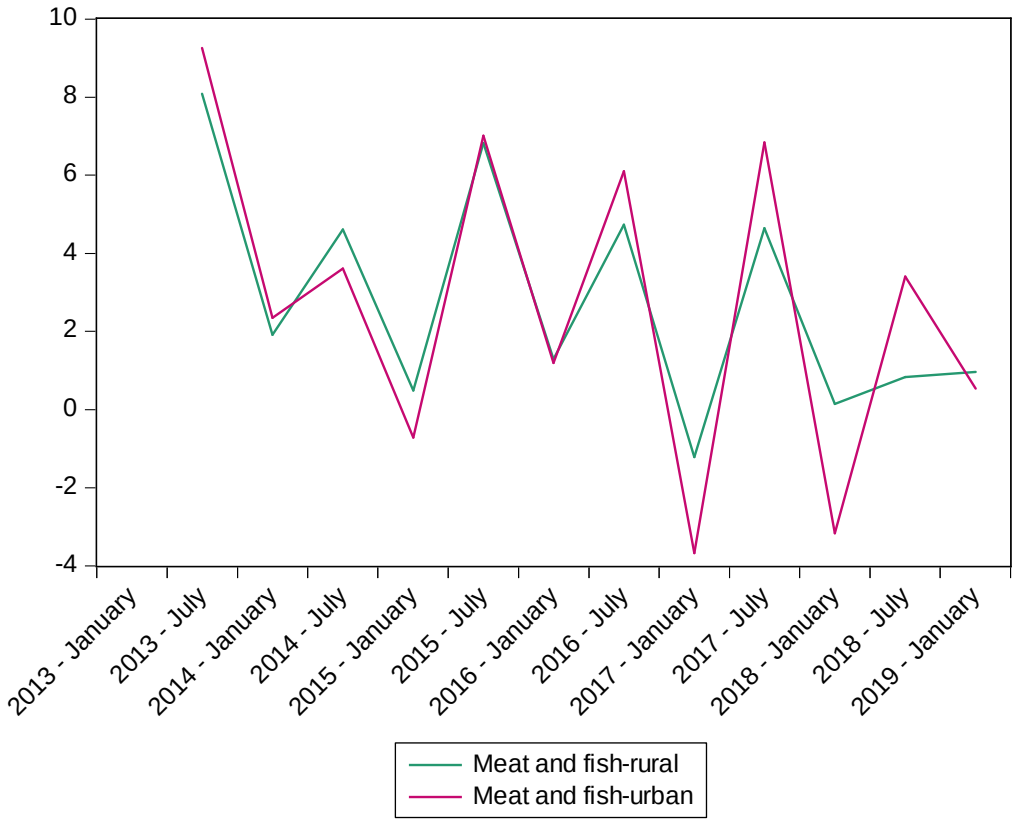
Egg, Meat, and Fish are the important non-vegetarian food items, which are considered as a vital source of protein, iron, zinc, and B vitamins. Fish and fish products account for about ten percentage of the overall exports of the country and approximately 20 percentage of the export of agricultural commodities. As per the data released by the MOSPI, the weight in animal food on the total CPI index is Fish-Inland (0.52%), egg (0.23%), Fish-Marine (0.42%), Mutton (0.44%), Poultry Chicken (0.60%), Pork (0.06%). The trend of CPI of Egg, fish and meat is displayed in the following part.




Source: MoSPI

*Figure 4.14*: CPI –food v/s CPI- Fish and Meat

It is very clear from figure 4.14 that up to 2015-16, CPI food and CPI-Meat and Fish move together with the Consumer Price Index of overall food items. But after that, CPI-meat and fish have increased and lie above CPI food. This increase in price is due to increase in demand for these commodities. As per Bennett's law, when income rises the consumption of non-food grains, for example, fruits, vegetables, meat, fish, egg, milk etc. rise more than proportionate, compared to the starchy food grain consumption (Bennett, 1954). Here the people demand more high protein food like meat and fish after 2015. Thus, the higher demand causes an upsurge in the price of these products.

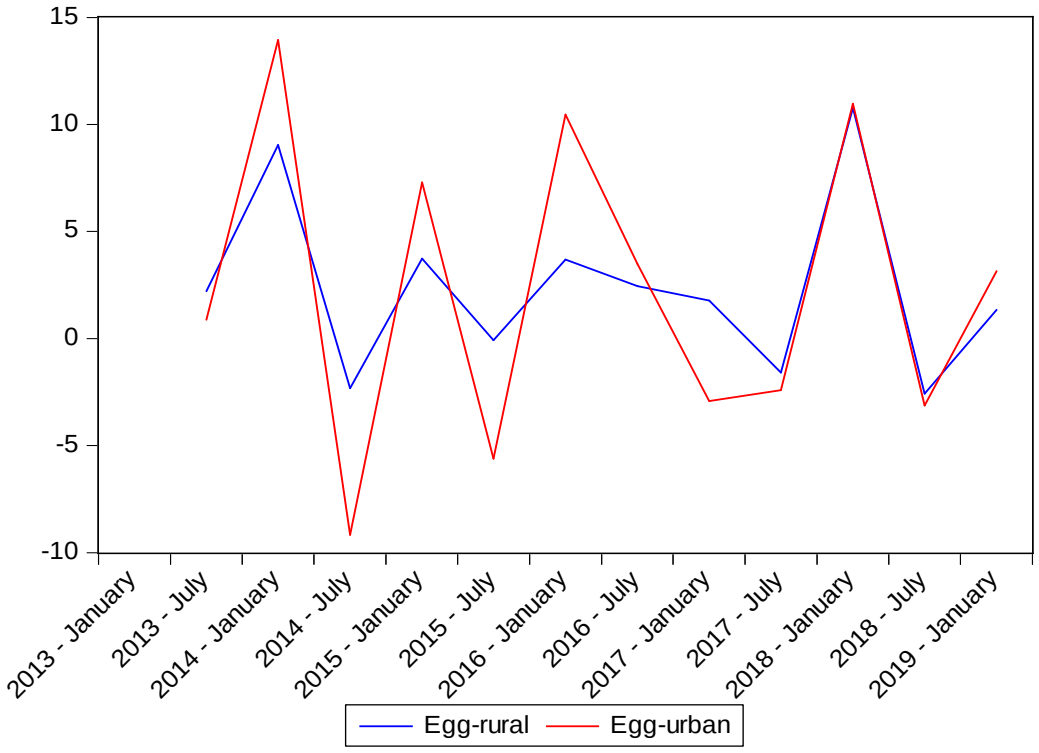



Source: MoSPI

*Figure 4.15*: Price fluctuations of fish and meat in urban and rural areas

Figure 4.15 displays the half-yearly growth of meat and fish in the Consumer Price Index of urban and rural areas. The weights given in to the fish and meat in the new series of CPI are 4.38 and 2.73 in rural and urban areas respectively. The overall

weight for fish and meat is 6.04. Though the growth rate of the urban area is moving along with rural area, spikes are more for urban price fluctuations. That means urban prices fluctuate more compared to the price fluctuations in the rural area.




Source: MoSPI

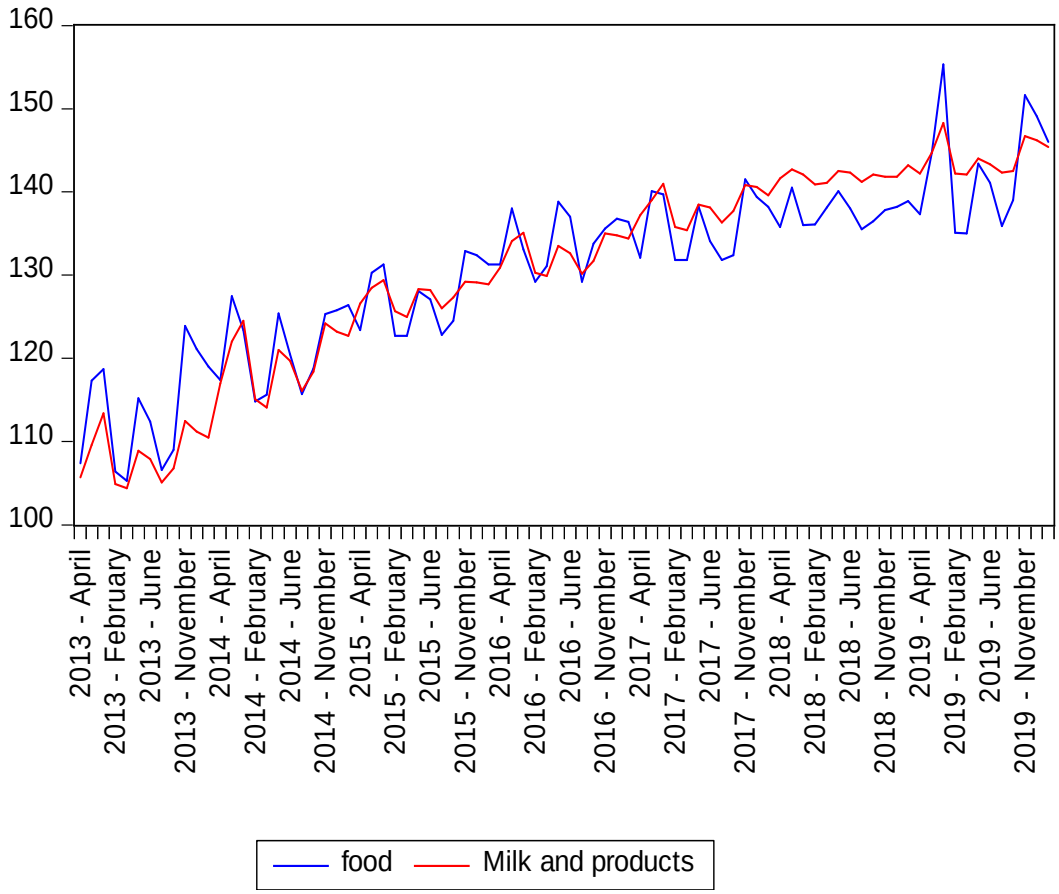
*Figure 4.16*: Price fluctuations of egg

Figure 4.16 displays the half-yearly growth of egg in the Consumer Price Index of urban and rural areas. The weights given in to the egg in the new series of CPI are 0.49 and 0.36 in rural and urban areas respectively. The overall weight for the Consumer Price Index for an egg is 0.43. By examining the trend of the growth rate of CPI egg, we can see that there are considerable spikes in urban prices of eggs. That means urban prices fluctuate more compared to the price fluctuations in the rural area.

- Milk and Milk Products

Milk is a nutrient-rich liquid food item produced from mammary glands of mammals. Milk is used as the primary nutrient of infants of mammals. They are considered as essential food items of the human being. Usually, milk is taken from

cow, goat, water buffalo etc. Milk is regarded as complete food and is related to the culture of India. India is the principal manufacturer of milk and also a leading exporter of milk powder. The trend of milk and milk products are shown in the following figure.



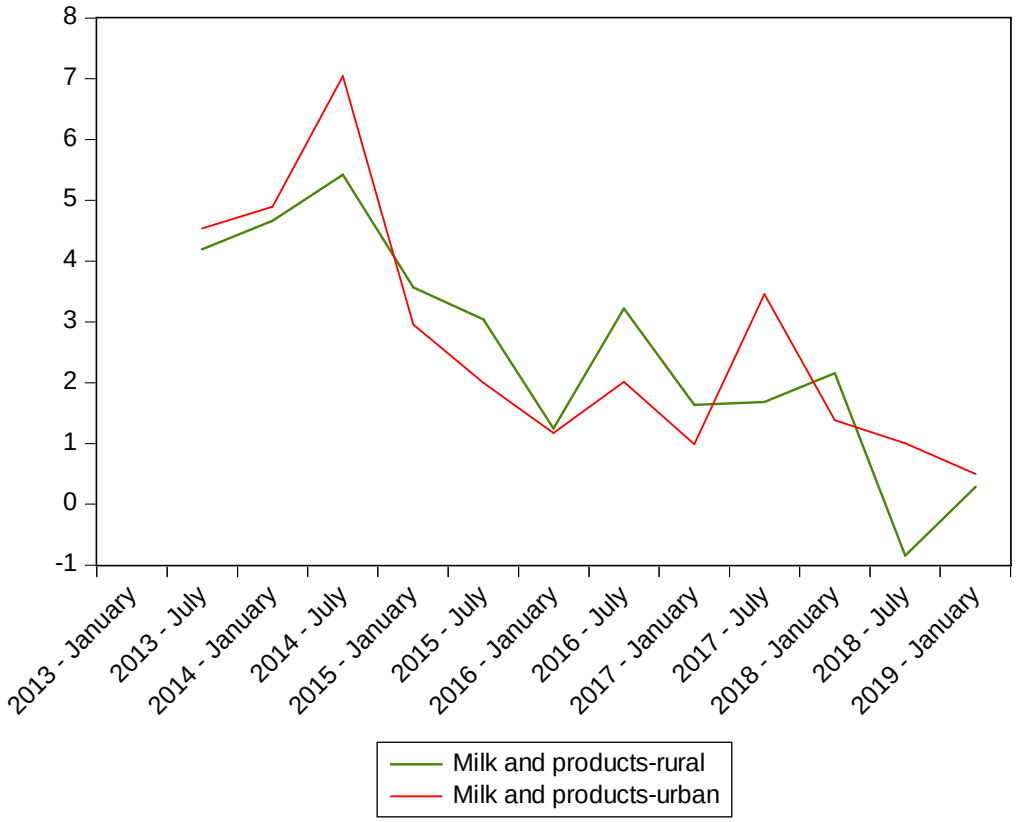

Source: MoSPI

*Figure 4.17*: The trend of milk and milk products

Figure 4.17 explains a positive trend of milk and milk products. They moved along with the trend of the Consumer Price Index of overall food items. Milk production in India has been increasing gradually from 55.6 to 176.3 million tonnes over the years from 1991-92 to 2017-18. So, even if there is an upsurge in demand for milk and milk products, it can be encountered by a rise in the production of milk. So, rising milk prices do contribute much to food inflation.

Figure 4.18 displays the half-yearly growth of milk and in the Consumer Price Index of urban and rural areas. The weights given in to the milk and related products

in the new series of Consumer Piece Index are 7.72 and 5.53 in rural and urban areas, respectively. The overall weight for the Consumer Price Index for the egg is 6.61. By examining the trend of the growth rate of CPI for milk and milk products, we can see that there are considerable spikes in urban and rural prices of milk and milk products. That means, contrasting to other commodities, both rural and urban prices vary more.




Source: MoSPI

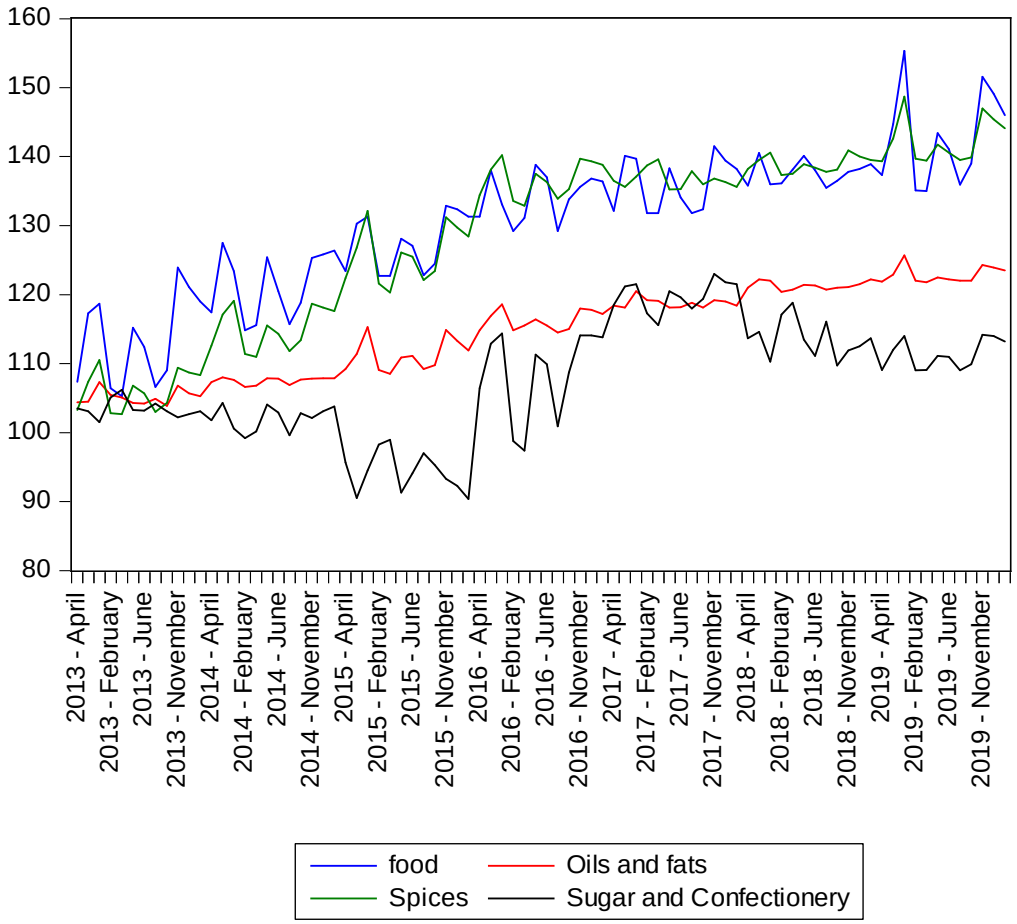
*Figure 4.18*: Price fluctuations of milk and milk products in the rural and urban area

- **Spices, sugar, oil and fat**

These commodities are the processed or semi-processed food items which are used in the food to impart a specific flavour, to enhance the flavour. There are around 35 spices and condiments which can be divided into six gatherings, in view of the pieces of the plants from which they are acquired. India produces spices on 2.0 million hectare lands with a yearly generation of about 2.3 million tons, contributing almost 20% of the world's creation and it is the largest exporter of spices in the

world[6].According to the data of MOSPI the prominent Condiments and Spices with their weight in total CPI index are Ginger (Dry) (0.021%), Turmeric (0.10%), Chillies (Dry) (0.14%), Black Pepper (0.02%), Cardamom (0.014%), Betelnut/Arecanut (0.084%), Cumin (0.062%), Garlic (0.053%), Coriander (0.021%), Tamarind (0.009%).

As per the data on Consumer Price Index, the weights assigned to sugar are 1.7 (Rural CPI), 0.97 (Urban CPI) and 1.36 (Combined CPI). At the same time, the weights given to spices are 3.11 in rural area, 1.79 in the urban area and 2.5 for combined CPI. The weights to oil and fat are 4.21in rural area, 2.81 in the urban area and 3.56 for both rural and urban area.

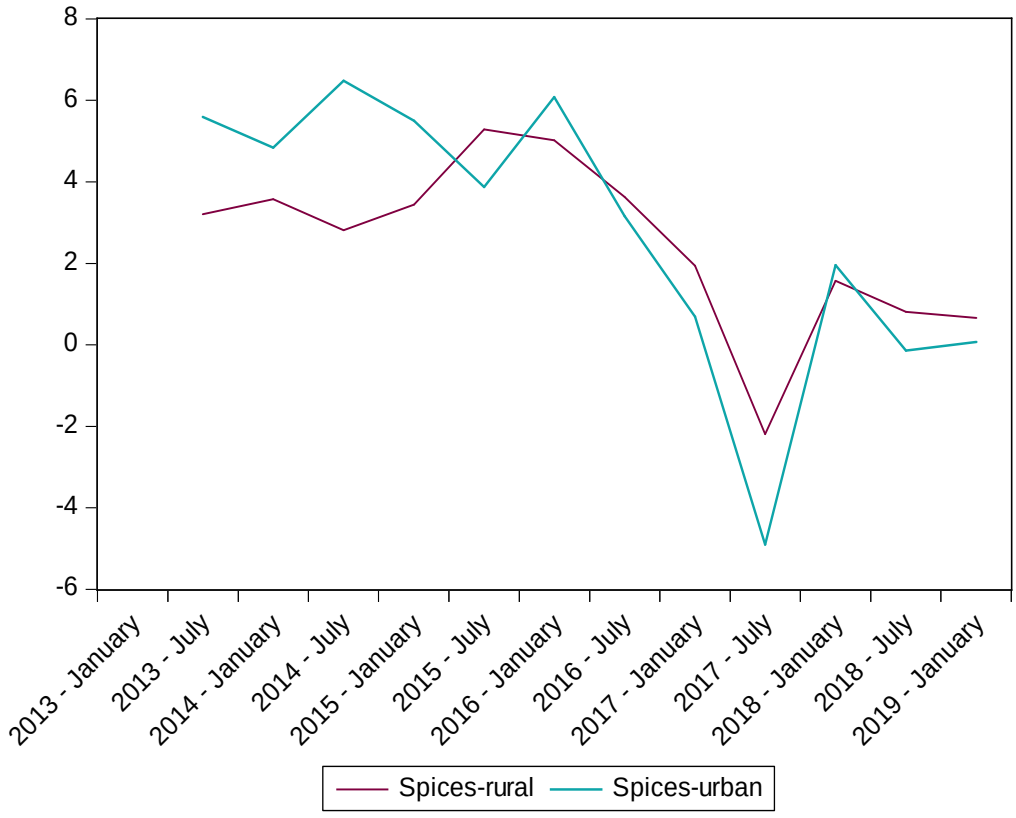



Source: MoSPI

*Figure 4.19*: Trend of oil and fats, spices and sugar

[6] Indiaagronet.com, accessed from, www.indiaagronet.com/horticulture/CONTENTS/spices_and_condiments.htm, dated 27th September 2018.

Here in figure 4.19, CPI-spices moves along with CPI_food. That is indicated as the spices contribute much to the food price inflation. But when the oil and fats are taken, the overall CPI lies far above the CPI of oils and fats. Here we can conclude that oil and fats do not affect food price inflation. The case is similar to sugar and confectionery.



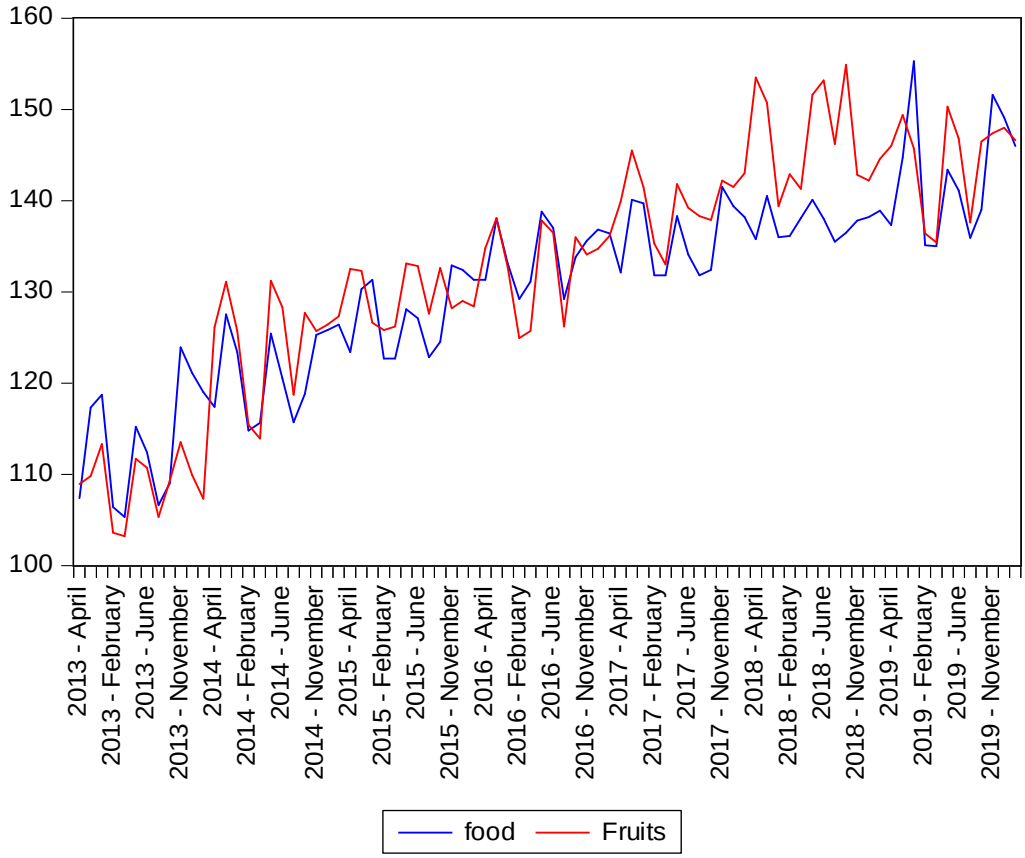

Source: MoSPI

*Figure 4.20*: Price fluctuation of Spices in the rural and urban area

Among the food items analysed in figure 4.19, we can see that only the spices contribute to the food price inflation. Therefore, the price fluctuations of spices in the rural and urban area are examined in figure 4.20, which displays the half-yearly growth of spices in the Consumer Price Index of urban and rural areas. The weights given in to spices in the new series of CPI are 43.11 for rural area and 1.79 in urban areas. The overall or combined weight for spices is 2.5. Though the growth rate of the urban area is moving along with rural area, spikes are more for urban price fluctuations. That means urban prices fluctuate more compared to the price fluctuations in the rural area.

- Fruits

Fruits are the relevant component of plants that are used as food. Vegetables are also as an important source of vitamin and minerals. Amongst fruits, the India ranks first in the cultivation of Papayas (43.6%), Bananas (25.7%), and Mangoes (40.4%) (including guavas and mangosteens)[7]. According to the data of MOSPI, the prominent Fruits with their weight in total CPI index are Banana (0.329%), Mango (0.462%), Apple (0.075%), Orange (012.%), Papaya (0.063%), Coconut (Fresh) (0.078%), Cashew nut (0.065%), Grapes (0.049%), Pineapple (0.039%), Guava (0.045%), Litchi(0.029%), Lemon (0.065%), Sapota (0.028%), Mosambi (0.025%), Pomegranate (0.021%), Amla (0.018%), Jackfruit (0.024%), Pear (0.010%), Almonds (0.024%), and Walnut (0.026%).

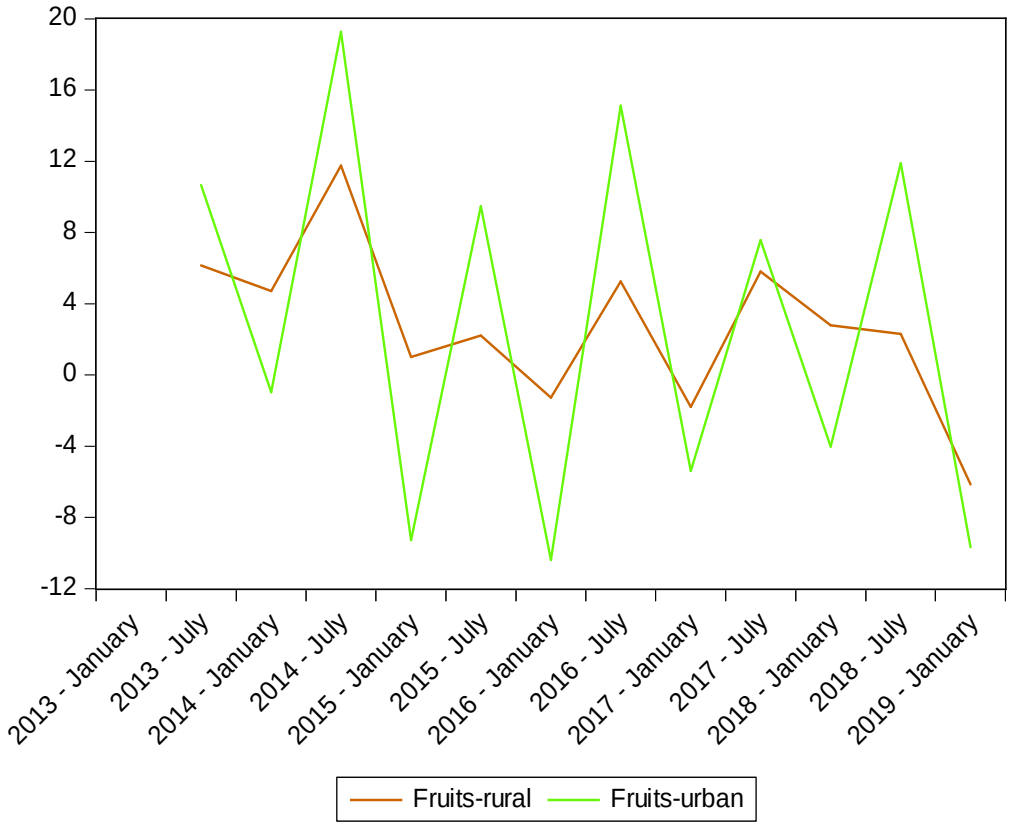



Source: MoSPI

*Figure 4.21*: Trend of CPI_fruits

[7] Agricultural & Processed Food Products Export Development Authority (APEDA), Archived from http://apeda.gov.in/apedawebsite/six_head_product/FFV.htm

The CPI_fruits also shows an increasing trend, and it is moving along with CPI_food. When the movement of CPI food is analysed, it can be seen that there are considerable spikes over the years. This may be due to changes in demand for fruits, fluctuations in production due to bad weather conditions, increase in the cost of production, lack of storage facilities, lack of effective marketing etc.



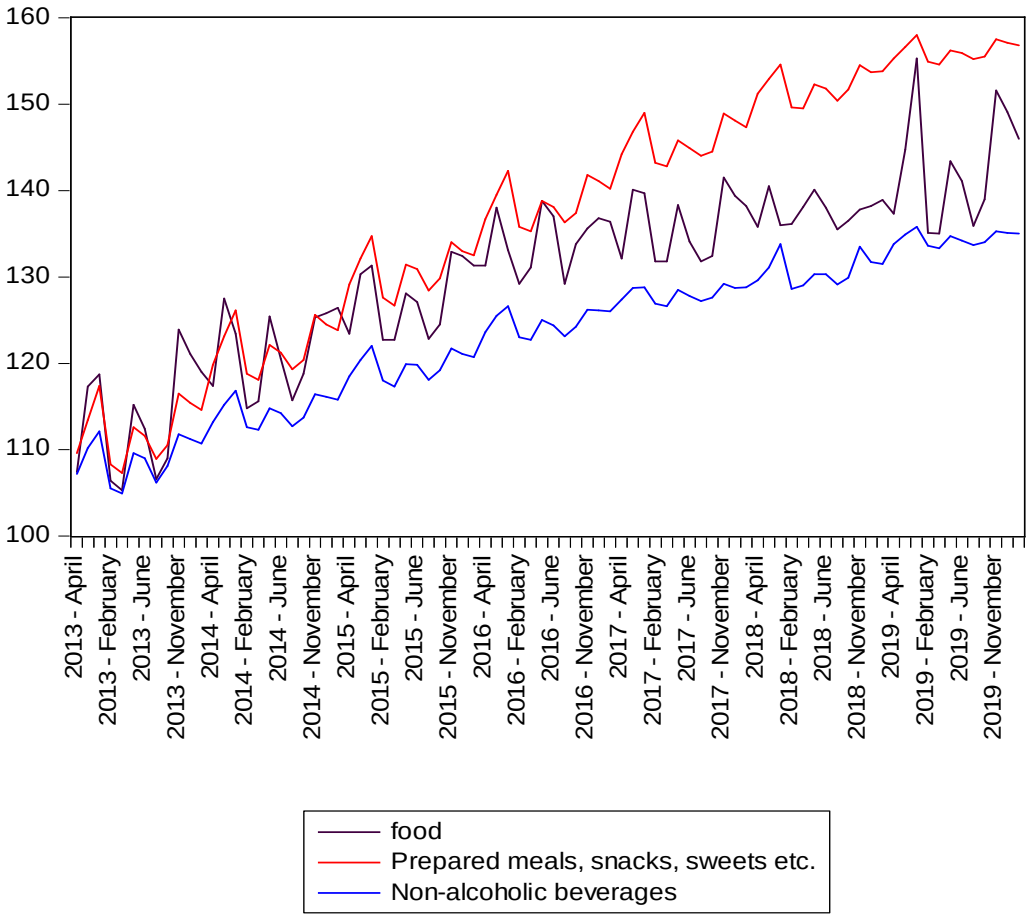

Source: MoSPI

*Figure 4.22*: Price fluctuations of fruits in Urban and rural areas

Figure 4.22 displays the half-yearly growth of the Consumer Price Index of fruits in urban and rural areas. The weights given in to the fruits in the new series of CPI are 2.88 and 2.9 in rural and urban areas respectively. It is the product with comparatively more weight for urban CPI. The weight for combined CPI fruits is 2.89. the figure clearly explains the price fluctuations of fruits in the urban area. The prices of fruits in the rural area do not subject to much more changes. That means urban prices fluctuate more compared to the price fluctuations in the rural area.

- **Prepared Meals and snacks**

Prepared meals and snacks are the processed food items. They are also the value-added commodities. As per the data of MoSPI on Consumer Price Index, the weight assigned to CPI prepared meals is 5.56 for the rural area, 5.54 for urban area and 5.55 for both urban and rural area (combined CPI)




Source: MoSPI

*Figure 4.23*: Trend of CPI_prepared meals and snacks

Prepared meals and snacks are value-added food products. Figure 4.14 shows an increasing trend of the Consumer Price Index of prepared meals and snacks. This trend doesn't exhibit any spikes over the years compared to the CPI of overall food. Up to 2014-15 both move more or less same path, and after that, the CPI for prepared or processed food began to diverge and lies above the overall food.

When the trend of Consumer Price Index of food items, it is evident that the commodities like vegetables, fruits, fish and meat accelerated food price inflation. And from the preceding analysis, we can see that there are several factors affecting food price fluctuations including production, cost of production, policies of government and increase in income. A detailed analysis of these factors is given in the coming section.

## 4.4 Factors influencing food price inflation in India

So many studies are already done for examining the determinants of food inflation in India. We can derive the essential variables affecting food inflation from these studies. Chand (2010) argued that the majority of India's food price fluctuations is because of shocks in agricultural production. The author recommended improving facilities for storage of food articles, expanding buffer stocks of excess food items and join together trade policy with food production scenarios in the nation. Gopakumar and Pandit (2014) built a structural simultaneous equations model for cereals products and procurement and showed that management from demand-side is comparatively crucial than from the supply-side. Nair and Eapen (2012) argued that shortfalls in production and its cost had occupied an important role in the inflation scenario during January 2008 and July 2010 and the demand-side aspects have little role. Bhattacharya and Sen Gupta (2015) concluded that both demand-side - and supply-side elements played an important role in surging in food price inflation in India.

It can be understood from the previous discussions that food inflation is problematic, determined by numerous factors, including demand and supply-side factors. From analysing the trend, we can see that variables like production, cost of production, international prices, overall inflation, the income of the consumers etc. may have an important role. So, it is important to check the relationship between food price fluctuations and these variables. For that, the present study focused on the factors like WPI_ Food, WPI_AC, WPI_FUEL, Money supply, Production of grains, Minimum Support Price and Per capita Income.

- Data and variables

The study is based on the data series from 1986-87 to 2018-19. All the data series are converted to their growth form in order to get a single unit. Since the new CPI series has a lesser period data, the study concentrated on the food index of Wholesale Price Index. The source of WPI data is the Ministry of Commerce and Industry, Government of India. The growth rate of WPI_Food[8] has been taken as the dependent variable. Food prices are usually affected by the overall inflation rate. For capturing the overall inflation growth rate of WPI-AC (All Commodities) has been considered.

Nowadays the fuel prices are fluctuating day by day. It has some effect on the daily life of the common man by increasing transportation cost and indirectly it affects the prices of most of the commodities. Moreover, fluctuations in food prices can be treated as a proxy for fluctuations in the exchange rate. Because petroleum products are the largest exporting items and crude oil is the largest importing item in India as per data given in the official records of GoI in 2018 and 2019. Therefore, it is significant to study the role of oil price in food price inflation. For examining the role of oil price fluctuation, the growth rate of WPI_fuel has been used. In economic theory, it is evident that price rise, along with a rise in income, does not affect the purchasing power of the people. Consequently, when we are analysing food price fluctuations, the growth in income should be considered. The data on Per capita income is taken from the Handbook of Statistics on Indian Economy, Reserve Bank of India.

Growth in money supply can be considered as a proxy of monetary policy or government intervention, and M3 is taken for the purpose. The source of the data of money supply is the handbook of statistics on the Indian economy, Reserve Bank of India. Another variable used here is growth in the production of food grains as a proxy

[8] Structural break has been tested and found no such break in the data (Result is given in appendix)

variable for the output of food items. Minimum Support Prices always fix just above the total cost of production. Therefore, the MSP can be considered as a proxy variable for the cost of production. Data on production, MSP, and stocks are collected from various issues of Agricultural Statistics at a Glance and the DES online database in the Ministry of Agriculture (MoA 2019).

For checking stationarity Augmented Dicky Fuller test has been used. Stationarity is tested for growth of money supply, gr. Per capita income, gr. Production of food grains, expansion of WPI food, fuel and all commodity and for Minimum Support Price of grains. The outcomes are given in the following tables.

Table 4.3

*Unit root test result for Money Supply*

Null Hypothesis: GR__MONEY_SUPPLY has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.514532 | 0.0001 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.4

*Unit root test result for Per capita Income*

Null Hypothesis: GR__PCI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.436555 | 0.0014 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.5

*Unit root test result for Production of Food Grains*

Null Hypothesis: GR__PRODUCTION__FOOD_GRAINS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -10.45098 | 0.0000 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.6

*Unit root test result for WPI_Food Article*

Null Hypothesis: GR__WPI_FA has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.433248 | 0.0173 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.7

*Unit root test result for WPI_All Commodities*

Null Hypothesis: D(GR__WPI_AC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.076092 | 0.0000 |
| Test critical values: | 1% level | -3.670170 | |
| | 5% level | -2.963972 | |
| | 10% level | -2.621007 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.8

*Unit root test result for WPI_Fuel*

Null Hypothesis: GR_WPI_FUEL has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.778018 | 0.0075 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.9

*Unit root test result for Minimum Support Price*

Null Hypothesis: MSP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.420614 | 0.0015 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Source: Author's own calculation

Table 4.3 gives the results of the unit root test of Money Supply. The null hypothesis is the variable 'gr. Money supply has unit root' is rejected since the p-value is below 0.05. That means the variable is stationary at its level. So, gr. money supply is I(0). Table 4.4 displays the unit root result of gr, per capita income. This variable is also stationary at the level since the p-value is less than 0.05. That means the Test is significant at 5% level. So, it can be concluded that the variable is an I (0) variable.

Table 4.5 illustrates the unit root result of gr. Production of food grains. This variable is also stationary at the level since the p-value is less than 0.05 by rejecting the null hypothesis. That means the Test is significant at 5% level. So, it can be concluded that the variable is an I (0) variable. Table 4.6 illustrates the unit root result of gr. WPI_food. This variable is also stationary at the level since the p-value is less than 0.05 by rejecting the null hypothesis. That means the Test is significant at 5% level. So, it can be concluded that the variable is an I (0) variable.

Table 4.7 illustrates the unit root result of the first difference of the variable gr. WPI_All Commodity. The variable gr. WPI_ All Commodity is stationary at the first difference since the p-value is less than 0.05 by rejecting the null hypothesis. That means the Test is significant at 5% level. So, it can be concluded that the variable is an I (1) variable.

Table 4.8 displays the unit root result of gr. WPI-fuel. This variable is also stationary at the level since the p-value is less than 0.05. That means the Test is significant at 5% level. Therefore, it can be concluded that the variable is an I(0) variable.

Table 4.9 illustrates the unit root result of gr. Minimum Support Price. This variable is also stationary at level since the p-value is less than 0.05 by rejecting the null hypothesis. That means the Test is significant at 5% level. So, it can be concluded that the variable is an I (0) variable.

The results of all unit root tests can be summarised in table 4.10.

Table 4.10

*Stationarity-Summary*

| Variables | Stationarity | | Order |
|---|---|---|---|
| | Level | First Difference | |
| Gr. WPI_F | Stationary | NA | I(0) |
| Gr.WPI_AC | Not | Stationary | I(1) |
| Gr.WPI_Fuel | Stationary | NA | I(0) |
| Gr. Percapita Income | Stationary | NA | I(0) |
| Gr. Money supply | Stationary | NA | I(0) |
| Gr. Production | Stationary | NA | I(0) |
| Gr. MSP | Stationary | NA | I(0) |

Source: Authors own calculations

The conclusion of all the unit root tests is given in table 4.10. From the table, it is clear that except gr. WPI All commodity all are I (0), that is stationary at a level and the variable gr. WPI All commodity is stationary at its first difference form.

Since the variables are a combination of I (0) and I (1), Auto-Regressive Distributed Lag model can be used for checking the long-run relationship. The basic form of the ARDL model is given below.

$$y_t = \alpha + \sum_{i=1}^{p} \gamma_i y_{t-i} + \sum_{j=1}^{k} \sum_{i=0}^{qj} X_{j,t-i} \beta_{j,i} + \varepsilon_t$$

Where

$y_t$ the WPI_Food

And $X_{j,} is\ the\ explanatory\ variables$; including Minimum Support Price, Per capita income, food grain production, Money supply, Fuel price index and WPI_AC.

Table 4.11

*ARDL Test Results*

Dependent Variable: GR__WPI_FA
Method: ARDL
Date: 06/28/20 Time: 11:21
Sample (adjusted): 4 32
Included observations: 29 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): GR__MONEY_SUPPLY GR__PCI GR__PRODUCTION__FOOD_GRAINS GR__WPI_AC GR_WPI_FUEL MSP
Fixed regressors: C
Number of models evaluated: 12288
Selected Model: ARDL(3, 1, 2, 0, 3, 3, 3)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| GR__WPI_FA(-1) | -0.174933 | 0.061137 | -2.791062 | 0.0489 |
| GR__WPI_FA(-2) | -0.378918 | 0.168714 | -2.245915 | 0.0596 |
| GR__WPI_FA(-3) | -0.290452 | 0.219567 | -1.322842 | 0.2275 |
| GR__MONEY_SUPPLY | 0.229224 | 0.114254 | -2.070732 | 0.0495 |
| GR__MONEY_SUPPLY(-1) | -0.446149 | 0.147812 | -3.018353 | 0.0194 |
| GR__PCI | 0.308753 | 0.118436 | 2.543162 | 0.0542 |
| GR__PCI(-1) | -0.062812 | 0.536493 | -0.117079 | 0.9101 |
| GR__PCI(-2) | 0.786410 | 0.350452 | 2.243988 | 0.0597 |
| GR__PRODUCTION__FOOD_GRAINS | 0.015259 | 0.129753 | 0.117602 | 0.9097 |
| GR__WPI_AC | 1.207408 | 0.344996 | 3.499770 | 0.0100 |
| GR__WPI_AC(-1) | 0.256849 | 0.395122 | 0.650050 | 0.5364 |
| GR__WPI_AC(-2) | 0.662636 | 0.360653 | 1.837323 | 0.1088 |
| GR__WPI_AC(-3) | 0.711183 | 0.433930 | 1.638934 | 0.1452 |
| GR_WPI_FUEL | 0.233344 | 0.116591 | -1.985627 | 0.0670 |
| GR_WPI_FUEL(-1) | -0.141768 | 0.112086 | -1.264823 | 0.2464 |
| GR_WPI_FUEL(-2) | 0.048793 | 0.124409 | 0.392201 | 0.7066 |
| GR_WPI_FUEL(-3) | -0.250877 | 0.138743 | -1.808206 | 0.1135 |
| MSP | 0.911590 | 0.387141 | 2.353374 | 0.0529 |
| MSP(-1) | -0.139878 | 0.083216 | -1.680908 | 0.1367 |
| MSP(-2) | 0.156405 | 0.075530 | 2.070779 | 0.0771 |
| MSP(-3) | 0.193368 | 0.094753 | 2.040761 | 0.0806 |
| C | 0.026749 | 0.044090 | 0.606704 | 0.5632 |
| R-squared | 0.958196 | Mean dependent var | | 0.076357 |
| Adjusted R-squared | 0.902784 | S.D. dependent var | | 0.051774 |
| S.E. of regression | 0.021171 | Akaike info criterion | | -4.776483 |
| Sum squared resid | 0.003138 | Schwarz criterion | | -3.739224 |
| Log-likelihood | 91.25900 | Hannan-Quinn criteria. | | -4.451626 |
| F-statistic | 17.640402 | Durbin-Watson stat | | 1.903509 |
| Prob(F-statistic) | 0.005167 | | | |

Source: Author's own calculation

The above table shows the short-run effect of different variables on food price inflation. For fitting the model optimum lag is fixed on the basis of Akaike info criterion (AIC) lag selection criterion and the selected lag is 3. Since the probability of F statistics is very low (0.005167), the model is significant at 5% level. So, this model completely satisfies the economic theories and knowledge from previous literatures, from which the independent have taken.

The model treats food inflation (gr.WPI_F) as the dependent variable, and the lagged values of the dependent variable and the variables like money supply, all commodity inflation, fuel inflation, per capita income, minimum support price, and production of food grains are considered as the independent variables. Almost all independent variables, except the production of food grains, are showing a significant short-term relationship with food inflation. If the money supply is enlarged by 1 per cent, food inflation will increase by 0.22 per cent. The result goes in line with the economic theory that a cheap money policy leads to food price inflation.

When there is one per cent increase in per capita income, it led to a 0.3 per cent increase in food prices. The result is indicating that the demand pressure due to an increase in income also leads to food inflation. Overall inflation marked 1.2 per cent impact on food inflation, which is representing the idea that the hike in general price level also leads to an increase in food prices.

Fuel prices also have an effect on food price inflation at 10 per cent level. When there is an increase in fuel prices, the cost of transportation also increases, which in turn lead to an upsurge in food prices. Minimum Support price, which is considered as a proxy of agricultural cost of production, also has a positive effect on food price inflation. If MSP increases by one per cent, food price inflation increases by 0.90 per cent. The result gives a clear picture of the short-run effect of these factors on food inflation.

But in the short run, production of grains does not affect food inflation. That may be due to the fact that the production of grains shows consistency over the years, especially after the green revolution. Moreover, the food grains are distributed through fair price shops, which stabilise the prices of those products in the market.

Along with the short-run relationship between the above-mentioned independent variables and food inflation, it is essential to check its long-term association. The long-run effect of these variables is examined with the help of the bounds test, that is the next part of the ARDL model. The specific form is given below;

$$\Delta y_t = \sum_{t=1}^{p-1} \gamma_i^* \Delta y_{t-1} + \sum_{j=1}^{k} \sum_{i=0}^{qj-1} \Delta X_{j,t-i} \beta_{j,i}^* - \alpha - \rho y_{t-1} - \sum_{j=1}^{k} X_{j,t-1} \delta_j + \varepsilon_t$$

The Test for the existence of level of relationships is then simply a test of

$$H_0 = \rho = \delta_1 = \delta_2 = \delta_3 = \cdots = \delta_k = 0$$

The null hypothesis is tested for using the F test. That is indicating that if it is rejected, there is a long-term relationship between food inflation and the independent variables. The result of the bounds test is displayed in the following part.

Table 4.12

*ARDL Long Run Form and Bounds Test*

Dependent Variable: D(GR__WPI_FA)
Selected Model: ARDL(3, 1, 2, 0, 3, 3, 3)
Case 3: Unrestricted Constant and No Trend
Date: 06/30/20 Time: 14:23
Sample: 1 32
Included observations: 29

| Conditional Error Correction Regression | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 0.026749 | 0.044090 | 0.606704 | 0.5632 |
| GR__WPI_FA(-1)* | -1.844303 | 0.483399 | -3.815281 | 0.0066 |
| GR__MONEY_SUPPLY(-1) | 0.675373 | 0.256503 | 2.633003 | 0.0338 |
| GR__PCI(-1) | 1.032351 | 0.383765 | 2.690065 | 0.0311 |
| GR__PRODUCTION__FOOD_GRAINS** | 0.015259 | 0.129753 | 0.117602 | 0.9097 |
| GR__WPI_AC(-1) | 2.838076 | 0.667815 | 4.249795 | 0.0038 |
| GR_WPI_FUEL(-1) | -0.567196 | 0.192081 | -2.952894 | 0.0213 |
| MSP(-1) | 0.411485 | 0.164250 | 2.505237 | 0.0407 |
| D(GR__WPI_FA(-1)) | 0.669370 | 0.322484 | 2.075668 | 0.0766 |
| D(GR__WPI_FA(-2)) | 0.290452 | 0.219567 | 1.322842 | 0.2275 |
| D(GR__MONEY_SUPPLY) | -0.229224 | 0.134254 | -1.707392 | 0.1315 |
| D(GR__PCI) | 0.308753 | 0.568436 | 0.543162 | 0.6039 |
| D(GR__PCI(-1)) | -0.786410 | 0.350452 | -2.243988 | 0.0597 |
| D(GR__WPI_AC) | 1.207408 | 0.344996 | 3.499770 | 0.0100 |
| D(GR__WPI_AC(-1)) | -1.373819 | 0.436631 | -3.146408 | 0.0162 |
| D(GR__WPI_AC(-2)) | -0.711183 | 0.433930 | -1.638934 | 0.1452 |
| D(GR_WPI_FUEL) | -0.223344 | 0.116591 | -1.915627 | 0.0970 |
| D(GR_WPI_FUEL(-1)) | 0.202083 | 0.127833 | 1.580835 | 0.1579 |
| D(GR_WPI_FUEL(-2)) | 0.250877 | 0.138743 | 1.808206 | 0.1135 |

| | | | | |
|---|---|---|---|---|
| D(MSP) | 0.201590 | 0.087141 | 2.313374 | 0.0539 |
| D(MSP(-1)) | -0.349773 | 0.124605 | -2.807060 | 0.0263 |
| D(MSP(-2)) | -0.193368 | 0.094753 | -2.040761 | 0.0806 |

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 3: Unrestricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR__MONEY_SUPPLY | 0.366194 | 0.085022 | 4.307053 | 0.0035 |
| GR__PCI | 0.559752 | 0.259023 | 2.161012 | 0.0575 |
| GR__PRODUCTION__FOOD_GRAINS | 0.008274 | 0.069106 | 0.119725 | 0.9081 |
| GR__WPI_AC | 1.538834 | 0.175772 | 8.754737 | 0.0001 |
| GR_WPI_FUEL | 0.307539 | 0.069683 | 4.413420 | 0.0031 |
| MSP | 0.223111 | 0.081446 | 2.739375 | 0.0289 |

EC = GR__WPI_FA - (0.3662*GR__MONEY_SUPPLY + 0.5598*GR__PCI
+ 0.0083*GR__PRODUCTION__FOOD_GRAINS + 1.5388
*GR__WPI_AC + 0.3075*GR_WPI_FUEL + 0.2231*MSP)

| F-Bounds Test | | | Null Hypothesis: No levels relationship | |
|---|---|---|---|---|
| Test Statistic | Value | Signif. | I(0) | I(1) |
| | | | Asymptotic: n=1000 | |
| F-statistic | 5.413944 | 10% | 2.12 | 3.23 |
| k | 6 | 5% | 2.45 | 3.61 |
| | | 2.5% | 2.75 | 3.99 |
| | | 1% | 3.15 | 4.43 |
| Actual Sample Size | 29 | | Finite Sample: n=35 | |
| | | 10% | 2.387 | 3.671 |
| | | 5% | 2.864 | 4.324 |
| | | 1% | 4.016 | 5.797 |
| | | | Finite Sample: n=30 | |
| | | 10% | 2.457 | 3.797 |
| | | 5% | 2.97 | 4.499 |
| | | 1% | 4.27 | 6.211 |

| t-Bounds Test | | | Null Hypothesis: No levels relationship | |
|---|---|---|---|---|
| Test Statistic | Value | Signif. | I(0) | I(1) |
| t-statistic | -4.815281 | 10% | -2.57 | -4.04 |
| | | 5% | -2.86 | -4.38 |
| | | 2.5% | -3.13 | -4.66 |
| | | 1% | -3.43 | -4.99 |

Source: Author's own calculation

Since the value of the F statistic is larger than I(0) and I(1), the null hypothesis is rejected, and in the second part, the absolute value of t statistic is greater than two, here also null hypothesis is rejected. Therefore, we can realize that there is a long-run relationship between the dependent variable WPI food and other variables. Let us discuss each independent variable separately.

In our model growth in WPI_F has been taken as the dependent variable. In this section, we are checking the long-term relationship between food price inflation and the independent variables. The first independent variable we are used here is the growth in Money supply, which is taken as a proxy for monetary policy. As theories

suggest, when there is an increase in money supply, the prices of most of the commodities are positively affected. Our model also has got a similar kind of result that a one per cent increase in the money supply leads to 0.366 per cent increase in food inflation. That is to say; there is a positive and long-term relationship between the food price inflation and money supply. Therefore, food price inflation can be controlled by adopting a dear money policy.

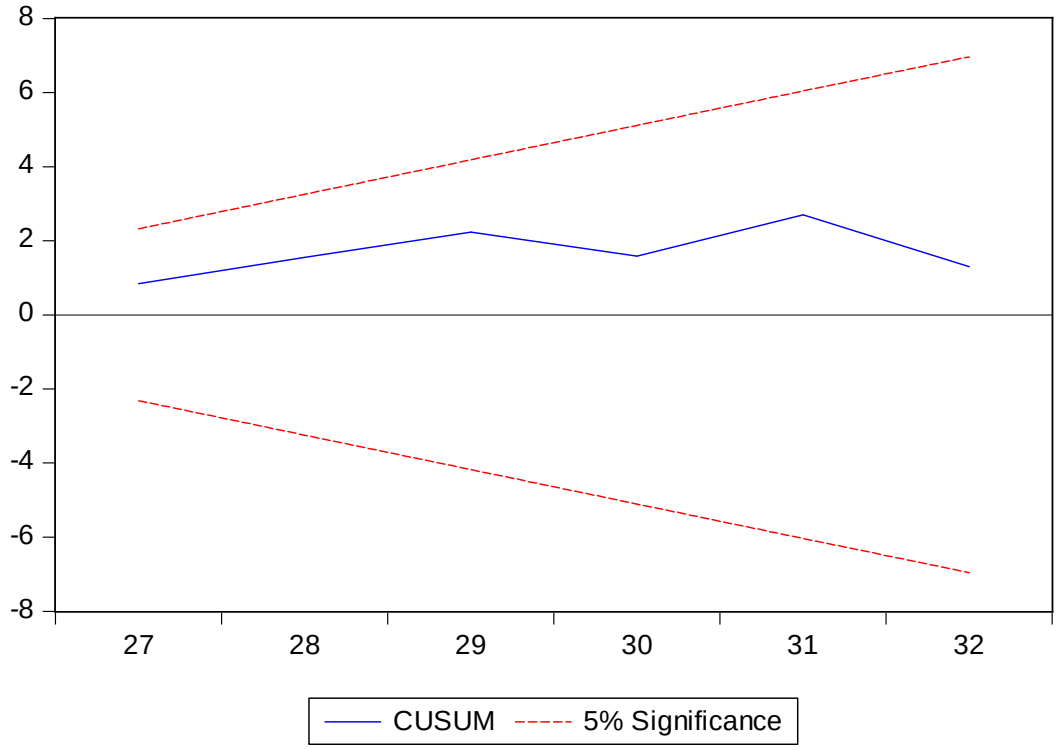
The growth in per capita income is also significant at ten per cent level, and it is positively related to food price inflation in the long run. The result is showing that a one per cent increase in the per capita income leads to 0.559 per cent increase in the food price inflation. Naturally, when there is an increase in the income of the people, the demand for food articles increased. So as the model suggests, there exists a long-term relationship between food inflation and the demand side factor-like growth in per capita income.

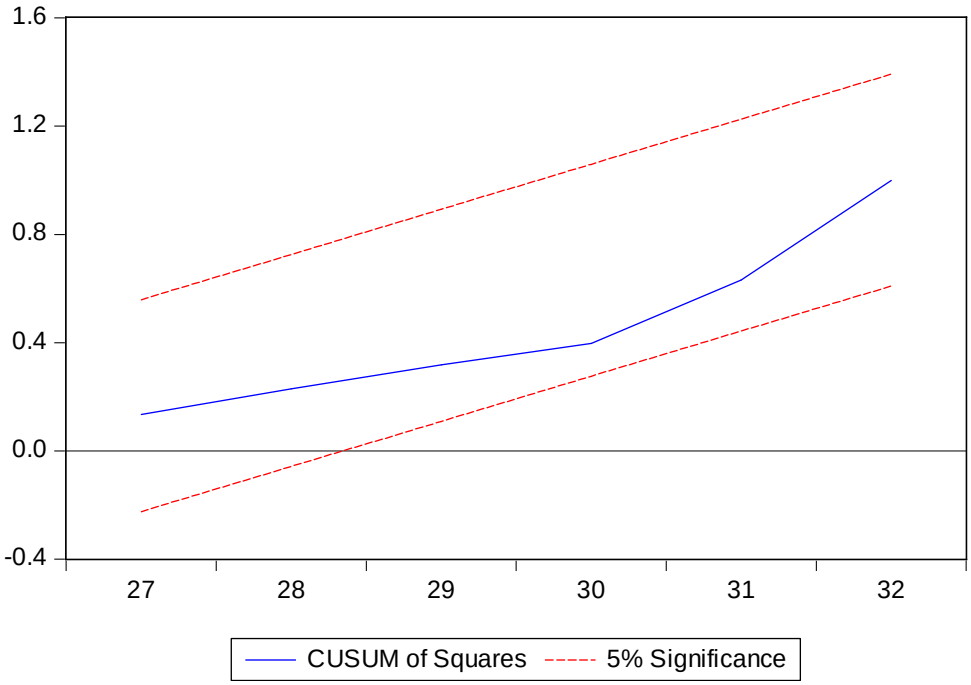
As mentioned in the previous sections, growth in food grain production has been taken as a proxy for growth in the production of food articles. It is the only variable mentioned in the model, which is showing no long-term relationship between food price inflation. It may be due to the fact that there is no shortage in the production of food grains after the green revolution. And, many of the food grains are supplied through fair price shops like Public Distribution System at a subsidised rate. Moreover, from the analysis of commodity-wise trend of food inflation, we came to know that the food products other than cereals are much contributed to food price inflation.

The most influencing variable is overall inflation, that is a one per cent increase in the general inflation leads to a 1.2 per cent increase in food inflation. That is food price inflation is influenced by all commodity inflation also in the long run. The case is similar to growth in fuel prices. As the fuel prices increased by one per cent, food inflation also increased by 0.3 per cent. That is there exists a direct positive relationship between food inflation and oil price inflation.

The variable growth in Minimum Support Price is considered as a proxy of cost of production. As the theories of economics suggested, the increase in the cost of production leads to an increase in food prices. Similarly, a one per cent increase in the MSP increases food inflation by 0.2 per cent. The result of the Bounds test is indicating that there is a direct positive relationship between minimum support price and food inflation in the long run.

The long-run form of ARDL model suggests that the variables like money supply, per capita income, fuel prices, overall inflation and minimum support price are showing a significant positive relationship with the dependent variable in the long run. So, in order to control food price inflation, we have to control these variables with adequate policies. The stability of the model is tested by the CUSUM test as well as CUSUM square test.






Source: Author's own calculation

*Figure 4.24*: Test for the stability of the model

For verifying the reliability of the analysis, the CUSUM and CUSUM Square tests are used. It is one of the advanced techniques which is widely used in such types of analysis. It is assumed for the testing of the stability of analysis; the blue line should lie between these two upper and lower lines, which is as per the outcome of CUSUM. Sometimes CUSUM test is not able to verify the stability of the model, so many researchers and econometrician also advocate for the application of CUSUM squire to make the result more credible. For doing so, furthermore, the CUSUM square test has also been applied. The result of CUSUM square test also postulate that the above analytical model is stable; this is so because the blue line of the analysis lies between the upper and lower boundaries which have been represented by the red line which is desirable for the stability of the model. The outcome of the CUSUM and CUSUM square test shows that there is stability in the analytical model, which is strong enough to accept the strength and reliability of the model.

## 4.5 Conclusion

The primary motive of this chapter has been to examine the trend and magnitude of food price inflation in India and also to understand the determinants of food price inflation in India. This study gives an elementary understanding of the price movements of different commodities. The study finds that food inflation is a severe problem in India, and the majority of the food items are subject to frequent fluctuations. Moreover, the food price fluctuation affects urban India more compared to rural India. The results do confirm the strong and long-term relationship between the determinants like overall inflation, minimum support price, fuel prices, money supply and per capita income of food price inflation in India. Consequently, it is indispensable to study the impact of food price fluctuations on poor people in the urban area. A detailed analysis is given in the subsequent chapters.

# Chapter V

# FOOD CONSUMPTION OF THE URBAN POOR IN INDIA

# CHAPTER V

# FOOD CONSUMPTION OF THE URBAN POOR IN INDIA

## 5.1 Introduction

The welfare of every economy depends on the consumption of goods and services. A consumption basket can be divided into two broad groups such as food and non-food. The food group is further divided into several groups, namely cereal, pulses, vegetables and fruits, egg, fish and meat and other food items. Cereal group comprises the items like rice, wheat, jowar, bajara, ragi, maize, and barely etc. These food items are a source of energy which helps people to enhance their productivity for doing all types of physical and mental work. The non-cereal group includes milk and milk products, fish and egg, edible oil, meat, sugar, vegetables, fruits and beverages etc. which are full of vitamins, protein, calcium, minerals and fat. The non-cereal group is relatively high-priced than cereal group. That's why non-cereals items are also called high value-added food items (Bandara, 2013)

There are two fundamental laws related to food consumption, which explains the changing patterns of food consumption. They are;

- The first phenomenon is known as *Engel's law* (Engel, E., 1857) which states that as income rises, the share of additional income spent on food tends to decline.

- The second one is known as *Bennett's law* (Bennett, M.K., 1941) which states that as income rises, consumers allocate more of their income to non-cereals. Cereals are less expensive but are much in calories, while non-cereal items (such as meat, egg & fish, fruits & vegetables and milk & its products) are expensive but are low in calories.

As we all know, the consumption of food depends on household income and the price of the food items. In the previous chapter, the price fluctuations in food items

have been explained in detail. To know the impact of food price fluctuations on urban poor, we should have a vivid picture of the food consumption basket of the poor people. This chapter elucidates all these matters in a very comprehensive manner.

This chapter is based on the various rounds of NSSO data. It deals with the budget share of the poor people, especially urban poor in India and how they react to the price change in food articles. For this, the chapter has been organised into two parts. In the first part, the socio-economic conditions of the sample households in NSSO data have been analysed. The budget share of poor people has been examined in the second section.

## 5.2 Classification of households based on expenditure class

The study is entirely based on poor people in India, especially the urban poor. For this purpose, the total sample households in the 68$^{th}$ Round NSSO Data are divided into three, based on their monthly per capita expenditure at mixed recall period. Here the monthly per capita expenditure has been taken as a proxy for the income of the consumers. Those households, whose monthly per capita expenditure is below Rs. 1197, are termed as poor. The expenditure class of middle-income family is in between Rs. 1197 and Rs. 2020. The expenditure class above Rs.2020 is considered as the richer class.

Table 5.1

*Expenditure Class wise Distribution*

| Sector | Poor (%) | Middle Class (%) | Rich (%) |
|---|---|---|---|
| Rural | 73.208 | 64.9374 | 38.0116 |
| Urban | 26.792 | 35.0626 | 61.9884 |
| Total | 100 | 100 | 100 |

Source: 68th Round NSSO Data

Table 5.1 displays the sector-wise distribution of different classes of households. It is very interesting to note that the majority of low-income families live in rural areas compared to the urban area. The condition is more or less similar as far as the middle-income households are taken. But the problem is different in the case

of the urban area. It can be observed that the majority of families with higher consumption expenditure lives in an urban area. Or the cost of living in the urban area is higher compared to the rural area. The entire analysis is based on these classifications.

## 5.3 Socio-economic profile of the sample households

Socio-economic conditions are considered as influential factors in the study of every society. Generally economic status of any family depends upon the social factors such as educational level, size of the family and the degree of pleasant atmosphere prevalent in the family. So, it is essential to examine the socio-economic conditions of the samples to know the requirements of the lowest expenditure class in India. The present section scrutinizes the socio-economic characteristics of the poor sample households of 68$^{th}$ Round NSSO data. It includes a brief discussion on age, gender, religion, social class, literacy rate, employment-related characteristics, expenditure class and then highlights all these factors in the background of the social class.

### 5.3.1 Age and sex of the sample respondents

When the gender of sample respondents is analysed, it is essential to note that the sex ratio is almost similar to the all India sex ratio. Around 52 per cent of individuals are male, and the rest are female.

Table 5.2

*Age-wise distribution of individuals*

| Age Class | Poor (%) | Middle Class (%) | Rich (%) |
|---|---|---|---|
| Age below 18 | 44.03 | 36.42 | 28.54 |
| Age b/w 18 to 60 | 50.16 | 56.82 | 63.32 |
| Age above 60 | 5.81 | 6.76 | 8.14 |

Source: 68th Round NSSO Data

Table 5.2 represents the age of the sample respondents. Here three age groups are taken into consideration- a group of youngest persons, working group and old age

people—the first and the third fall under the dependency class. The second category is the working-age group. It is fascinating that the majority of the poor people are falling in the dependent group. Conversely, the majority of the rich section are from the working-age group. Another notable thing is that more than 40% of poor people are children or teenagers. It is indeed exciting to note that there is a visible inverse relationship that exists between economic status and percentage share of children. Among the poor, 44.3 per cent are children whereas, among the rich, this percentage is only 28.54. This may be due to the negative relationship between birth rate and economic development. Moreover, another fact is that the percentage of old aged is lower among the poor and increases when economic status improves. This may be due to the direct association with health status and income.

### 5.3.2 Educational status

The development of every society depends on education and literacy rate. It has influenced the economic and social status of every individual. The present study examines the education level of the sample households in India, and this analysis is based on the expenditure class- poor, middle class and rich.

Table 5.3

*General education level of the sample households*

| Literacy | Poor (%) | Middle Class (%) | Rich (%) |
|---|---|---|---|
| Non-Literate | 35.50 | 23.46 | 12.98 |
| Below Primary | 20.79 | 16.35 | 11.56 |
| Primary | 14.62 | 13.89 | 10.55 |
| Middle | 14.18 | 16.91 | 14.44 |
| Secondary | 8.13 | 13.35 | 15.71 |
| Higher Secondary | 4.54 | 9.24 | 14.34 |
| Diploma/Certificate Course | 0.22 | 0.63 | 1.91 |
| Graduate | 1.71 | 5.01 | 13.34 |
| Post Graduate and Above | 0.29 | 1.15 | 5.17 |

Source: 68th Round NSSO Data

Table 5.3 shows the education level of sample households. The literacy rate in India as per 2011 census is 74%. The literacy rate of richer sections and middle-income people in the sample households are more than compared to the all India level. But the case of poor people is much different. 35.5% of poor people are illiterate. Another notable thing is that a very negligible number of poor people have graduation and above. A clear positive relationship with educational attainment and economic status is visible from this table. Here the poor are educationally backwards compared to the rich and middle-class people.

### 5.3.3 Type of family of the sample households

The type of family of the sample households is explained in this part based on the different expenditure class. The families are divided into two- joint families and nuclear families. The small families consist of a maximum of six members and families with more than six members are considered as big families.

Table 5. 4

*Type of families of the sample households*

| Family Type | Expenditure Class | | |
|---|---|---|---|
| | Poor (%) | Middle Class (%) | Rich (%) |
| Small family | 58.20 | 72.70 | 87.10 |
| Big family | 41.79 | 27.29 | 12.89 |

Source: 68th Round NSSO

From table 5.4, it can be seen that most of the families in India are small families. On average, 58% of the poor, 73% of the middle class and 87% of the richer section are from small families. That means the higher per capita monthly expenditure is negatively related to the number of members in the family.

### 5.3.4 Religion Wise Distribution of Sample Households

India is a place of vide varieties of religious beliefs. Here in the samples, five main religious groups have been considered. All the other minority religious groups are named as others.

Table 5.5

*Religious wise distribution of samples*

| Religion | Poor (%) | Middle Class (%) | Rich(%) |
|---|---|---|---|
| Hinduism | 34.5 | 32.7 | 32.8 |
| Islam | 37.4 | 36.4 | 26.2 |
| Christianity | 21.6 | 35.4 | 42.9 |
| Sikhism | 9.5 | 31.7 | 58.8 |
| Buddhism | 28.1 | 36.4 | 35.6 |
| Others | 28.2 | 30.8 | 41.1 |

Source: 68th Round NSSO Data

Table 5.5 displays the religion-wise distribution of sample households. Among the religious groups, the Hindu religion distributed almost equally among different expenditure class. But when we take the Islam religion, majority of the households are from the poor and middle-class section. Around 42 per cent of the Christian families are from the richer class. Majority of the other religious group are also included in richer sections. This can be better understood from the next part.

### 5.3.5 Social class-wise distribution of sample households

Social class is a representation of the social status of every community. It will give a vivid picture of the actual social situation of a household in a country like India. Table 5.6 gives the community wise percentage of economic class.

Table 5.6

*Social class-wise distribution of sample households*

| Social Class | Poor (%) | Middle Class (%) | Rich (%) |
|---|---|---|---|
| Scheduled Tribes | 41.4 | 32.7 | 25.9 |
| Scheduled Castes | 46.2 | 32.8 | 21 |
| Other Backward Classes | 35.1 | 35.2 | 29.7 |
| Others | 21.5 | 31.6 | 46.9 |

Source: 68th Round NSSO data

Table 5.6 shows that 41.4% of ST groups are poor, and the percentage of poor declines when social status improves, among general category, only 21.5 percentages is poor. On the other hand, 46.9 percentages of upper castes or general categories are rich. When social status improves, the percentage share of rich persons increased. This is a clear sign of the close relationship with social class and economic class.

Along with this, we can compare the share of social and economic classes with the all-India class wise population share based on the 2011 census.

Table 5.7

*Percentage Share of poor people to the total population*

| Social Class | Poor (%) | Rich (%) | All India Share* |
|---|---|---|---|
| Scheduled Tribes | 16.6 | 10.43 | 8.63 |
| Scheduled Castes | 21.4 | 9.70 | 19.59 |
| Other Backward Classes | 41.4 | 34.96 | 40.94 |
| Others | 20.5 | 44.89 | 30.8 |

Source: 68th Round NSSO Data
*based on census data 2011

Table 5.7 shows that among poor 16.68 per cent is from the ST group, whereas their population percentage is only 8.63. Among the poor, 21.4% are from the SC community, whereas their population percentage is only 19.59. In the case of OBC, the population percentage is 40.94, among poor 41.4 per cent is from the OBC community. But it is noted within the total population, 30.8 per cent is upper-caste whereas, only 20.5 per cent of poor is from this class. On the contrary among rich only 10.4 per cent is from the ST community, 9.7 is from SC 34.9 is from OBC, and 44.8 per cent is from general category. This table clearly identifies the fact that social class is one of the important determinants of economic class. From 30 per cent of the general community constitute 44.8 per cent of richer people whereas 19.5 per cent of the SC population is having only 9.7 per cent of the rich population in India. This clearly indicates the prevalence of the relationship between social class and economic class.

In India, scheduled caste and scheduled tribes are regarded as the most vulnerable sections of the society. Majority of these categories are constituted as the economically backward class, that is, the poor class. The SC, ST and OBC constitute around 80% of the poor sample households. A lesser percentage of people from scheduled caste and tribes are included in the rich class. The case is different in the section 'others' that is about half of the rich people from the general categories, who are considered as the upper classes of the society. It may be concluded from the above discussion that the poor sample households are economically and socially vulnerable.

### 5.3.6 Employment Status of households in the rural area and in the urban area

The economic status of every individual depends on the status of employment. There are different categories of employment in urban and rural areas. In rural area, employment is based mainly on agriculture. But in the urban sector, employment is mainly based on non-agricultural works. In table 5.7 and table 5.8, the employment of different classes of people, both in rural and urban areas respectively, are displayed.

Table 5.8

*Employment of rural households*

| | Poor (%) | Middle class (%) | Rich (%) |
|---|---|---|---|
| Self-employed in: Agriculture | 40.1 | 37.8 | 22.1 |
| Self-employed in: Non-agriculture | 42.3 | 38.6 | 19.1 |
| Regular wage/salary earning | 20.8 | 41.4 | 37.8 |
| Casual labour in: Agriculture | 65.4 | 28.1 | 6.5 |
| Casual labour in Non-agriculture | 59.5 | 31.8 | 8.7 |
| Others | 29.6 | 35.7 | 34.8 |

Source: 68th Round NSSO Data

It can be seen from Table 5.8 that 65.4 per cent of casual labourers in agriculture and 59.5 per cent of the casual labourer in the non-agricultural sector are poor. Moreover, self-employed in agriculture, 40.1 per cent, and self-employed in non-agriculture, 42.3 per cent are poor. It can also be noted that around 40 per cent of the poorer sections work in the agriculture sector, and only 9% of household are

regular wage or salary earners. Thirty-three per cent of poor people are casual labourers. But in the case of middle-class people majority are working in non-agriculture and around 20 per cent are regular salaried class. But the majority of the richer groups earn a regular salary, and only 8 per cent of households are engaged in casual works.

Table 5.9

*Employment of urban households*

| Type of employment | Poor (%) | Middle class (%) | Rich (%) |
|---|---|---|---|
| Self-employed | 43 | 42 | 32 |
| Regular wage/salary earning | 22 | 34 | 49 |
| Casual labour | 28 | 16 | 5 |
| Others | 7 | 8 | 14 |

Source: 68th Round NSSO Data

Table 5.9 shows the employment of urban households in India. The types of employment in urban India can be divided into four- self-employed, regular wage or salary earning, casual labourers and others. Above 70% of the urban households find their earnings from casual labourers and from self-employment. Self-employed and salaried class constitute a majority of the middle-class families in the urban area. About half of the rich households in urban area are regular salaried households.

### 5.3.7 Land possession of poor sample households

Possession of land is an important indicator of economic status. The poor sample household possesses lesser land holdings compared to the other classes of people. In this part, the type of land is divided into three - homestead only, homestead and other lands, and other lands only. The landholding other than homestead may be used for agricultural activities and production of food items. The type of land possessed by poor households both in the rural and urban area is explained in the following section.

Table 5.10

*Type of Land Holdings*

| Land Possession | Poor In India | |
|---|---|---|
| | Rural (%) | Urban (%) |
| No land | 3.01 | 17.33 |
| Homestead only | 33.91 | 64.59 |
| Homestead and other land | 62.84 | 17.38 |
| Other land only | 0.24 | 0.69 |

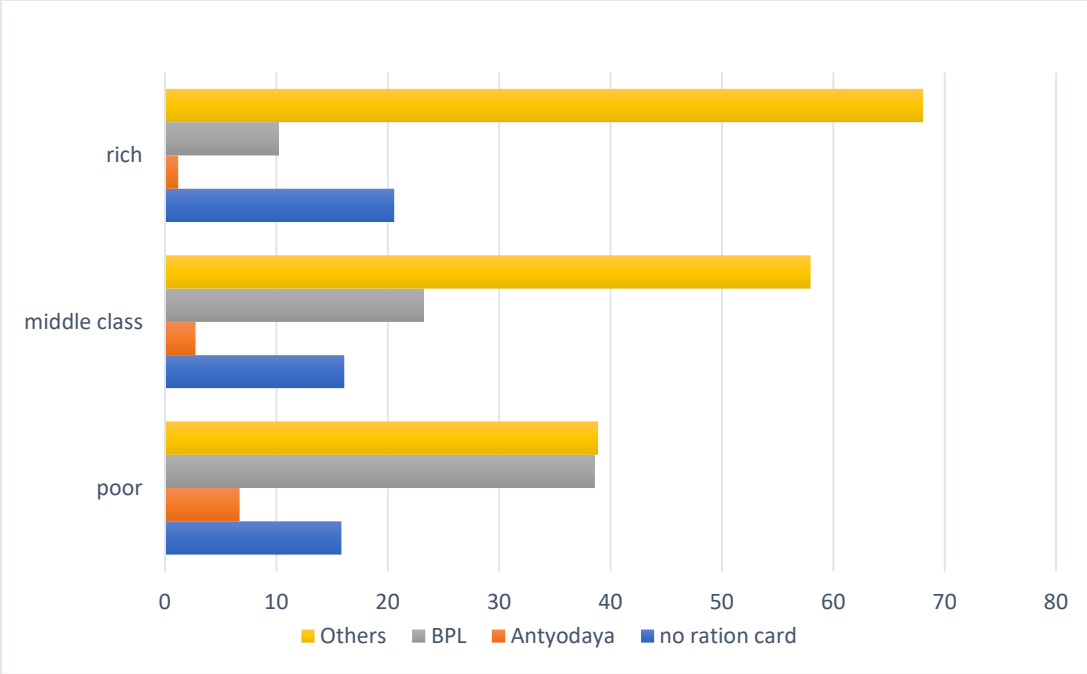
Source: 68th Round NSSO Data

Table 5.10 displays the possession of the type of land of the poor people both in rural and in the urban area. The poor people with no land are higher in the urban area than in the rural area. And another notable thing is that more than 60% of the landowners in the urban area possess homestead only. But in the rural area, most of the rural poor possessed other lands along with homestead because many of the rural poor are involved in agricultural activities. From this, we can conclude that the majority of the urban poor are landless people.

### 5.3.8 Type of ration card possessed

The government of India adopted a targeted public distribution system in1997, which divided the people as APL and BPL. And based on this, Indians are given ration card according to their poverty status. This analysis is based on the year 2011-12. So, at that time, there were three categories of ration card holders -AAY, BPL and APL.

Figure 5.1 shows the distribution of expenditure class based on ration card possessed. It is noted from the figure that more than 15% of all classes of people do not possess a ration card. Nearly seven per cent of the poor households own AAY card, and 38.6% of the poor sample households own BPL card. Most of the rich and middle-class people own APL card. But the quite interesting fact is that more than 38% of the poor households also own the APL cards. That means they are out of the targeted group.




Source: 68th Round NSSO Data

*Figure 5.1*: Type of ration card possessed

By examining the figure 5.1, we can conclude that majority, which includes more than 50% of the poor households were out of the targeted group, and they couldn't enjoy the benefits of fair price shops. It can be seen that more than 30 per cent of poor households possess a ration card with APL status. This may be due to the exclusion error. But some households from richer sections also possess AAY ration cards, and this can be due to the inclusion errors.

From the above discussion of the socio-economic status of the sample households, we can summarise that the households from the lowest expenditure class in the sample are economically as well as socially vulnerable. So, they can be treated as poor.

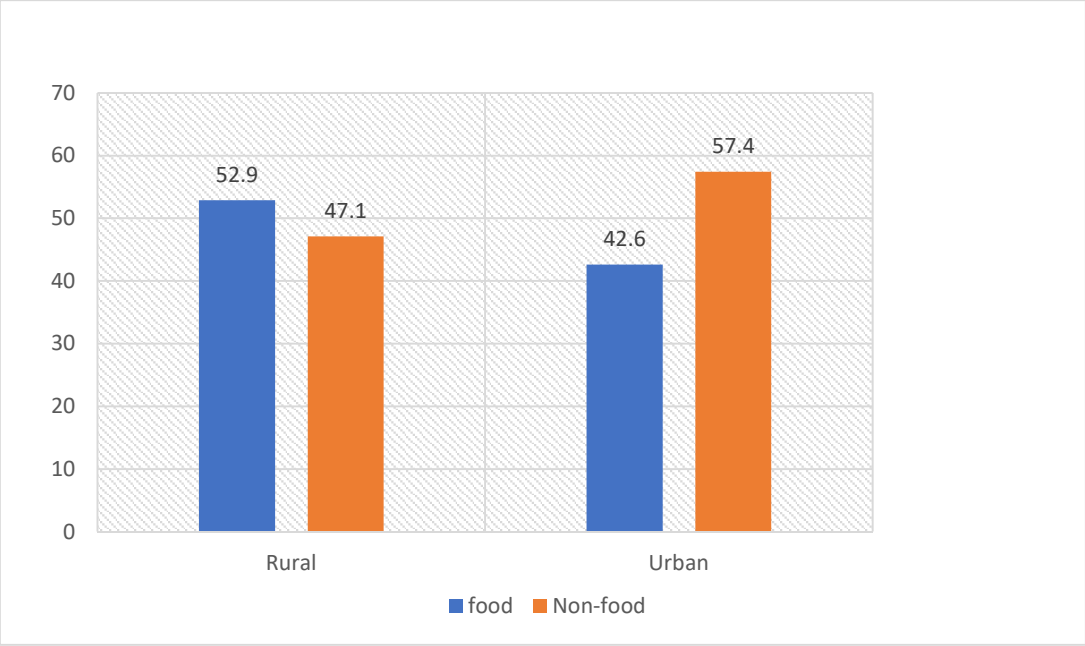
## 5.4 Budget Share of the households in India

After analysing the socio-economic characteristics of the sample households, it is essential to examine the budget share of the people in India, both for urban and rural. By examining the budget share of the people, we can understand how the total expenditure devoted to each category, that is food and non-food, and the price fluctuation of which item is more affected. In this section initially, the shares of food

and non-food have been examined. Then item wise share has been taken into consideration. This part has made a comparison of sector-wise and class-wise budget shares.

### 5.4.1 Sector-wise share of total expenditure

In NSSO data, the actual figures of money income are not given. So, for the entire analysis, total expenditure can be regarded as a proxy for money income. Here the share of total expenditure between two broad categories- food and non-food- have been examined for urban and rural areas.




Source: Source: 68th Round NSSO Data

*Figure 5.2*: Sector-wise share of expenditure on food and non-food

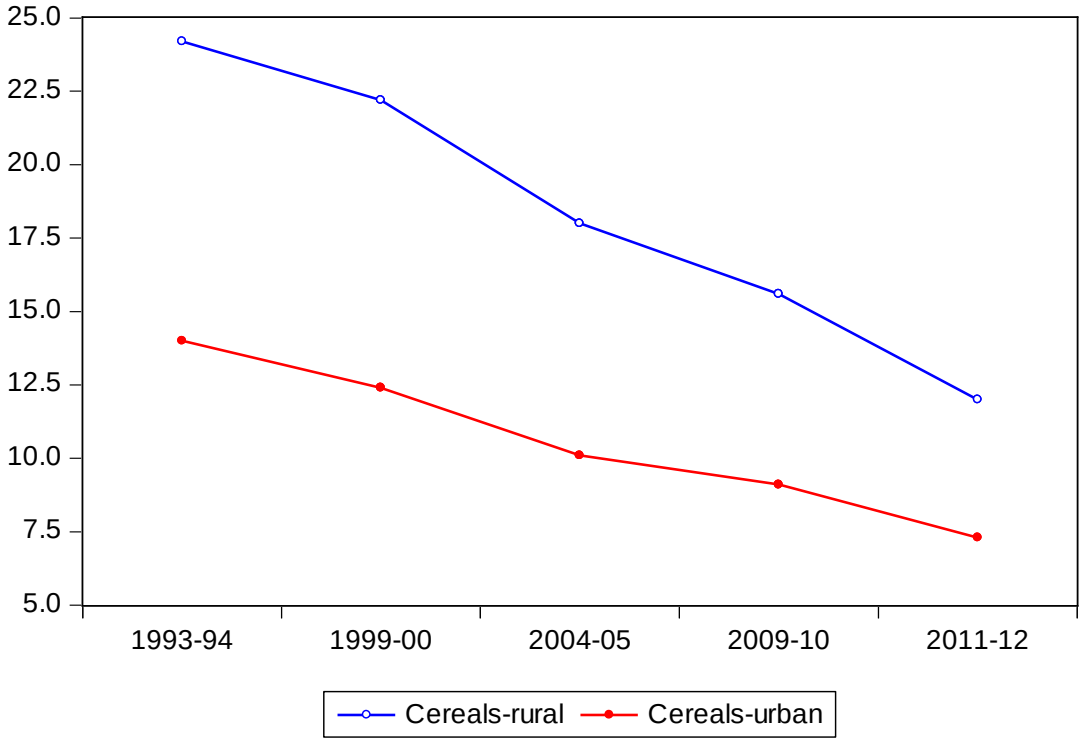
Figure 5.2 shows that in rural India, the share of food to total expenditure is greater than the share of non-food to total expenditure. But the case is different in the urban area, where the share of food to total expenditure is less than the share of non-food to total expenditure.

### 5.4.2 Consumption pattern of food items

After examining the proportion of food to non-food expenditure, it is essential to move towards the item-wise consumption pattern of food expenditure. Food items in India are categorized such as cereals, cereal substitutes, gram, pulses and its products, milk and its products, edible oil, fish, egg, & meat, fresh & dry fruit, sugar & salt, vegetables, spices and beverages. This part is based on the various NSSO reports.

- **Cereals and Products**

Cereals and products are important food items in India. It is considered as a vital source of energy. It includes Rice, wheat, jowar, bajra, maize, barly, small millets, ragi and their diversified products. The cereal products contain chira, khoi, lawa, muri, atta, maida, suji, rava, sewai, noodles, bread etc. The notable point is that household cereal consumption does not include consumption of cereals by livestock belonging to the household.



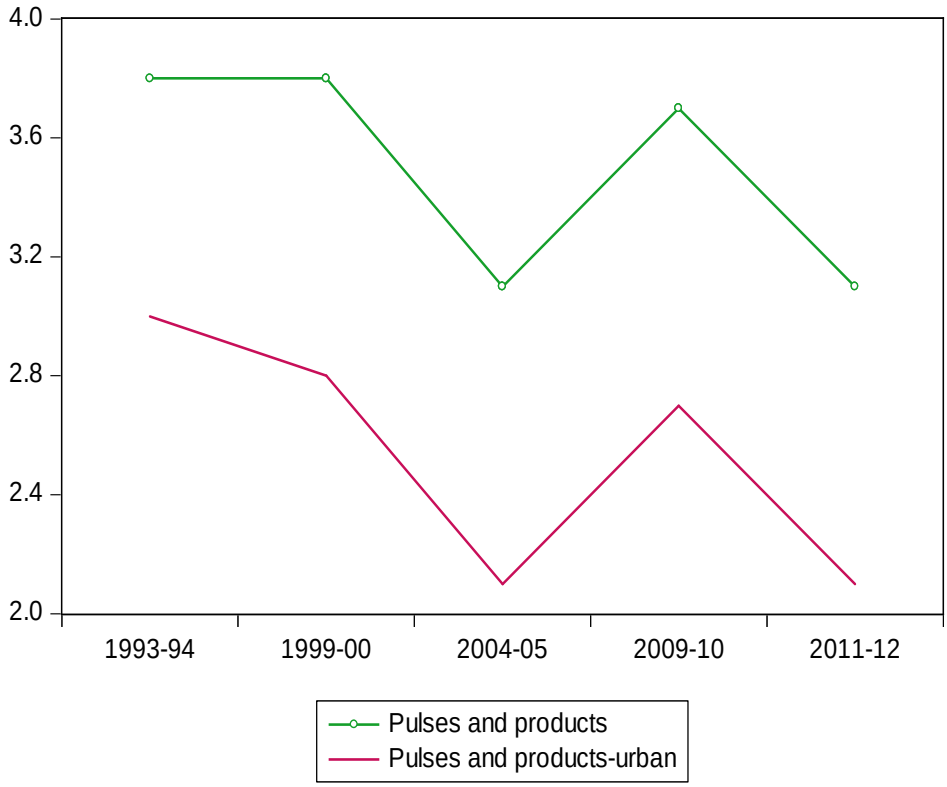

Source: different NSSO Rounds

*Figure 5.3*: Pattern of Cereals Consumption Expenditure to total expenditure

Figure 5.3 explains the trend in the share of consumption expenditure on cereals to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round. This figure displays that cereal consumption is showing a falling trend over the years both in the rural area and in the urban area. Over the 18-year period ending 2011-12, cereals have registered the largest decline in share among all the item groups – from 24% to 12% in rural India. The share of cereals to consumption expenditure has marked a big decline from 14% to 7% in the urban area. We can describe this phenomenon with the help of Bennet's Law, that is, as income increases, there is a shift in the consumption of cereal food items to non-cereal food items.

- **Pulses and Products**

Pulses are the key source of protein in the Indian diet, especially among low-income people. The major pulse products include Arhar, tur, urad, moong, masur, peas, khesari etc. Their diversified products are also part of consumption expenditure under the head.



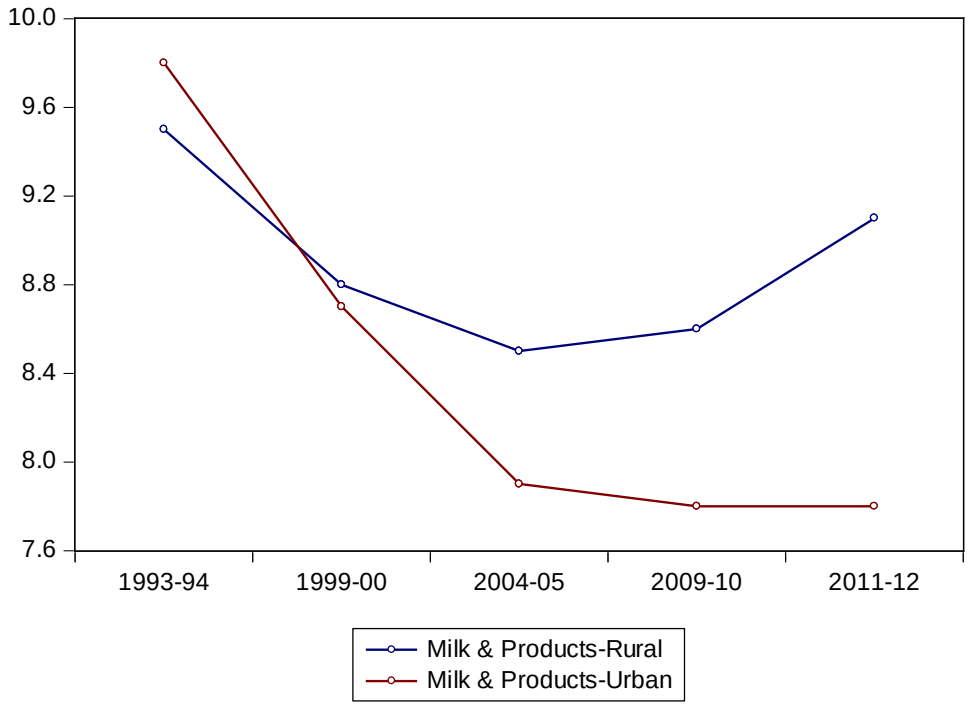

Source: different NSSO Rounds

*Figure 5.4*: The pattern of Cereals Consumption Expenditure to total expenditure

Figure 5.4 explains the trend in the share of consumption expenditure on pulses to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round. From figure 5.4, we can understand that the share in consumption expenditure of pulses is showing a falling trend both in the rural area and in the urban area except in 2009-10(66th Round). The share of pulses and products has marked a decline from 3.8% to 3.1%. This falling share of consumption expenditure may be due to the fundamental shift from traditional sources of protein to relatively high valued protein commodities along with an increase in income of the households.

- **Milk and Milk products**

Another important category of the food item is milk and milk products. Milk and milk products are considered as another important source of energy and protein. Baby food, milk powder, ghee, curd, butter, ice-cream, etc. are part of milk products.



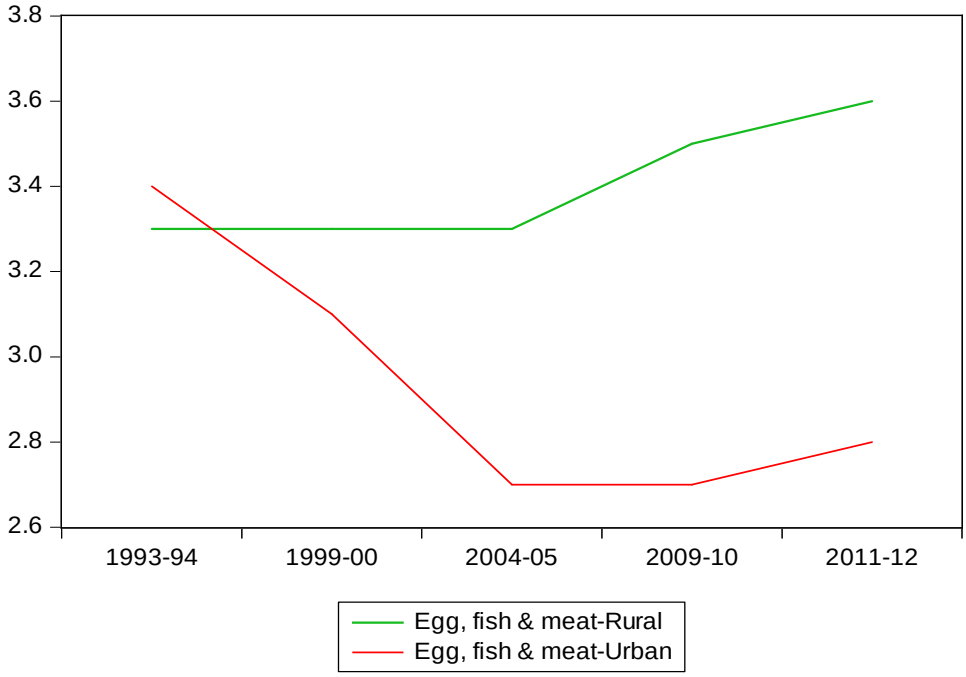

Source: different NSSO Rounds

*Figure 5.5*: Pattern of Consumption Expenditure of milk to total expenditure

Figure 5.5 elucidates the trend in the share of consumption expenditure on milk and milk products to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round. The figure shows that the share of milk consumption expenditure is showing a falling trend over the years in the urban area, though there is an increase in the absolute amount. But for the rural area, the consumption was initially falling, but then it began to increase from 2004-05 onwards. That means the rural people began to consume more milk and milk products than the previous years. An increase in income may be one of the reasons for this increase in the share of consumption expenditure on high valued milk and milk products.

- **Egg, Fish and Meat**

Another category of food item is broadly classified as egg, fish and meat. It includes all categories of meat such as mutton, beef, pork and chicken, and fish which includes all inland and marine fish products. In short, all types of non-vegetarian items are included in the category. It may be broadly classified as a category of non-vegetarian's food items. These items are rich sources of proteins, vitamins, minerals, fats and micronutrients.



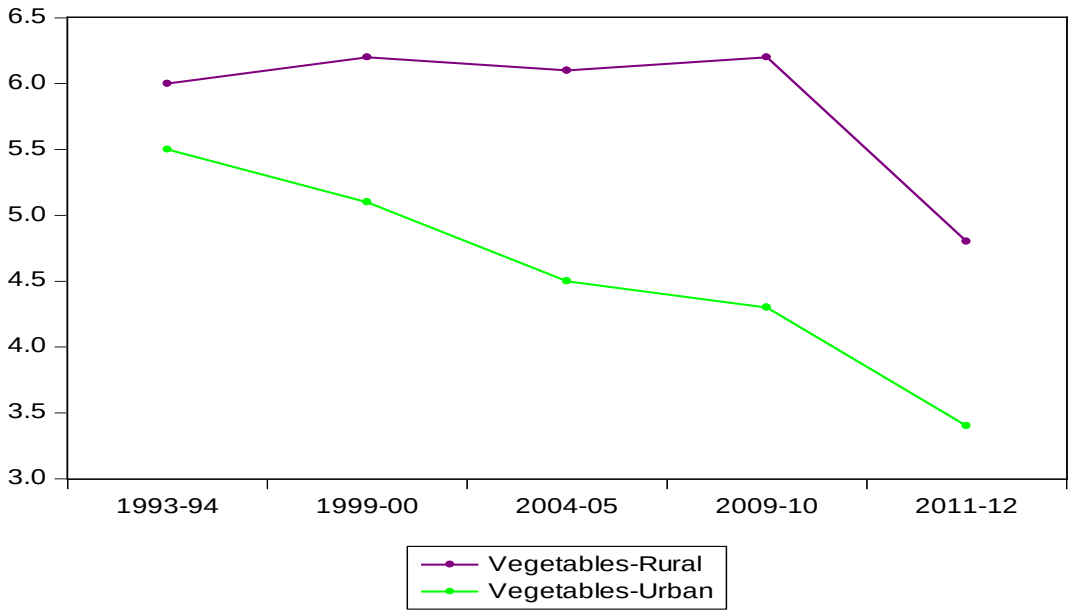

Source: different NSSO Rounds

*Figure 5.6*: Pattern of Consumption Expenditure of Egg, fish and meat to total expenditure

Figure 5.6 explains the trend in the share of consumption expenditure on the egg, fish and meat to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round. The absolute expenditure on these items has increased both in urban and in rural areas. But when the share of expenditure of these products to total consumption expenditure is analysed, the outcome is considerably different. The share is showing a constant trend up to 2004-05 in a rural area, and then it began to increase. It is falling in the urban area and increases slightly after that. The increase in the share of consumption expenditure of these products may be due to an increase in the income of the consumers.

- Vegetables

The next important food item includes vegetables. Since Indian culture is based on vegetarianism, vegetables hold a prominent position in the dietary pattern of Indians. Potato, onion, tomato, brinjal, radish, carrot, lady's finger, green chillies, cauliflower, cabbage, pumpkin, peas, beans, etc. are some of the commonly used vegetables. The following figure explains the shares of these items to total expenditure over the years. The analysis also depends on the various Rounds of NSSO data.



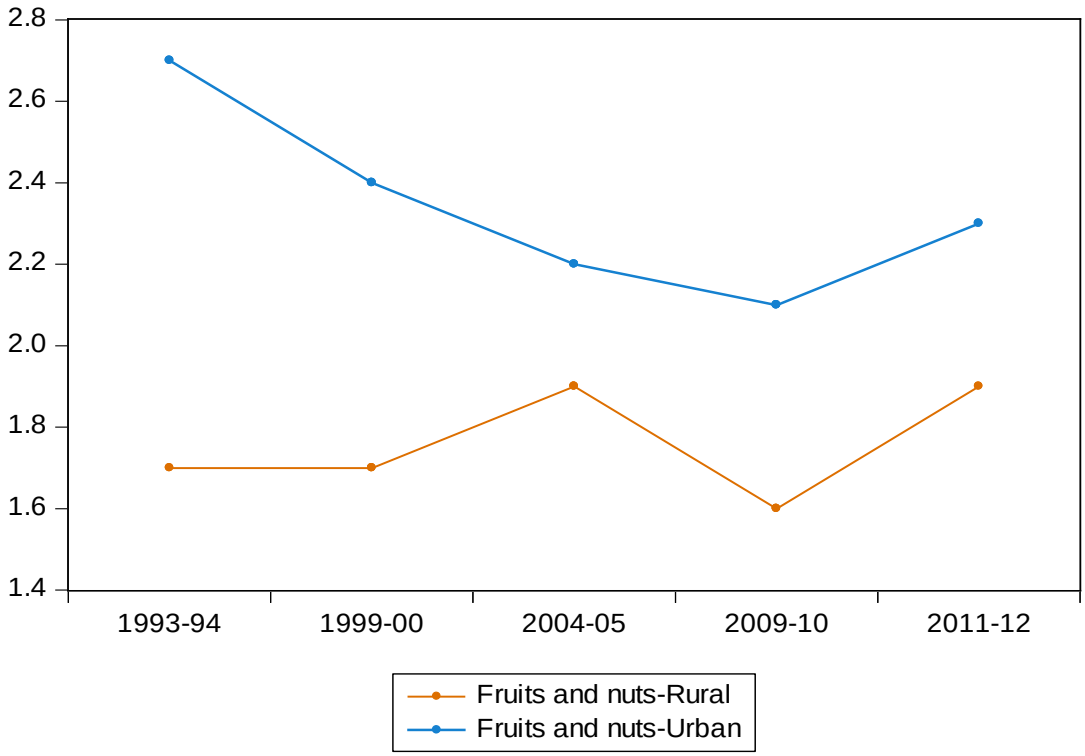

Source: different NSSO Rounds

*Figure 5.7*: Pattern of vegetable Consumption Expenditure to total expenditure

Although the absolute expenditure on vegetables is increasing both in the rural and urban area, the share of these items to total expenditure is falling in the urban area, and share in rural India is almost constant up to 66th Round, then showing a falling trend.

- Fruits and nuts

The fruits are the next category of the food item. Banana, jackfruits, watermelon, pineapple, grapes, orange, apple, green coconut, singara, papaya, berries, leechi, mango, pears, kharbooza, guava etc. are the items studied under this head. Along with fresh fruits, dry fruits are also taken into account. Coconut (*copra*), groundnut, walnut, dates, cashewnut, raisin, kishmish andmonacca are the items considered under dry fruits.



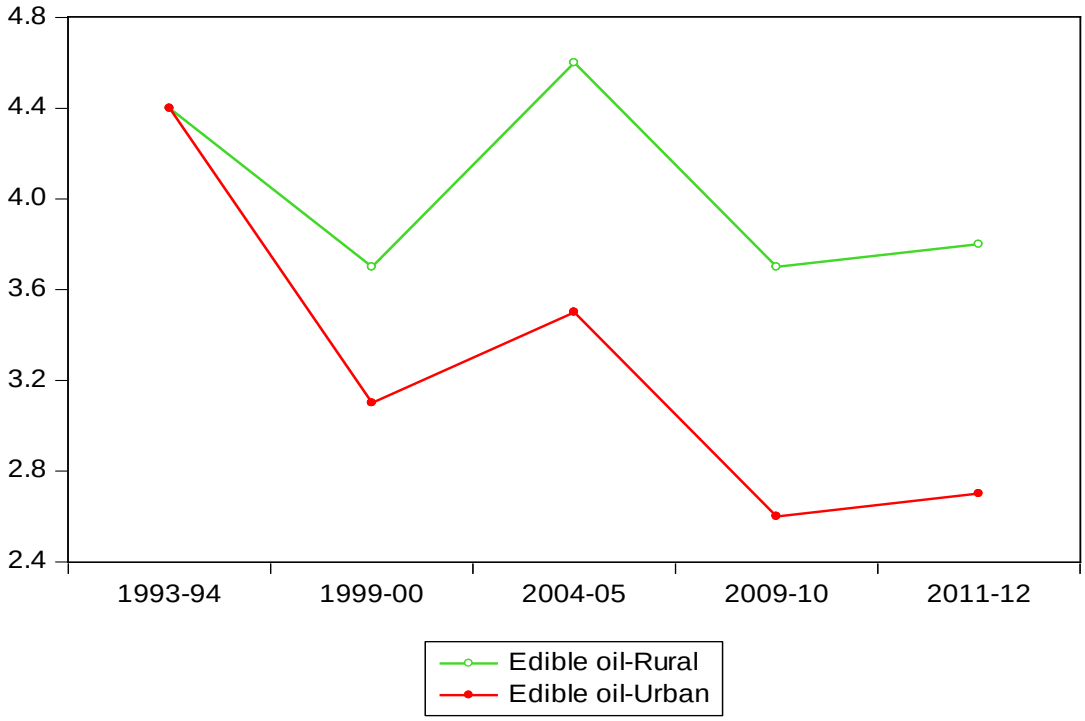

Source: different NSSO Rounds

*Figure 5.8*: Pattern of Consumption Expenditure of fruits and nuts to total expenditure

The figure 5.8 explains the trend in the share of consumption expenditure on fruits and nuts to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round. The absolute expenditure on these items has increased both in urban and in a rural area over the years. It is exciting to note that unlike the items discussed so far, the share of consumption expenditure is more in an urban area than in the rural area. The share is falling up to 2009-10 and then began to increase in 2011-12 for urban India. But in the rural area, the share is first increasing, then falling and again increasing.

- **Edible oil**

The edible oils are another category of food item included in the diet of Indian household. Vanaspati, margarine, coconut oil, mustard oil, refined oil, groundnut oil, etc., are the different types of edible oil used by Indian consumers. The figure explains the shares of these items to total expenditure over the years. The analysis also depends on the various Rounds of NSSO data.



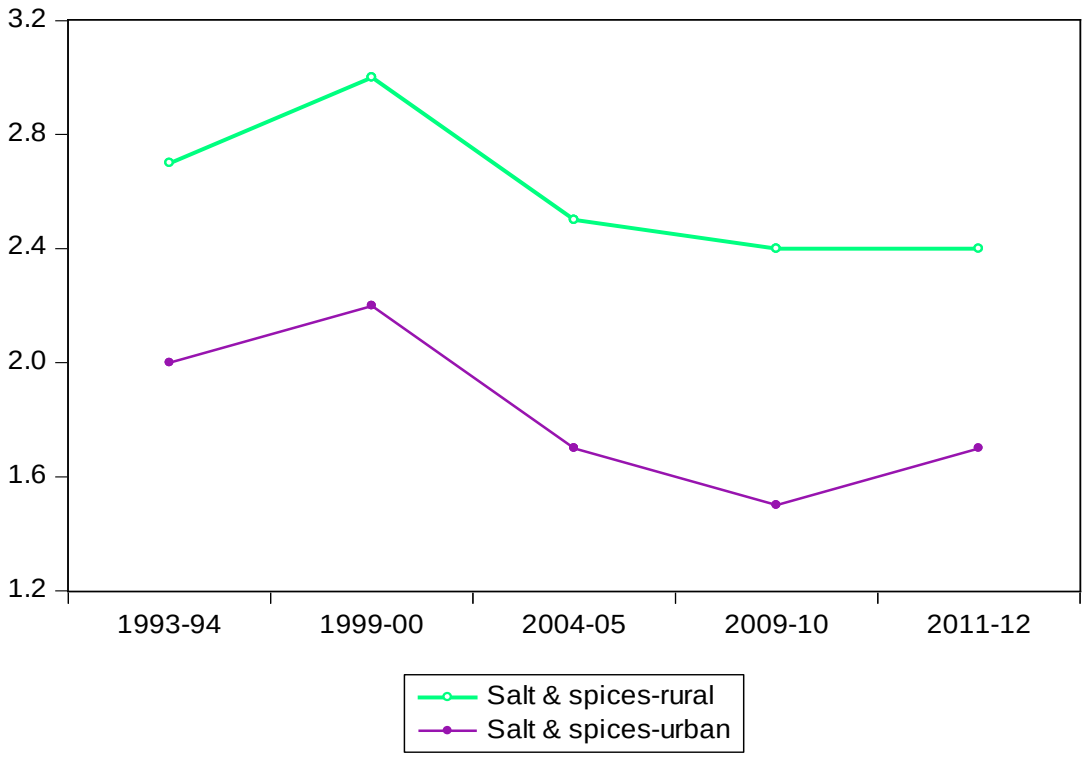

Source: Different NSSO Rounds

*Figure 5.9*: Pattern of Consumption Expenditure of edible oil to total expenditure

Like many of the food items, the share of edible oil is higher in the rural area than in urban area. The share of edible oil both in urban and in the rural area shows a similar pattern. It is first falling then increasing, again falling and increasing,

- **Salt and spices**

Ginger, jeera, garlic, turmeric, black pepper, dry chillies, tamarind, dhania, curry powder, oilseeds and other spices are the items under the spices. And salt is one of the important items in the diet of the households.




Source: different NSSO Rounds

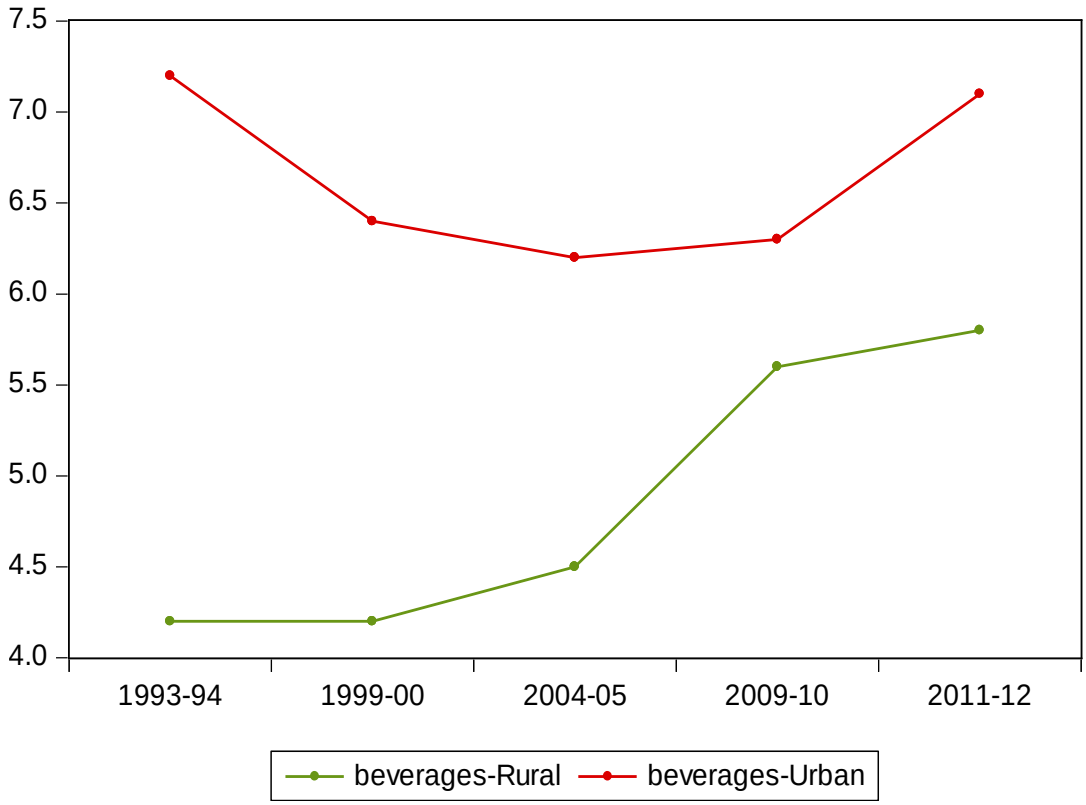
*Figure 5.10*: Pattern of Consumption Expenditure of salt and spices to total expenditure

The figure 5.10 displays the trend in the share of consumption expenditure on salt and spices to total consumption expenditure in various NSSO Rounds from 50$^{th}$ Round onwards to 68$^{th}$ Round. The absolute expenditure on these items has increased both in urban and in a rural area over the years. Here also, the share is higher in a rural area compared to the urban area. The expenditure share in both sectors moves

together. First, it is increasing then falls up to 66th Round, and after that, it is increasing.

- **Beverages**

This stands for "beverages and refreshments". It includes coffee, tea, soft drinks, mineral water, fruit juice (not prepared at home), soda water and other beverages. Snacks prepared at home are not included here. Figure 5.11 explains the trend in the share of consumption expenditure on beverages to total consumption expenditure in various NSSO Rounds from 50th Round onwards to 68th Round.




Source: different NSSO Rounds

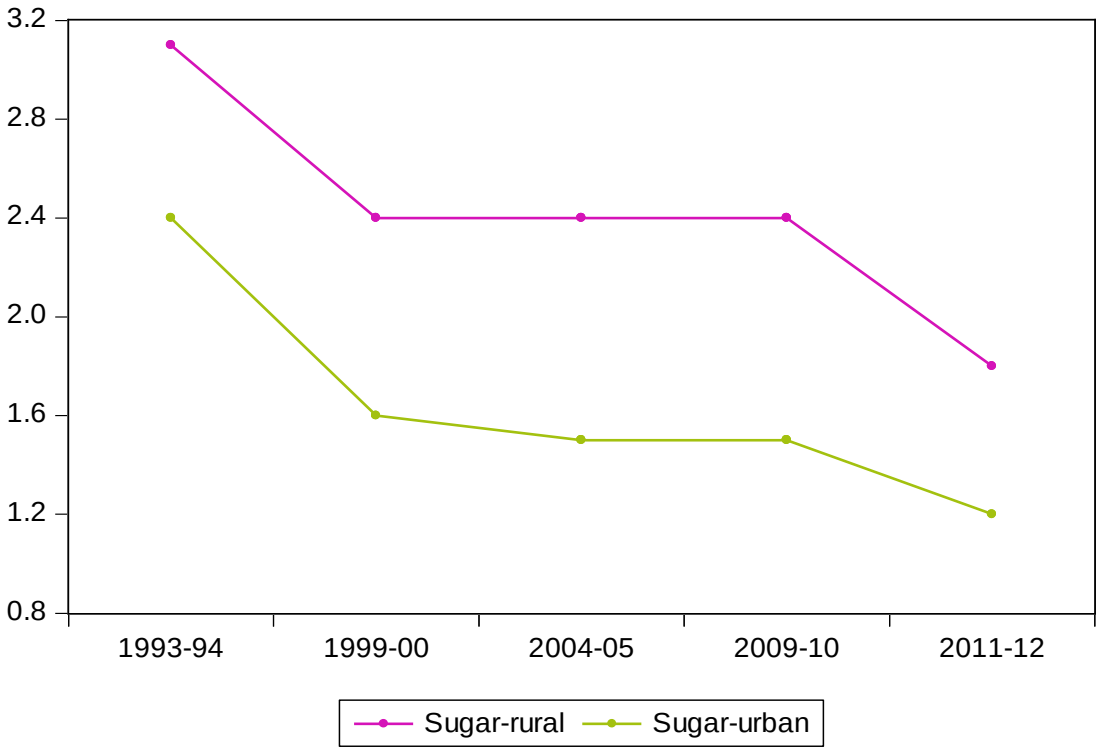
*Figure 5.11*: Pattern of Consumption Expenditure of beverages to total expenditure

The absolute expenditure on beverages increased over time. The share of beverages both in the urban and rural area has been increasing. It is the only item for which the share is increasing over time for both sectors. It is increased from 4.2 percentage to 5.8 percentage in rural India. Another notable thing is that like fruits

and nuts, the urban share of beverages lies above the rural share. Increase in income, shift towards processed items etc. may be the reasons behind this increase in the share of beverages.

- **Sugar**

India occupies the second rank in the production of sugar in the world. It is considered as an essential item of mass consumption. Figure 5.12 explains the trend in the share of consumption expenditure on sugar to total consumption expenditure in various NSSO Rounds from 50$^{th}$ Round onwards to 68$^{th}$ Round. The absolute expenditure on these items has increased both in urban and in a rural area over the years.




Source: different NSSO Rounds

*Figure 5.12*: Pattern of Sugar Consumption Expenditure to total expenditure

The share of sugar has been declined from 3.8% to 1.2 % in the rural area and 2.4 to 1.2 in the urban area. But for both sectors, the absolute expenditure on sugar has increased.

The pattern of the share of item wise consumption expenditure reveals that the share of majority food items is declining except for commodities like beverages. The most important reason for this deterioration is an increase in income over the years. The per capita income of the Indians shows an increasing trend. As per Engel's law, as income increases, the share of consumption expenditure on food items has been declining. And there we can see a shift from conventional food consumption to more diversified food products. That is, the share of food expenditure has been shifted from cereals to non- cereals.

### 5.4.3 Item wise share of expenditure to total food expenditure for rural area

In this part, the item-wise average expenditure of rural India has been examined. Here it can be seen that the cereal and products contributed more to the share of consumption expenditure of the rural people. They spend Rs. 757 on an average on food items. It accounts for 52.87% of the total expenditure.

Table 5.11

*Item wise share of food expenditure for rural area*

| Items | Rural | Percentage |
|---|---|---|
| Cereals and their substitute | 154 | 20.3 |
| Pulses & their Products | 42 | 5.5 |
| Milk and Milk products | 115 | 15.2 |
| Edible oil | 53 | 7.0 |
| Egg, fish & meat | 68 | 9.0 |
| Vegetables | 95 | 12.5 |
| Fruits | 41 | 5.4 |
| Sugar, Salt & Spices | 76 | 10.0 |
| Beverages | 113 | 14.9 |
| Total | 757 | 100 |

Source: NSSO 68th Round

It accounts for more than 20% of the total expenditure on food. Milk and milk products hold the second position in the consumption expenditure with a share of 15 per cent to the total food consumption expenditure. It is followed by vegetables and

beverages, both accounts 12.5 and 14.9 percentage respectively. Sugar, salt and spices together contribute ten per cent to the total consumption expenditure on food. The least contributors are pulses and fruits.

### 5.4.4 Item wise share of food expenditure for Urban area

In this part, the item-wise average expenditure of urban India has been examined. Here it can be seen that the cereal and products contributed more to the share of consumption expenditure of the people in the urban area. They spend on an average Rs. 1121 on food items. It accounts for 42.6 percentage to the total expenditure.

Table 5.12

*Item wise share of food expenditure for Urban area*

| Items | Urban | Percentage |
|---|---|---|
| Cereals and their substitute | 175 | 15.6 |
| Pulses & their Products | 54 | 4.8 |
| Milk and Milk products | 184 | 16.4 |
| Edible oil | 70 | 6.2 |
| Egg, fish & meat | 96 | 8.6 |
| Vegetables | 122 | 10.9 |
| Fruits | 90 | 8 |
| Sugar, Salt & Spices | 94 | 8.4 |
| Beverages | 236 | 21.1 |
| Total | 1121 | 100 |

Source: NSSO 68th Round

Unlike the rural sector, beverages contribute more to total food expenditure. It accounts for more than 21% of the total expenditure on food, followed by milk and milk products which contribute 16.4 percentage. Cereals and products hold the third position in the consumption expenditure with a share of 15.6 percentage to the total food consumption expenditure. It is followed by vegetables and egg, fish and meat, both accounts 10.9 and 8.6 percentage respectively. Sugar, salt and spices together

contribute 8.4 percentage to the total consumption expenditure on food. The least contributors are pulses.

## 5.5 Budget share of the poor in India

The study mainly focused on the impact of food price fluctuation on the poor people in the urban area. For that, it is important to know the budget share of the poor people in India. This enables us to understand for which food item the poor spend more. The class-wise expenditure on food and non-food items, share of food expenditure to non-food expenditure and share of item wise expenditure to total food expenditure etc. are analysed in this section.

### 5.5.1 Class wise monthly Per capita expenditure on food and non-food

For the study, the total sample is divided into three on the basis of expenditure class. The first class lies below a monthly expenditure below Rs. 1197, and the particular expenditure class is termed as poor. The middle-income group lies in between an expenditure class of Rs. 1197 and Rs. 2020. The expenditure class above Rs.2020 is considered as the richer class.

Here the average monthly Per capita expenditure on food and non-food items of different expenditure class has been examined.

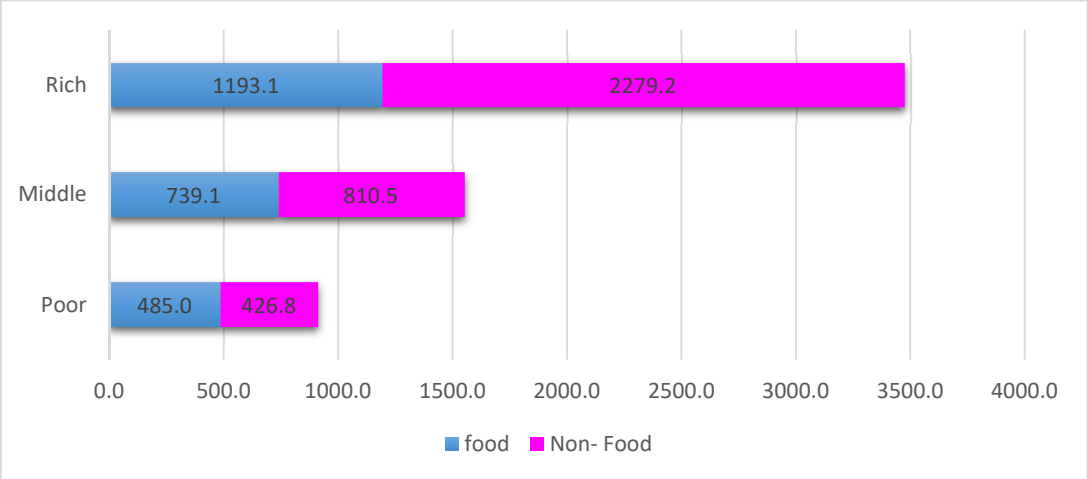



*Figure 5.13*: Class wise Average Monthly Per Capita Expenditure

Figure 5.13 explains the average monthly per capita expenditure on food and non-food items. The per capita expenditure on a non-food item is higher for rich and middle-class people, and they spend a comparatively lesser amount on food items. But when the poor people are considered, spending on food items are higher compared to the non-food items. Another notable thing is that the absolute values for both food and non-food are increasing as we move from poor to rich, whereas the share of food items is falling.

### 5.5.2 Sector Wise Average Monthly Per Capita Expenditure

In this section, the sector-wise average monthly per capita expenditure on food and non- food is examined. Table 5.13 explains the sector-wise expenditure in detail. It is quite exciting to note that the average monthly expenditure on both food and non-food is higher for the rich people, whereas a small amount is spent by the poorer sections. For all classes of people, the expenditure on food and non-food is higher in an urban area compared to its rural counterpart. This may happen because of the cost of living in the urban area is more than that of the rural area.

Table 5.13

*Sector-wise Average Monthly Per Capita Expenditure*

| Sector | Expenditure class | Average Monthly Per Capita Expenditure | |
|---|---|---|---|
| | | Food | Non-food |
| Rural | Poor | 497.0 | 417.5 |
| | Middle | 735.1 | 785.4 |
| | Rich | 1116.7 | 1981.0 |
| Urban | Poor | 501.3 | 451.8 |
| | Middle | 746.5 | 856.8 |
| | Rich | 1244.9 | 2481.9 |

Source: NSSO 68th Round

### 5.5.3 Share of food and non-food expenditure

The class-wise per capita expenditure share of food and non-food is examined in this segment with the help of table 5.13. For poor people, both in an urban and rural

area, the share of food exceeds the share of non-food expenditure. Middle-class people spend more on non-food, that is 51.7 for rural and 53.4 in the urban area. Food contributes only 48.3 and 46.6 both in rural and in urban areas, respectively. The share of food expenditure for the richer class is 36% in the rural area and only 33.4% in the urban area. At the same time, the non-food share is much higher in urban and also in rural areas.

Table 5.14

*Share of food and non-food*

| Class | Sector | non-food | food |
|---|---|---|---|
| Poor | Rural | 46.6 | 53.4 |
| | Urban | 47.4 | 52.6 |
| Middle-Class | Rural | 51.7 | 48.3 |
| | Urban | 53.4 | 46.6 |
| Rich | Rural | 64.0 | 36.0 |
| | Urban | 66.6 | 33.4 |

Source: NSSO 68th Round

From the foregoing discussions, we can conclude that the average monthly per capita expenditure of the urban people is greater than its rural counterparts. That means the cost of living is much higher in urban areas. Another notable point is that the share of food expenditure is higher for poor people compared to the richer. Among the poor people, the urban poor spend more on food than the rural poor.

### 5.5.4 Item wise share of food expenditure of the poor

The study mainly focused on the food consumption of the poor people in India. In this section, the item-wise expenditure share of poor people is examined. For the purpose, the entire food items can be divided into different groups- cereal and products, cereal substitutes, pulses and products, milk and milk products, egg, fish and meat, vegetables and fruits, edible oil, salt and sugar, spices, beverages, packaged processed food, packaged served food etc. This investigation can be divided into three categories. In the first part, a comparison of item wise expenditure between different

classes has been made. The second portion gives a comparison of the urban and rural share of item wise food expenditure. Since the study aims to focus specifically on urban poor, a comparison has been made in between urban poor and urban rich.

Table 5.15

*Item wise expenditure of the Food items*

| Food items | Poor | Middle-class | Rich |
|---|---|---|---|
| Cereals | 30.07 | 24.03 | 17.47 |
| Cereal Sub | 0.10 | 0.15 | 0.14 |
| Pulses | 7.02 | 6.20 | 5.23 |
| Milk and Milk Products | 13.50 | 19.01 | 21.99 |
| Salt and Sugar | 4.07 | 3.83 | 3.17 |
| Edible Oil | 8.24 | 7.37 | 5.96 |
| Egg Fish and Meat | 7.87 | 9.42 | 9.77 |
| Vegetables | 11.00 | 9.71 | 8.58 |
| Fruits | 2.14 | 3.45 | 5.41 |
| Dryfruits | 0.54 | 0.90 | 1.57 |
| Spices | 4.65 | 4.32 | 3.68 |
| Beverages | 3.12 | 3.93 | 4.62 |
| Served Processed Food | 5.18 | 4.49 | 7.93 |
| Packaged Processed Food | 2.51 | 3.20 | 4.48 |

Source: Calculated from NSSO 68th Round

Table 5.15 shows the item-wise share of expenditure to total food expenditure of different classes of people. For all commodities, the absolute expenditure is more for rich and middle-class households compared to the poor. The poor people spend more on cereal products because cereals are the main source of energy of the poor people. It is followed by milk and milk products and vegetables. The middle-class people also spend more on cereals, but their share is less than poor people. The middle class spend 19% of their total food expenditure on milk and milk products, and it is followed by vegetables and egg, fish and meat. They spend more on packaged processed food items than poor people. They spend a lesser portion on salt and sugar compared to the poor class. The richer sections of the society spend more on milk and

milk products followed by cereals. The expenditure on egg, fish and meat is higher for the rich compared to the other groups. They spend more on beverages, packaged food items and fruits and dry fruits.

By analysing the expenditure share of food items based on different classes of people, it can be noticed that the share of essential food items like cereals, pulses, vegetables, salt and sugar etc. is falling along with an increase in income. But the share of consumption expenditure for the protein-rich high-priced varieties of commodities like egg, fish, meat, milk and milk products and also for the processed food items, is increasing with an increase in income.

In table 5.16, the item-wise share of food expenditure of poor people in the rural and urban area has been analysed. Both the urban and rural poor spend more than 50% of their total expenditure on food items. In this part, the item-wise share is considered.

Table 5.16

*Item wise expenditure of the poor*

| Food items | Rural (%) | Urban (%) |
|---|---|---|
| Pulses | 7.0 | 7.1 |
| Cereal sub | 0.1 | 0.1 |
| Cereals | 30.4 | 29.3 |
| Milk and milk products | 13.4 | 13.8 |
| Salt and sugar | 4.1 | 4.1 |
| Edible oil | 8.2 | 8.5 |
| Egg fish and meat | 7.9 | 7.8 |
| Vegetables | 11.0 | 11.0 |
| Fruits | 2.1 | 2.2 |
| Dry fruits | 0.5 | 0.6 |
| Spices | 4.6 | 4.9 |
| Beverages | 3.0 | 3.5 |
| Served processed food | 5.4 | 4.6 |
| Packaged processed food | 2.5 | 2.6 |

Source: Calculated from NSSO 68th Round

Here the cereals and products occupy a prominent percentage in the total food expenditure of the poor people both in the urban area and in the rural area. It is 30.4% in the rural area and 29.3% in the urban area. Pulses and vegetables have almost equal share both in rural and in the urban area. There is a slight difference in the share of egg, fish and meat, fruits and dry fruits, packaged food products etc. Milk and milk products also marked the small difference in the share that is more in the urban area. Not much disparity can be seen in the share of consumption expenditure for rural and urban poor. That means the people with the same income have almost similar consumption basket irrespective of the sectoral differences.

In the previous section, the share of food items of poor in different sectors is examined. Here, in this part, the consumption basket for both rich and poor in the urban area has been analysed. Table 5.17 shows the share of item wise expenditure of the urban poor and urban rich has been examined.

Table 5.17

*Item wise expenditure of the Urban poor and Rich*

| Food items | Urban Poor | Urban Rich |
|---|---|---|
| Cereals | 29.3 | 16.99 |
| Cereal Sub | 0.1 | 0.12 |
| Pulses | 7.1 | 5.12 |
| Milk and Milk Products | 13.8 | 21.33 |
| Salt and Sugar | 4.1 | 2.89 |
| Edible Oil | 8.5 | 5.98 |
| Egg Fish and Meat | 7.8 | 9.32 |
| Vegetables | 11.0 | 8.68 |
| Fruits | 2.2 | 5.63 |
| Dry Fruits | 0.6 | 1.70 |
| Spices | 4.9 | 3.55 |
| Beverages | 3.5 | 4.90 |
| Served Processed Food | 4.6 | 9.08 |
| Packaged Processed Food | 2.6 | 4.71 |

Source: Calculated from NSSO 68th Round

Poor in the urban area spend one-third of their total food expenditure on cereal products whereas the rich people spend only 17% on cereals. The poor and rich spend 7.1% and 5.12 respectively on pulses. For milk and dairy products, a share of 13.8% by poor and 21.33% by the rich. The rich spend less on salt and sugar, spices and also on vegetables. The share of beverages served and packaged processed food, fruits and egg, fish and meat are lesser for the poor people in an urban area compared to the rich.

From this, we can conclude that the poor in the urban area spend more on essential food items like cereals, pulses, vegetables etc. but at the same time, the rich spend more on milk and milk products, egg fish and meat, beverages, served processed food, packaged food and fruits. All these items are high priced commodities.

## 5.6 Conclusion

This chapter examined the socio-economic characteristics of the poor, budget share of the sample households and budget share of the poor people. From the study, it can be understood that the lowest expenditure class, here named as the poor class, is economically and socially vulnerable group. The share of food falls as income of the households increases over the years. The poor spend more on food items compared to non- food items. And they spend more on essential commodities.

# Chapter VI

# PRICE FLUCTUATIONS AND URBAN POOR

# CHAPTER VI

# PRICE FLUCTUATIONS AND URBAN POOR

## 6.1 Introduction

Food inflation is an important problem as far as a country like India is concerned. The trend and pattern of food inflation are discussed in Chapter IV. From that chapter, we can understand the trend of inflation of each commodity in detail and also examine the factors leading to food price inflation. There we can see that the prices of many of the food items have fluctuated drastically, and there is a long-run association among the factors determining food inflation. And in Chapter V, the budget share of the poor people, particularly the urban poor, has been examined. Going through that chapter, we get a very vivid picture of the expenditure pattern of the poor households and also the item-wise expenditure share of each food items. We know that food price inflation is a hidden tax for the poor. So, it is essential to examine the impact of food price fluctuations on the poor people in India, especially urban poor. This chapter gives a detailed explanation of the effect of food price fluctuation on the urban poor in India.

The first part of this chapter examines the modelling of the food demand system of the urban poor by using Quadratic Almost Ideal Demand System. QUAIDS model gives a more accurate view of consumer behaviour among different income groups. It is considered as a very useful model in examining the consumer food demand patterns in countries like India (Mittal, 2010). Then the estimation result is reviewed for both the first and second stage estimation. The elasticities of different food items (both compensated and uncompensated elasticities) are analysed in the following sections. After examining the food demand system of the urban poor, an attempt has been made to investigate the elasticities of rural food demand system. Then a comparison is given in the subsequent part to check which sector is affected

the most. In the last part, the food demand system of Kerala is analysed, since Kerala is unique among all other Indian states and the different from the nation as a whole.

## 6.2 The Model for Food demand system of urban Poor

This demand model depends on a two-stage budgeting outline, in which customers assign their income in two stages. In the first stage, consumers choose how to spend their income across different types of goods as well as services. Here in this model, it involves a selection between food and non-food items. In this stage, every buyer chooses, how to spend her income on food and non-food commodities. The estimated results can be converted into a single equation framework than a system of equation.

In the second stage, each consumer simultaneously chooses that in what way the total food expenditure has to be distributed among varieties of food items. For instance, the consumer decides how much of the total food expenditure on cereals, how much on pulses, how much on milk and dairy products and other food items and their interdependence. The two-stage approach raises a significant assumption of group-separability, that is, preferences among items of one group are independent of the other consumption groups. For example, demand for particular food articles cannot be influenced by the demand for certain non-food commodities.

The food items in this are divided into six food products groups - cereals and their products, pulses and their products, egg, meat and fish, milk and related products, fruits and vegetables and other food products. The cereals and products include rice and rice products, wheat or atta, rawa, whole purpose flour, suji, bread and other wheat products, jowar and its products, noodles, bajra and its products, millets, ragi and their products, maize, barley, other cereal substitutes. Pulses and pulse products include whole and Masur, split gram, arhar, moong, peas, tur, khesari, gram products, urd, other pulse products. Liquid milk, butter, ice cream, milk powder, condensed milk, ghee, baby food, and other dairy products are together considered in the group milk and related products. The fish and prawns, eggs, meat items like mutton, pork, beef, chicken and other non-vegetarian items like crab, birds, oyster, tortoise etc. are included in the fourth category- egg, fish and meat. Potato, cauliflower, beans, carrot,

radish, lady's finger, cabbage, onion, brinjal, green chillies, parwal/patal, barbate, kundru, tomato, pumpkin, peas, gourd, lemon palak/other leafy vegetables, and other vegetables are part of vegetables. The fruit like watermelon, jackfruit, pears, Banana, leechi, guava, berries, coconut, kharbooza, pineapple, orange, mango, mausambi, singara, papaya, grapes, apple, and other fresh fruits are included in the fruits group. The fifth category of food items fruits and vegetables have all these items. The other food items include edible oil, spices, salt and sugar, beverages, packaged processed food items and served processed food items.

The quadratic almost ideal demand system is based on the indirect utility function (Poi,2012);

$$\boldsymbol{lnV}\,(\boldsymbol{p},\boldsymbol{m}) = \left[\left\{\frac{\boldsymbol{lnm} - \ln \boldsymbol{a}(\boldsymbol{p})}{\boldsymbol{b}(\boldsymbol{P})}\right\}^{-\mathbf{1}} + \boldsymbol{\lambda}(\boldsymbol{P})\right]^{-\mathbf{1}}$$

Where,

$\ln a(p)$ is the transcendental logarithmic function

$$\begin{aligned}\ln a(p) = \boldsymbol{\alpha_0} &+ [\alpha_1 lnP_1 + \alpha_2 lnP_2 + \alpha_3 lnP_3 + \alpha_4 lnP_4 + \alpha_5 lnP_5 + \alpha_6 lnP_6] \\ &+ \frac{1}{2}[\gamma_{12} lnP_1 lnP_2 + \gamma_{13} lnP_1 lnP_3 + \gamma_{14} lnP_1 lnP_4 + \gamma_{15} lnP_1 lnP_5 \\ &+ \gamma_{16} lnP_1 lnP_6 + \gamma_{23} lnP_2 lnP_3 + \gamma_{24} lnP_2 lnP_4 + \gamma_{25} lnP_2 lnP_5 \\ &+ \gamma_{26} lnP_2 lnP_6 + \gamma_{34} lnP_3 lnP_4 + \gamma_{35} lnP_3 lnP_5 + \gamma_{36} lnP_3 lnP_6 \\ &+ \gamma_{45} lnP_4 lnP_5 + \gamma_{46} lnP_4 lnP_6 + \gamma_{56} lnP_5 lnP_6]\end{aligned}$$

Here,

$$P_1 = price\ of\ cereals$$

$$P_2 = price\ of\ pulses$$

$$P_3 = price\ of\ Milk\ and\ milk\ products$$

$$P_4 = price\ of\ Egg, Fish\ and\ Meat$$

$$P_5 = price\ of\ vegerables\ and\ fruits$$

$$P_6 = price\ of\ other\ food\ items$$

The evaluations are attained with data on unit value as a replacement for actual price data. The unit value can be calculated as dividing of the total expenditure on the particular commodity by the consumed quantities of the commodity. The unit value can be regarded as a *"subjective price"* and the maximum price adequate for a purchase a commodity. Furthermore, though the unit value can be act as a proxy of the price, it is not an actual price because commodities are not homogenous. Another notable point is that the unit value is subject to the quality of a product, that is, the wealthier consumers may consume a higher unit value since they have purchased higher quality commodities with a higher price for the same quantity.

And b(P) is the price aggregates; that is;

$$b(P) = \beta_1 \log P_1 + \beta_2 \log P_2 + \beta_3 \log P_3 + \beta_4 \log P_4 + \beta_5 \log P_5 + \beta_6 \log P_6$$

Where $\beta_1$ shows the proportionate change in the aggregate price as a result of a change in the Pi.

And the quadratic form is specified by $\lambda(P)$.

$$\lambda(P) = \lambda_1 lnP_1 + \lambda_2 lnP_2 + \lambda_3 lnP_3 + \lambda_4 lnP_4 + \lambda_5 lnP_5 + \lambda_6 lnP_6$$

After applying Roy's identity in the indirect utility function, we obtain expenditure share of each good. That is;

$$w_i = \alpha_i + \sum_{j=1}^{k} \gamma_{ij} lnP_j + \beta_i \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_i}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

The detailed explanation of each QUAIDS model is given in Chapter III.

In this study, six food items are specified. They are cereals, pulses products, fish, meat and egg, milk and related products, vegetables and fruits and other food articles. For cereals and cereal products, the equation becomes;

$$w_1 = \alpha_1 + \sum_{j=1}^{k} \gamma_{1j} lnP_j + \beta_1 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_1}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

For pulses and pulse products, it becomes;

$$w_2 = \alpha_2 + \sum_{j=1}^{k} \gamma_{2j} lnP_j + \beta_2 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_2}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

For Milk and milk products the estimated equation becomes;

$$w_3 = \alpha_3 + \sum_{j=1}^{k} \gamma_{3j} lnP_j + \beta_3 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_3}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

For the egg, fish and meat, it becomes;

$$w_4 = \alpha_4 + \sum_{j=1}^{k} \gamma_{4j} lnP_j + \beta_4 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_4}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

The equation for vegetables and fruits be;

$$w_5 = \alpha_5 + \sum_{j=1}^{k} \gamma_{5j} lnP_j + \beta_5 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_5}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

And for the other food items the equation becomes;

$$w_6 = \alpha_6 + \sum_{j=1}^{k} \gamma_{6j} lnP_j + \beta_6 \ln\left[\frac{m}{a(P)}\right] + \frac{\lambda_6}{b(P\ )}\left[ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

The details of coefficients, which are derived by using the QUAIDS model, are explained in the following sections. By using this model, the food demand system of urban and rural India and also the urban food demand system of Kerala have been examined.

### 6.3 Food demand System of the Urban Poor

In the previous chapters, the conditions and the budget shares of urban poor have been explained in detail. From the socio-economic conditions of the urban poor, we can see that their condition is very pathetic. The poor in the urban area is generally engaged in casual works, where there is a continuous danger of dismissal, removal

and lack of social security. Absence of formal employment restricts the income or means of support available to them. Casual employment is extremely unstable, poorly salaried and vulnerable to periodic fluctuations. And unlike rural poor, they do not possess agricultural land. Most of them are socially backward, along with their economic backwardness.

Moreover, they spend more than half of their total expenditure on food items. Therefore, it is essential to understand the food demand system of the urban poor in India. And in order to examine how the urban poor, respond to the price fluctuations, the QUAIDS model is used here.

The estimated model of Quadratic Almost Ideal Demand System in two-step budgeting frameworks for the urban poor households are displayed in Table 6.1. In the first stage of QUAIDS, each household chooses how much she spends on food articles and how much she spends on non-food commodities. And in the next step, each household decides in what manner total food expenditure is distributed the among different food items. In this study, the food groups are divided into six – cereals & cereal products, pulses & pulses products, milk and dairy products, vegetables and fruits, fish, meat and egg and other food items.

Table 6.1

*Estimated QUAIDS coefficients for Urban poor in India*

Stage 1: Estimated food Expenditure function of urban poor

| | Coef. | Std. Err. | z | P>\|z\| |
|---|---|---|---|---|
| Ln (price for food) | -0.12438 | 0.00297 | -41.85000 | 0.00000 |
| Ln (price for non food) | -0.05589 | 0.00185 | -30.22000 | 0.00000 |
| Ln (per capita total expenditure) | 0.20118 | 0.00448 | -44.87000 | 0.00000 |
| Ln (per capita total expenditure)$^2$ | 0.00520 | 0.00202 | 2.58000 | 0.01000 |
| Intercept | 0.90172 | 0.00735 | 122.68000 | 0.00000 |
| Adjusted R2 | 0.83520 | | | |
| Number of Observations | 9079 | | | |

Stage 2. Estimated parameter of the food demand system in India using QUAIDS

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| Alpha | | | | | | |
| alpha_1 | .3347119 | .0145602 | 22.99 | 0.000 | .3061745 | .3632493 |
| alpha_2 | .2134884 | .0052998 | 40.28 | 0.000 | .2031009 | .2238759 |
| alpha_3 | .176431 | .0119401 | 14.78 | 0.000 | .1530288 | .1998331 |
| alpha_4 | .1071227 | .0102753 | 10.43 | 0.000 | .0869836 | .1272619 |
| alpha_5 | .1185153 | .0091768 | 12.91 | 0.000 | .100529 | .1365015 |
| alpha_6 | .0497308 | .0107559 | 4.62 | 0.000 | .0286497 | .0708119 |
| Beta | | | | | | |
| beta_1 | .0156929 | .0011284 | 14.2 | 0.000 | -.0061183 | .0005042 |
| beta_2 | -.0403415 | .0042817 | -9.42 | 0.000 | -.0487334 | -.0319496 |
| beta_3 | -.0880659 | .0090411 | -9.74 | 0.000 | -.1057862 | -.0703457 |
| beta_4 | .023619 | .087376 | 2.71 | 0.037 | -.0147634 | .0194872 |
| beta_5 | .030473 | .0077574 | 3.92 | 0000 | -.0121569 | .0012514 |
| beta_6 | .1073053 | .0103275 | 10.39 | 0.000 | .0870638 | .1275468 |
| Gamma | | | | | | |
| gamma_1_1 | .0295777 | .0014171 | 20.87 | 0.000 | .0268003 | .0323552 |
| gamma_2_1 | -.0102818 | .0009243 | -11.12 | 0.000 | -.0120933 | -.0084703 |
| gamma_3_1 | .0042696 | .0018995 | 2.37 | 0.028 | -.0014533 | .0005992 |
| gamma_4_1 | -.0049701 | .0006994 | -7.11 | 0.000 | -.0063409 | -.0035993 |
| gamma_5_1 | -.0033587 | .0006386 | -5.26 | 0.000 | -.0046104 | -.0021071 |
| gamma_6_1 | -.0132367 | .0019847 | -6.67 | 0.000 | -.0171266 | -.0093467 |
| gamma_2_2 | .0332981 | .0008615 | 38.65 | 0.000 | .0316096 | .0349866 |
| gamma_3_2 | -.0089087 | .0009577 | -9.30 | 0.000 | -.0107857 | -.0070317 |
| gamma_4_2 | -.0052919 | .0006721 | -7.87 | 0.000 | -.0066092 | -.0039746 |
| gamma_5_2 | -.0051887 | .000601 | -8.63 | 0.000 | -.0063666 | -.0040108 |
| gamma_6_2 | -.003627 | .0012523 | -2.90 | 0.004 | -.0060815 | -.0011725 |
| gamma_3_3 | -.0068897 | .0029613 | -2.33 | 0.020 | -.0126938 | -.0010856 |
| gamma_4_3 | -.005859 | .0014551 | -4.02 | 0.007 | -.0034379 | .0022661 |
| gamma_5_3 | .0024727 | .0052977 | 2.01 | 0.050 | -.0000708 | .0050162 |
| gamma_6_3 | .0116419 | .0026014 | 4.48 | 0.000 | .0065433 | .0167406 |
| gamma_4_4 | .0161654 | .0006897 | 23.44 | 0.000 | .0148136 | .0175172 |
| gamma_5_4 | -.0009595 | .0004413 | -2.17 | 0.030 | -.0013245 | .0004055 |
| gamma_6_4 | -.004858 | .0016438 | -2.96 | 0.031 | -.0080798 | -.0016362 |
| gamma_5_5 | .0053401 | .0005535 | 9.65 | 0.000 | .0042553 | .0064249 |
| gamma_6_5 | .0031941 | .0014665 | 2.17 | 0.001 | -.0016803 | .0040684 |

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| gamma_6_6 | .0088857 | .0040254 | 2.21 | 0.027 | .000996 | .0167754 |
| lambda | | | | | | |
| lambda_1 | -.0101154 | .0022327 | -4.53 | 0.000 | -.0144913 | -.0057394 |
| lambda_2 | -.0024688 | .0009247 | -2.66 | 0.022 | -.0022812 | .0013436 |
| lambda_3 | .0351822 | .0023524 | 14.96 | 0.000 | .0305717 | .0397928 |
| lambda_4 | -.0041059 | .0018943 | -2.16 | 0.030 | -.0038186 | .0036068 |
| lambda_5 | -.0043568 | .0016897 | -2.57 | 0.032 | -.0046685 | .0019549 |
| lambda_6 | -.0231354 | .0026862 | -8.61 | 0.000 | -.0284003 | -.0178705 |

Source: Author's own calculation

*[ note: The value of alpha_0 ($\alpha_0$) in QUAIDS analysis is set such that the largest integer contained in the value obtained after computing natural logarithm of minimum among observed m (total expenditure (in food or in total)). That is, we choose alpha_0 ($\alpha_0$) such that the value is somewhat less than the lowest value of the natural logarithm of m in the observed data. Here, the minimum of ln(m) =5.126, then alpha_0 ($\alpha_0$) = 5]*

The results of the first stage present the coefficients of the estimated parameters of the function of total food expenditure. The descriptive variable quantity comprised in table 6.1 explains 83 per cent of the overall changes in the total food expenditure. Here we can see that all the coefficients are highly significant. According to the expectation of the model, there is a negative relationship between the coefficients of food and non-food prices of total food expenditure. The coefficient Per capita total expenditure is positive and also significant; which represents that there is a substantial change in total food expenditure when there is a change in the income of the consumers.

Stage 2 presents the estimated parameters of the quadratic demand system. The intercept coefficients $\boldsymbol{\alpha_i}$ are significant for all commodities. The coefficients $\beta_i$ are also significant. It means that the proportionate change in aggregate price as a result of a change in the price of a particular commodity has a substantial effect on the share of total food expenditure on that specific commodity. Coefficients gamma, which represents the combined effect of the price of the two commodities on the expenditure share of commodities, are also significant. The quadratic coefficients, which are denoted as lambda, are also significant. It implies that there is a non-linear relationship which exists among the total income and expenditure on food. Since all

the coefficients are significant, we can conclude that the model is suitable for explaining the food demand model of urban poor in India.

### 6.3.1 First stage budgeting estimation results

In the first budgeting framework, elasticities of two broad categories are estimated, that is, food and non-food. Approximations of poor urban household's demand for food articles from the first phase budgeting framework specify a vital heterogeneousness characteristic in the pattern of food demand system across the income groups of Indian urban consumers. The expenditure elasticity of the two product groups is displayed in table 6.2.

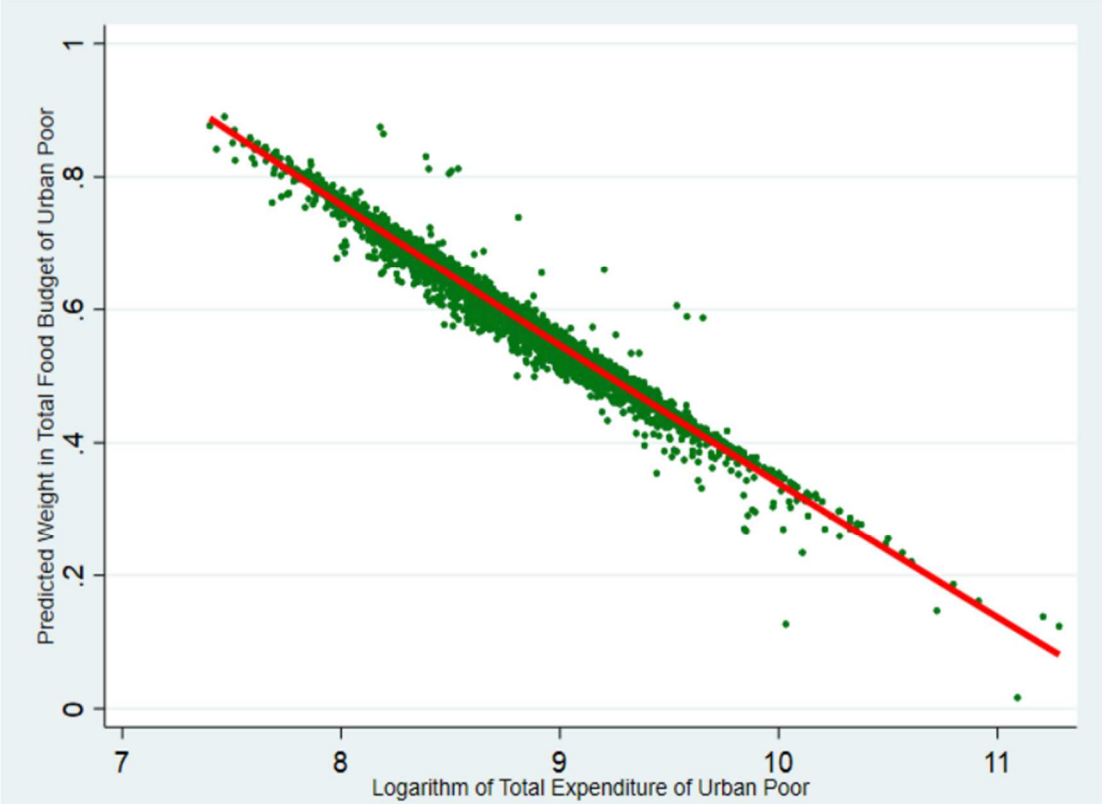
Table 6.2

*Expenditure elasticity (income) of commodities*

| Food demand elasticities: the first budgeting stage | |
|---|---|
| Income elasticity of total expenditure | |
| 0.649 | |
| Uncompensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.721 | -.491 |
| Compensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.604 | -0.398 |

Source: Author's own calculation

Table 6.2 shows the results of the first budgeting framework. The results of the estimates suggest that, when there is a one per cent increase in the per capita income of the consumer, the demand for food also increases by 0.65 per cent. In the same way, a one per cent rise in food prices reduces 0.72 per cent of total food expenditure, when the household is not compensated for the increase in price. But, if the household is compensated for the price hike, for maintaining its earlier level of welfare, the total food expenditure fell down by 0.604 per cent with a one per cent increase in food prices.




Source: Author's own calculation

*Figure 6.1*: Engel Curve for food

Figure 6.1 draws the weights of expenditure on food, as projected by the model, against the log values of different incomes (here total consumption expenditure is taken as the proxy for the income of the consumer). Here the Engel curve is downward sloping. As predicted by Engel's law, this graph also tells that, as income increases (here consumption expenditure is taken as the proxy for income), urban poor household consumer devote less on food, as the estimated weights on spending on food declines.

### 6.3.2 Second Stage budget estimation results

By using expenditure weights of a particular group of food articles and total expenditure on the food of a consumer, we can estimate the demand system for these food items. The estimates using econometric analysis of consumer demand for food, suggest that we can fundamentally categorize these analysed food categories into three, on the basis of the expenditure elasticities concerning total expenditure on food.

The first category can be termed as high-income elasticity products that is when there is an increase in income; the demand for the commodity also rises more than proportionate to the changes in income.

The second categories of food items fall under the unit income elastic products, an increase in revenue leads to a proportionate increase in quantity demanded of these commodities. That is the spending on such items (among all households) will increase at a constant rate as per the rise in total expenditure on food. In other words, as income increases, demand for the commodity also increases in the same proportion.

The third category of food articles can be labelled as Less-than-unity income elasticity products that are on an average the expenses on these food categories, for all households, will rise comparatively not as much as an increase in total expenditure on food.

The total expenditure is considered as a proxy for income since the actual data on income is not available. The estimated expenditure elasticity is given in table 6.3.

Table 6.3

*Expenditure elasticities of food categories*

| Food Variables | Expenditure Elasticity |
|---|---|
| Cereals and Products | 0.8616978 |
| Pulses and Products | 0.30802724 |
| Milk and Milk Products | 1.3584586 |
| Egg, Fish and Meat | 1.114046 |
| Vegetables and Fruits | 0.97748897 |
| Other Food Items | 1.0118724 |

Source: Author's own calculation

The expenditure elasticities, which is estimated in the model, is explained in Table 6.3 with respect to the mean values for all poor households in urban India. It does not consider changes in food expenditure across poor households. It is suggested that the cereals and pulses are necessary products whereas milk and dairy products and fish, meat and egg are superior commodities. That is, for cereals and pulses, as

income increases demand for the food items increases less than proportionately. Vegetables and fruits and other food items like beverages, spices, sugar, processed food items etc. are showing a unitary elasticity.

The patterns we got from the analysis are similar to Bennet's law, which shows that when income rises, consumption of food moves away from high carb-plant-dominated foods (for example cereals) towards more healthy and high-valued, high-protein foods consisting of milk, meat, vegetables and fruits, and meat. The estimates of price elasticity, both own and cross-price elasticity can be shown in the below tables.

Table 6.4

*Uncompensated Price Elasticities of food demand of urban poor*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.724115 | -0.034262 | 0.009612 | -0.004587 | 0.004381 | -0.012726 |
| Pulses and Products | 0.000708 | -0.320894 | 0.002804 | 0.001734 | 0.009807 | -0.002187 |
| Milk and Milk Products | -0.096622 | -0.062003 | -0.99396 | -0.051717 | -0.040393 | -0.113765 |
| Egg, Fish and Meat | -0.040349 | -0.042504 | -0.008007 | -0.881276 | -0.005319 | -0.036591 |
| Vegetables and Fruits | -0.018005 | -0.036628 | 0.016424 | -0.000334 | -0.957521 | 0.018575 |
| Other Food Items | -0.043845 | -0.044525 | -0.018024 | -0.018898 | 0.005171 | -0.891751 |

Source: Author's own calculation

Table 6.4 reports the uncompensated price elasticity of different food items consumed by the urban poor in India. It provides some understanding about the extent of responsiveness of demand for particular food items concerning its own prices and prices of other commodities. The own-price elasticity of each item is represented diagonally. It can be seen that one per cent increase in the price of cereals leads to 0.72 per cent decline in the demand for cereals. Likewise, a one per cent increase in the price of pulses leads to 0.32 per cent decline in the demand for pulses and products.

Similarly, the products like fish, meat and egg have an elasticity of 0.88 per cent. Milk and milk products (0.99 per cent) and vegetables (0.95 per cent) the price elasticity is almost one (unitary elastic). That is, a change in price leads to a proportionate change in the quantity demanded. And here we can say that most of the food items are less elastic.

From this, it can be argued that cereals and pulses are inelastic commodities for the urban poor and pulses are more inelastic compared to cereals. It is fascinating because, naturally, one will expect the elasticity of cereals may be less than pulses, but the result is reversed. This may be due to the fact that cereals may have some amount of substitutability due to the PDS distribution, whereas pulses are not having this type of substitutability. Another reason for the low-level elasticity of pulses may be due to the lower budget share of pulses among poor and higher budget share for cereals.

The uncompensated price elasticities are shown in table 6.4 also give some insights into the interdependence of different commodity groups. A one per cent increase in the price of cereals leads to 0.096 per cent decline in the demand for milk and milk products and 0.04 per cent decline in the demand for egg, fish and meat, and also for other commodities.

It can also be noticed that a change in cereal prices may not affect the demand for pulses and their products, since the cross-price elasticity is near to zero. The changes in the prices of pulses and pulse products affect almost all the commodities negatively. Changes in the price of milk and milk products may not affect the cereals, pulses and also egg, fish and meat. The effect of vegetable prices on cereals, pulses, egg, fish, meat and other food items is also negligible. The changes in the price of other food items affect almost all the commodities except pulses and pulse products. Finally, the cross-price uncompensated elasticities described in Table 6.4 show some degree of complementarity across different categories of food items. And some of them have appeared as substitutes. Especially, figures of uncompensated price elasticities show that cereal products are the substitutes for protein-based food items like milk and dairy products, pulses and also fish, meat and egg. That is when prices

of protein-based commodities increase while the total food expenditure remains constant, consumption is transferred to cereals and other related products.

Table 6.5

*Compensated price elasticity of food products of urban poor*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.637832 | 0.018605 | 0.179098 | 0.111019 | 0.12182 | 0.20729 |
| Pulses and Products | 0.067298 | -0.301996 | 0.06339 | 0.04306 | 0.051788 | 0.076461 |
| Milk and Milk Products | 0.197051 | 0.021342 | -0.726766 | 0.130536 | 0.144749 | 0.233088 |
| Egg, Fish and Meat | 0.178869 | 0.01971 | 0.191444 | -0.745231 | 0.032884 | 0.222323 |
| Vegetables and Fruits | 0.193309 | 0.023344 | 0.208685 | 0.00807 | -0.824301 | 0.268155 |
| Other Food Items | 0.174903 | 0.017556 | 0.181022 | 0.116856 | 0.143077 | -0.633391 |

Source: Author's own calculation

Table 6.5 shows the Hicksian compensated price elasticities of food items of urban poor in India. In the compensated (Hicksian) price elasticities, we get a somewhat different idea about the food demand patterns of the urban poor in India. Here the change in real income due to a change in the price is compensated so that the welfare of the consumer may remain constant, and only the substitution effect is considered in this compensated price elasticities. This compensation is done in order to achieve an initial level of welfare resulting from an upsurge in the price of the products.

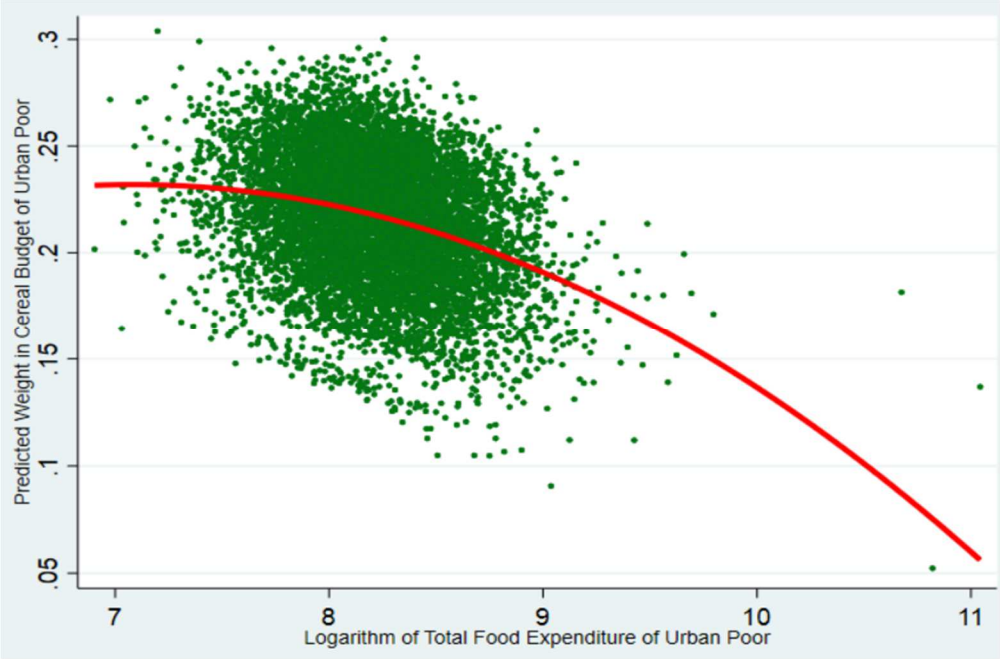
Here also the own-price elasticities are displayed diagonally. For almost all the food commodities, the own-price elasticities are less than one, that is they are inelastic in nature. In this part, we can see that most of the food categories appear as substitutes. Changes in the price of pulses do not affect the demand for all the other

categories. And some products are not at all involved due to a change in the price of other commodities. For example, when the price of vegetables is increasing or decreasing it does not affect the demand for egg, fish and meat. But changes in the price of egg, fish and meat have a positive effect on the demand for vegetables.

When the price elasticities of the food categories are analysed, we can see that majority of the food items have a less elastic (uncompensated) demand and some commodities like milk and related products, fish, meat and egg and other commodities such as beverages, processed food items, sugar, spices etc. are having an elasticity greater than or equal to one. But when the compensated price elasticity is considered almost all items show less sensitivity to the price of the commodities. From this, we can conclude that though the price of the food items increases, the demand for food is not affected severely. That means the urban poor have to pay more for the inflated food prices. This will reduce the welfare of the people.

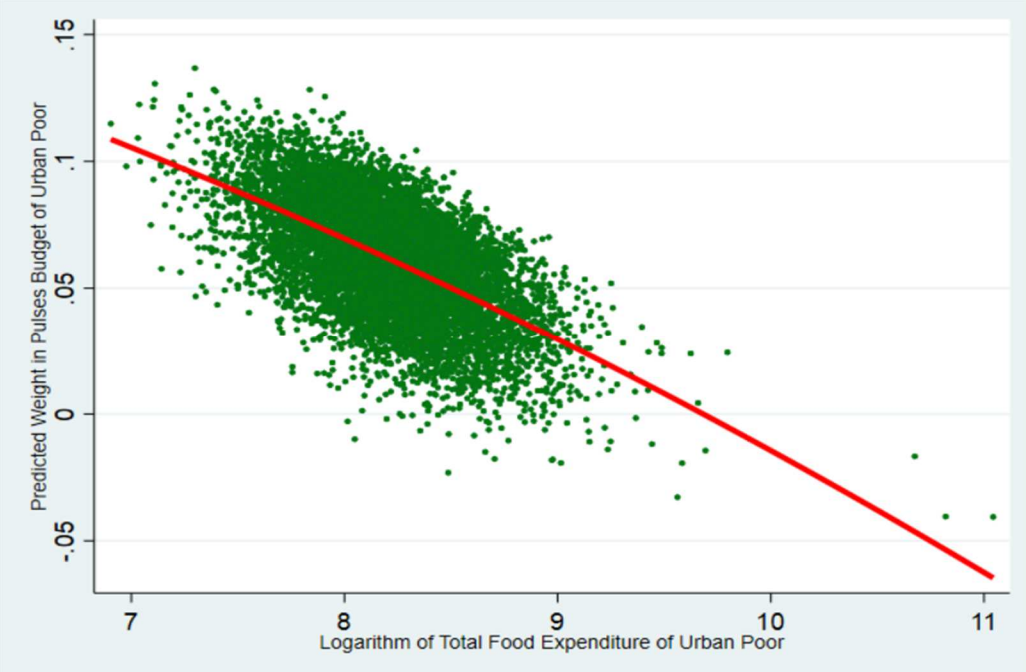
### 6.3.3 Fitted Engel Curve for Different Food Items

Engel's law tells us that as income increases (here consumption expenditure is taken as the proxy for income), consumers devote a small share of spending on food (there is a decline in the projected weights on food expenditure). In this section the estimated weight on the outlay on each food categories plots against the total expenditure devoted to purchasing food articles.



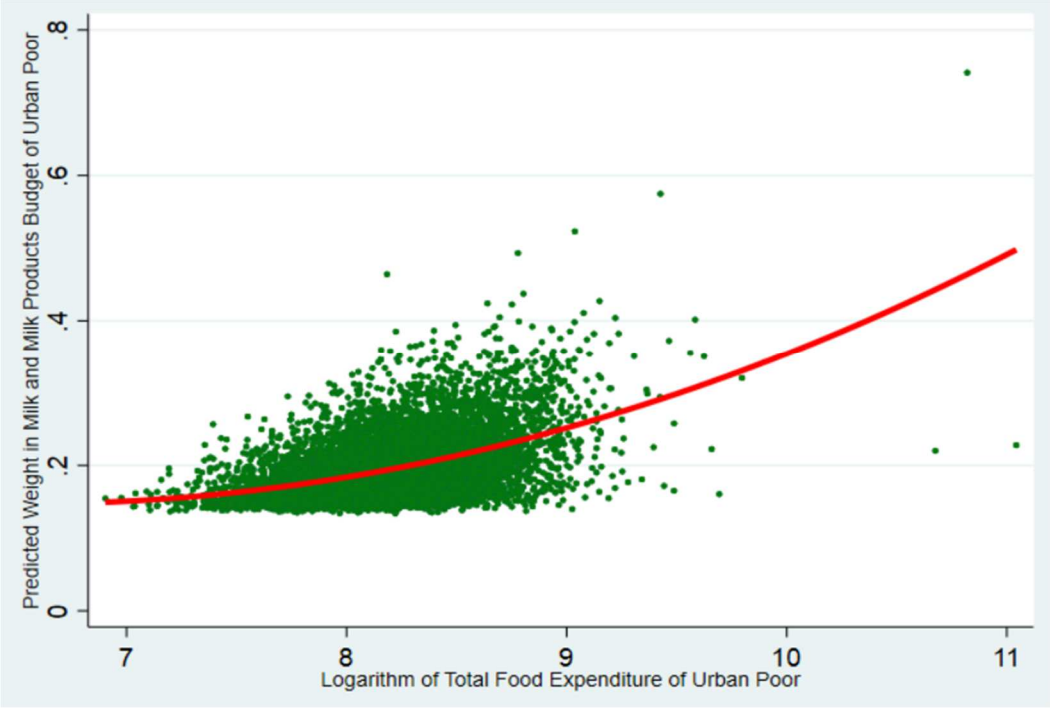

Source: Author's own calculation

*Figure 6.2*: Fitted Engel Curve for Cereals and products



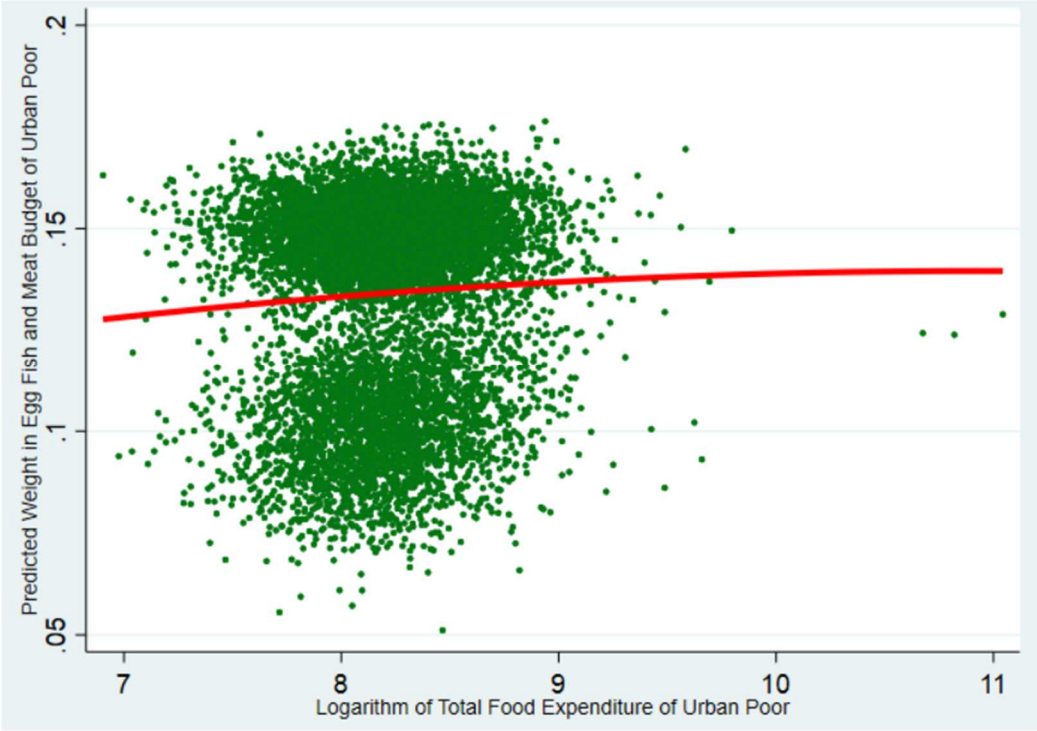

Source: Author's own calculation

*Figure 6.3*: Fitted Engel Curve for Pulses and products



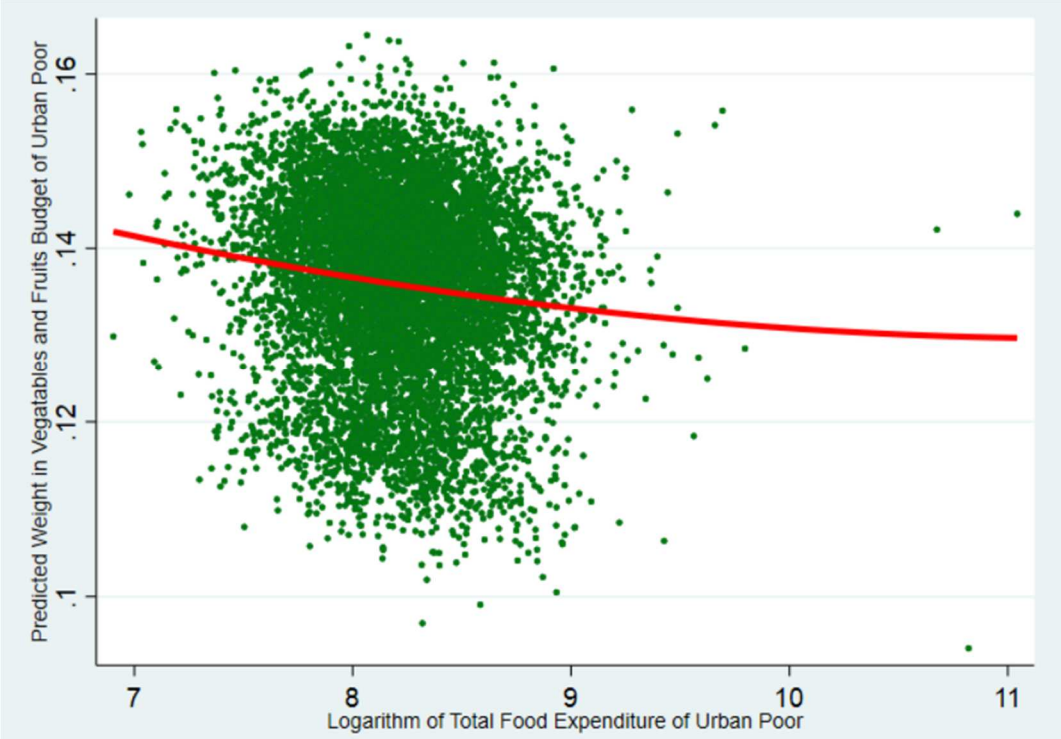

Source: Author's own calculation

*Figure 6.4*: Fitted Engel Curve for Milk and Milk products



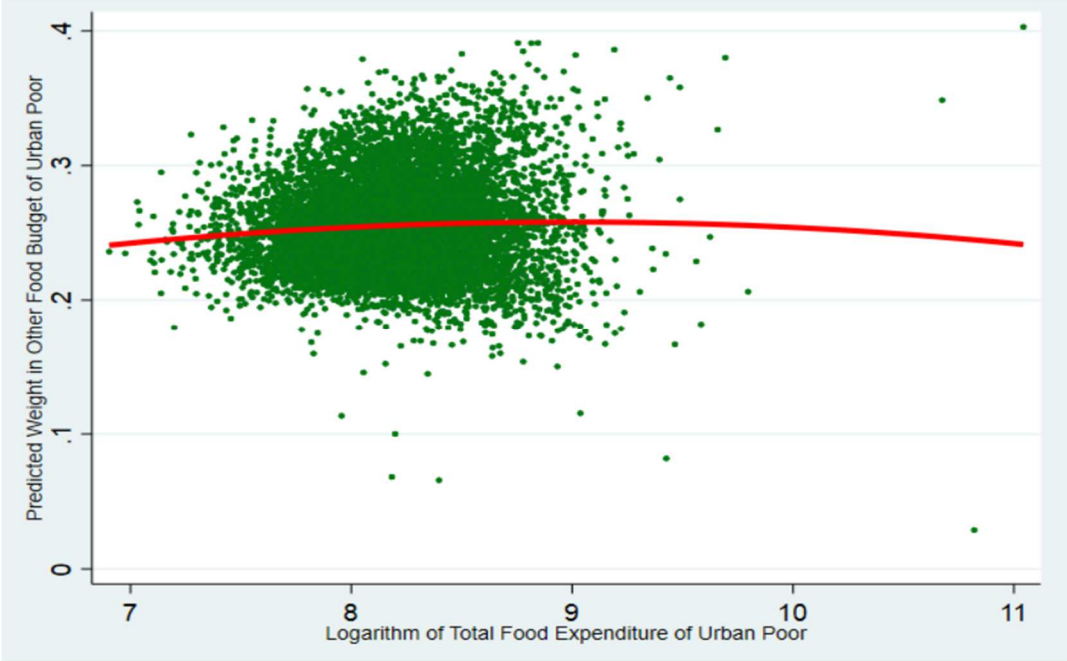

Source: Author's own calculation

*Figure 6.5*: Fitted Engel Curve for Egg, Fish and Meat




Source: Author's own calculation

*Figure 6.6*: Fitted Engel Curve for Vegetables and Fruits




Source: Author's own calculation

*Figure 6.7*: Fitted Engel Curve for other food products

The figures from 6.2 to 6.7 indicate the fitted Engel curves of different food items against total food expenditure. Figure 6.2 shows the Engel curve of cereals and cereal products. As shown in the figure, the Engel curve falls downward from left to right. This indicates that as the total food expenditure increases the expenditure on cereals decreases. Here the consumers may substitute cereals for non- cereal products. A similar Engel curve can be seen in the case of pulses and products in the figure 6.3. These pulse products also may be substituted by high valued products. Figure 6.4 shows the Engel curve of Milk and Milk products which is upward sloping. As the food expenditure increases the expenditure on milk and milk products also increases for the urban poor. As the income increases, the milk and milk products may be substituted for other low-priced cereal commodities. The Engel curve for egg, fish and meat is also showing an upward slope, as shown in figure 6.5. The other food items (figure 6.7) are also having an upward slopping Engel curve, though the slope is less than the slope of the Engel curve of milk and milk products. Figure 6.6 displays the Engel curve for vegetables and fruits. It is showing a gradual decline in the expenditure on vegetables and fruits as the expenditure on total food increases.

From the above discussion, we can conclude that for commodities like cereals and pulses, the Engel curve is falling. As the food budget increases, the share of these products decreases. But the share of other food items, fish, meat and egg, and milk and dairy products are increasing along with an increase in the food budget of the urban poor in India. In order to study the impact of food prices fluctuations on urban poor in India, we have to know the response of the rural poor also. So, in the following section, the demand estimates of the rural poor are examined.

## 6.4 Food demand system of the Rural Poor in India

From Chapter V, it can be understood that the rural poor in India also spend more than 50% of their total expenditure on food items. So, in this part, the elasticity of the food items in a rural area have been estimated. Here also, the estimation is based on the two-stage budgeting framework. In the initial stage, the consumer allocates his income on food and non-food items. And in the next step, the total food expenditure is allocated between various food categories. The model is given in the appendix.

### 6.4.1 First budgeting stage result of rural poor

In the first budgeting framework, elasticities of two broad categories are estimated, that is, food and non-food. Approximations of rural poor's demand for food articles from the first phase budgeting framework specify a vital heterogeneousness characteristic in the pattern of food demand system across the income groups of Indian rural poor consumers. The expenditure elasticity of the two product groups is displayed in table 6.6.

Table 6.6

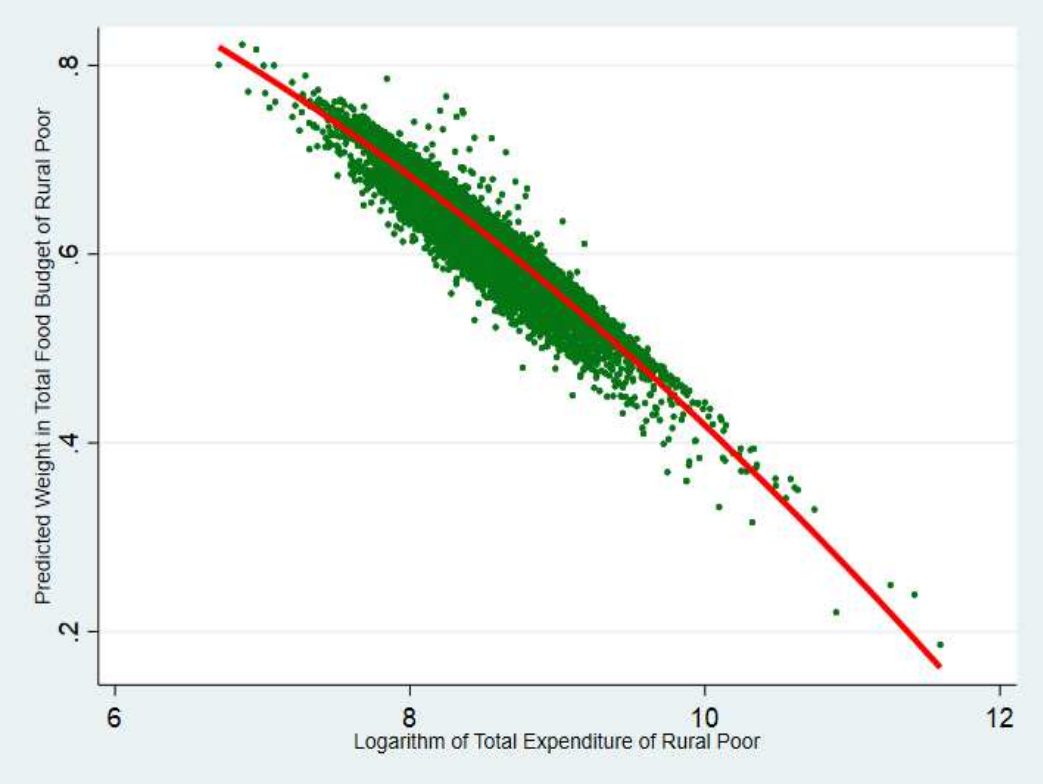
*First Budgeting Stage*

| Income elasticity of total expenditure | |
|---|---|
| 0.699 | |
| Uncompensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.751 | -0.355 |
| Compensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.487 | -0.408 |

Source: Author's Own Calculation

Table 6.6 shows the results of the first budgeting framework. The results of the estimates suggest that, when there is a one per cent increase in the per capita income of the consumer, the demand for food also increases by 0.70percent. In the same way, a one per cent rise in food prices reduces 0.75 per cent of total food expenditure, when the household is not compensated for the increase in price. But, if the household is compensated for the price hike, for maintaining its earlier level of welfare, the total food expenditure fell down by 0.75 per cent with a one per cent increase in food prices.

Based on this estimation, the Engel curve for total food expenditure against total expenditure (income) is displayed in figure 6.8.




Source: Author's own calculation

*Figure 6.8*: Fitted Engel Curve for other rural food sectors

Figure 6.8 plots the predicted weights of food expenses (by the model) and the logarithm of consumer's incomes (here total consumption expenditure is taken as the proxy for the income of the consumer). As predicted by Engel's law, this graph also tells that, as income increases (here consumption expenditure is taken as the proxy for income), projected weights on food expenditure decays.

### 6.4.2 Second Stage budget estimation results

The expenditure elasticities, which is estimated with the help of Quadratic Almost Ideal Demand System is given in table 6.7, correspond to their average values among all poor households in the rural area.

Table 6.7

*Expenditure Elasticity*

| Food Variables | Expenditure Elasticity |
|---|---|
| Cereals and Products | 0.9274216 |
| Pulses and Products | 0.39713696 |
| Milk and Milk Products | 1.0831126 |
| Egg, Fish and Meat | 1.1755066 |
| Vegetables and Fruits | 1.0069631 |
| Other Food Items | 1.0168136 |

Source: Author's own calculation

It is suggested that the cereals and pulses are necessary products, whereas fish and meat are superior commodities. That is, for cereals and pulses, as income increases demand for the food items increases less than proportionately. Vegetables and fruits, milk and milk products, and other food items like beverages, spices, sugar, processed food items etc. are showing a unitary elasticity.

The price elasticities, both own and cross-price elasticities are explained in the subsequent section. Here the Marshallian uncompensated, as well as Hicksian Compensated price elasticities, are estimated as estimated in the urban area. Table 6.8 shows the uncompensated price elasticity of the food demand in the rural area.

Table 6.8

*Uncompensated Price Elasticities of food demand of rural poor*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.93593 | -0.05989 | 0.011539 | -0.02936 | -0.01727 | -0.03651 |
| Pulses and Products | -0.03817 | -0.36965 | 0.005093 | 0.006012 | 0.003389 | -0.00381 |
| Milk and Milk Products | 0.007613 | -0.03779 | -1.0388 | -0.00767 | 0.003361 | -0.00983 |
| Egg, Fish and Meat | -0.12991 | -0.09342 | -0.00386 | -0.72971 | -0.03161 | -0.087 |
| Vegetables and Fruits | -0.01533 | -0.042 | 0.018697 | -0.00815 | -0.97414 | 0.013956 |
| Other Food Items | -0.0227 | -0.03847 | 0.004298 | -0.01419 | 0.005389 | -0.95114 |

Source: Author's own calculation

The uncompensated own-price elasticities of demand described in Table 6.8 make available some understanding about the degree of responsiveness of demand for particular food articles concerning its own prices. Here it can define as a one per cent rise in the price of cereals leads to 0.93 per cent decline in the demand for cereals and products. Similarly, a one per cent hike in the price of pulses leads to 0.36 per cent decline in the demand for pulses. From this, we can note that the pulses and products are inelastic products. For milk and milk products, vegetable and other food items, the price elasticity is almost one (unitary elastic). That is a change in price leads to a proportionate change in quantity demanded. But unlike urban poor, the egg, fish and meat are less-elastic commodities. And here we can say that most of the food items are less-elastic.

The uncompensated price elasticities of food articles of rural poor shown in table 6.8 give some understandings on the interdependence of different commodity groups. In the table, we can see that most of the products are complimentary. A one per cent increase in the price of cereals leads to a 0.03 per cent decline in the demand for pulses and products and 0.13% decline in the demand for egg, fish and meat. It can also be noticed that a change in cereal prices may not affect the demand for milk and milk products. The changes in the prices of pulses and products affect almost all the commodities negatively, but the effect is less sensitive. Changes in the price of milk and milk products do not affect the pulses, the fish, meat and egg and the other food articles like processed food, beverages etc. The effect of vegetable prices is also having a negligible impact on pulses, milk and dairy products and other food items. The changes in the price of other food items affect almost all the commodities except pulses and products.

The cross-price (uncompensated) elasticities, which is described in Table 6.8, show some degree of substitutability and complementarity between many of the food articles. Especially, figures of uncompensated price elasticities show that cereal products are the substitutes for protein-based food items like fish, meat and egg, milk and related commodities and pulses. That is to say, when prices of protein-based commodities increase. At the same time, the food expenditure remains unaffected;

consumption is transferred to cereals and other related products as in the urban food demand model.

The Hicksian compensated price elasticities are reported in table 6.9. The compensated price elasticities give a different idea about the food demand patterns of the rural poor in India. Here the change in real income due to a change in the price is compensated. So that the welfare of the consumer may remain constant and only the substitution effect is considered in this compensated price elasticities. This compensation is done in order to achieve an initial level of welfare resulting from an upsurge in the price of the products.

Table 6.9

*Compensated Price Elasticities of food demand of rural poor*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.65678 | 0.01558 | 0.207382 | 0.025644 | 0.136904 | 0.271266 |
| Pulses and Products | 0.065688 | -0.34157 | 0.077957 | 0.026476 | 0.060749 | 0.110697 |
| Milk and Milk Products | 0.290871 | 0.038793 | -0.84008 | 0.048139 | 0.1598 | 0.302475 |
| Egg, Fish and Meat | 0.151359 | -0.01737 | 0.193463 | -0.67429 | 0.123728 | 0.223111 |
| Vegetables and Fruits | 0.248018 | 0.029195 | 0.203448 | 0.043738 | -0.8287 | 0.304302 |
| Other Food Items | 0.243216 | 0.033422 | 0.190855 | 0.038207 | 0.152252 | -0.65795 |

Source: Author's own calculation

In the figure, we can see that the own-price elasticities are less than one for all the food categories that is they are inelastic in nature. In this part, we can see that all the food categories appear as substitutes. That means when the price of cereals increased by 1 per cent, then the demand for milk and dairy products, vegetables and

other food products increased by 0.2 per cent. Likewise, a one per cent rise in the prices of milk and milk products leads to a 0.2 per cent increase in the demand for cereals and related products and also for vegetables and fruits. Thus, in the compensated price elasticity, most of the commodities act as substitutes for other commodities.

## 6.5 Comparison of the Urban and Rural Poor

In the preceding sections, we have discussed the food demand system of rural and urban India. Now let's analyse which sector is badly affected by food price fluctuations. From Chapter IV, it can be understood that the food price fluctuation is a critical problem prevailing in India. Majority of the food articles are subject to the price fluctuations. And in Chapter V, the budget share of the poor people both in urban and in the rural area has been analysed.

Table 6.10

*Comparison of price elasticities in Rural and Urban Areas*

| Food Items | Uncompensated Price Elasticity | | Compensated Price Elasticity | |
|---|---|---|---|---|
| | Rural | Urban | Rural | Urban |
| Cereals and Products | -0.93593 | -0.824115 | -0.656775 | -0.637832 |
| Pulses and Products | -0.36965 | -0.320894 | -0.341566 | -0.301996 |
| Milk and Milk Products | -1.0388 | -0.99396 | -0.840078 | -0.726766 |
| Egg, Fish and Meat | -0.72971 | -0.881276 | -0.674289 | -0.745231 |
| Vegetables and Fruits | -0.97414 | -0.957521 | -0.828701 | -0.824301 |
| Other Food Items | -0.95114 | -0.891751 | -0.657952 | -0.633391 |

Source: Author's own calculation

Figure 6.10 reports the price elasticities -both compensated and uncompensated price elasticities -in the rural and urban area. The uncompensated price elasticity is lower for the urban space for all the commodities except egg, fish and meat. Unlike rural poor, the urban poor respond more to a change in the price of

meat, fish and egg. The situation is not different for compensated price elasticity. Here also the egg, fish and meat show a higher elasticity.

From the analysis, we can understand that the urban poor has a low elasticity compared to the rural poor. That is if there is an increase in the price of the food items, the urban poor will not change their demand. It leads to a rise in the expenditure on food items. When the spending on food items increases it, in turn, leads to a decrease in the consumption of other non-food items. But at the same time the price elasticity of the rural poor is more than that of the urban poor, which means if there is an increase in the price of food items, the rural poor will respond by reducing the consumption of the particular commodity. Most of the food items are produced in the rural area, and the rural poor possess land other than a homestead, which can be used for cultivation of food items. Hence, for the rural poor, there may be domestic availability of food items, and they may substitute the high-priced commodities with domestically available food items. So, the welfare of the urban people deteriorates more than the rural poor.

## 6.6 Kerala state and food demand system

When the demand for food in India is analysed, we have to consider Kerala separately because Kerala has a unique place in India with respect to characteristics, both social and economic. Kerala is a consumer state and also a non-agricultural state. For most of the agricultural commodities, especially food items, Kerala depends on other neighbouring states. So whenever there is a change in price, it will have an immediate impact on Kerala. And another notable feature is that Kerala has a high rate of urbanisation and it is a state where urban poverty is more than the rural poverty. Moreover, Kerala is much different from any other Indian states and from India itself in terms of its development experience. So, this part of the chapter focuses exclusively on Kerala.

## 6.7 Share of total expenditure to food and non-food

The total expenditure can be broadly classified into two- food and non-food. As per the Engel's law, the share of food expenditure falls with an increase in income.

The state GDP of Kerala is showing an increasing trend. That means the income is increasing over the years. The share of food expenditure is displayed in table 6.11.

Table 6.11

*MPCE of food and non-food Expenditure in Kerala*

| Round and Year | Food | | Non-food | |
|---|---|---|---|---|
| | Rural (%) | Urban (%) | Rural %) | Urban (%) |
| 50th Round 1994 | 60.5 | 53.9 | 39.5 | 46.1 |
| 55th Round 1999 | 53.71 | 49.05 | 46.29 | 50.95 |
| 60th Round 2004 | 46.54 | 40.76 | 53.46 | 59.24 |
| 66th Round 2010 | 45.93 | 40.19 | 54.07 | 59.81 |
| 68th Round 2012 | 37.74 | 33.94 | 62.26 | 66.06 |

Source: Various NSSO Reports

The share of food is showing a falling trend over the years, whereas the percentage of non-food items is increasing. In the 1990s, the share of food expenditure to total expenditure was more than the share of non-food expenditure. But in absolute terms, the total food expenditure is increasing, and the total non-food spending is also growing. From 1994 to 2012 the total food expenditure marked growth of 277% and the development of non-food expenditure also observed an increase of around 287%. That means there is a jump in the total food and non-food expenditure over the years.

## 6.8 Item wise share of food expenditure to total expenditure

Food items are categorized as cereals, cereal substitutes, gram, pulses and its products, milk and its products, edible oil, fish, egg, & meat, fresh & dry fruit, sugar & salt, vegetables, spices and beverages. In this section, the shares of each food items in terms of total consumption expenditure is examined through the data of various NSSO Rounds.

### 6.8.1 Cereals

Among the cereal products, rice and wheat are the only two significant items commonly used in Kerala. The cereal products include chira, khoi, lawa, muri, atta, maida, suji, rava, sewai, noodles, bread etc. Rice and its products are inevitable in a Kerala kitchen. Rice is the major item under cereals in Kerala.

Table 6.12

*Monthly per capita cereal consumption expenditure to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | In Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 68.4 | 17.5 | 64.1 | 13 |
| 55th Round 1999 | 110.68 | 14.45 | 105.74 | 11.33 |
| 60th Round 2004 | 112.35 | 11.35 | 120.35 | 8.77 |
| 66th Round 2010 | 146.42 | 7.97 | 151.08 | 6.26 |
| 68th Round 2012 | 141.52 | 6 | 155.67 | 5.11 |

Source: Various NSSO Reports

The per capita consumption expenditure on cereals is increasing over the years for the urban areas. The trend is also similar in the rural area except in 2011-12. The share of cereal consumption expenditure to total expenditure was showing a falling trend over the years.

### 6.8.2 Pulses and Pulses products

Pulses are the main source of protein for the lowest income group. The powerful pulses and products used are Arhar, tur, urad, moong, masur, peas, khesari etc. Their diversified product also forms the part of consumption expenditure under the head.

Table 6.13 shows the monthly per capita consumption expenditure of pulses both in its absolute terms and its share to the total spending. The absolute value of expenditure on pulses increases over the years, both in the rural and urban area. But when the share is examined, it does not show any increasing or decreasing pattern for the rural area. It is increasing for the urban area, though the increase is minimal.

Table 6.13

*Monthly per capita pulses consumption expenditure to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | In Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 7.2 | 1.8 | 8.1 | 1.6 |
| 55th Round 1999 | 13.47 | 1.76 | 16.98 | 1.82 |
| 60th Round 2004 | 13.31 | 1.34 | 18.74 | 1.37 |
| 66th Round 2010 | 35.3 | 1.92 | 43.25 | 1.79 |
| 68th Round 2012 | 34.38 | 1.46 | 39.47 | 1.26 |

Source: Various NSSO Reports

### 6.8.3 Milk and Milk products

Another major food item in Kerala is milk and milk products. The commodities like milk powder, curd, baby food, ghee, ice-cream, butter etc. constitute milk and related products.

Table 6.14

*Monthly per capita consumption expenditure of Milk and Milk products to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | in Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 20.4 | 5.2 | 27.7 | 5.6 |
| 55th Round 1999 | 37.88 | 4.95 | 49.27 | 5.28 |
| 60th Round 2004 | 36.91 | 3.73 | 57.77 | 4.21 |
| 66th Round 2010 | 65.67 | 3.57 | 82.98 | 3.43 |
| 68th Round 2012 | 89.15 | 3.78 | 119.88 | 3.93 |

Source: Various NSSO Reports

The monthly per capita consumption expenditure of milk and milk products is increasing both in urban and rural areas. The share of expenditure on milk to the total expenditure is showing a falling trend.

### 6.8.4 Egg, fish and meat

The next food items analysed here are egg, fish and meat. These are high valued products at high prices.

Table 6.15

*Monthly per capita consumption expenditure of egg, fish and meat products to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | in Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 33 | 8.5 | 40 | 8.1 |
| 55th Round 1999 | 61.33 | 8 | 70.38 | 7.54 |
| 60th Round 2004 | 75.91 | 7.47 | 83.11 | 6.7 |
| 66th Round 2010 | 159.94 | 8.71 | 172.9 | 7.16 |
| 68th Round 2012 | 179.81 | 7.63 | 192.02 | 6.3 |

Source: Various NSSO Reports

The consumption expenditure of these items has increased by 444% in rural and 380% in urban area from 1994 to 2012. There is a marginal decline in the percentage share of the item to the total consumption expenditure. These items are now prevalent at any range of consumers in Kerala. The state is depending on other states, especially for meat and egg, to fulfil the needs.

### 6.8.5 Vegetables

The rural consumption expenditure of vegetables has increased from 16.3 to 60.02 in the years 1994 and 2012, and that of the urban area increased from 16.9 to 66.12 during the same period. The share of vegetables to the total expenditure has been decreased from 4.2 to 2.54 in rural and 3.4 to 2.17 in urban Kerala. There is insufficient cultivation of the vegetables in Kerala due to various reasons. Some efforts are being made from the part of agricultural departments and other organizations founded for improving the cultivation in Kerala

Table 6.16

*Monthly per capita consumption expenditure of vegetable products to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | in Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 16.3 | 4.2 | 16.9 | 3.4 |
| 55th Round 1999 | 29.53 | 3.85 | 33.22 | 3.56 |
| 60th Round 2004 | 33.56 | 3.39 | 46..99 | 3.43 |
| 66th Round 2010 | 83.07 | 4.52 | 90.07 | 3.73 |
| 68th Round 2012 | 60.02 | 2.54 | 66.12 | 2.17 |

Source: Various NSSO Reports

### 6.8.6 Fruits

There is not much difference in the percentage spending of fresh fruits to the total consumption expenditure among rural and urban. But there's a significant reduction in the percentage share of monthly per capita consumption expenditure of fresh fruits from 1994 to 2012. Money spent on the fresh fruits in rural areas has increased from 23.9 to 79.38 in 1994 to 2012, and that of urban rose from 27.2 to 99.17.

Table 6.17

*Monthly per capita consumption expenditure of fruits to total expenditure*

| Round and Year | Rural | | Urban | |
|---|---|---|---|---|
| | in Rs. | Percentage | in Rs. | Percentage |
| 50th Round 1994 | 23.9 | 6.1 | 27.2 | 5.3 |
| 55th Round 1999 | 37.54 | 4.9 | 40.57 | 4.35 |
| 60th Round 2004 | 43.96 | 4.44 | 52.95 | 3.86 |
| 66th Round 2010 | 70.39 | 3.83 | 91.83 | 3.8 |
| 68th Round 2012 | 79.38 | 3.36 | 99.17 | 3.25 |

Source: Various NSSO Reports

### 6.8.7 Other Food Items

There is a drastic increase in the beverage consumption expenditure in Kerala. The beverages include tea, coffee, mineral water, fruit juice, shakes, soft drinks etc. The expenditure increased by 450 % in rural and 380 in an urban area when we consider 1994 as the base year expenditure. There is a marginal decline in the share of expenditure on spices to the total consumption expenditure, and the expenditure is almost the same in both rural and urban regions. The percentage of sugar consumption expenditure showed a decreasing trend in the total consumption expenditure from 2.5 to 1.05 % in rural and 2.2 to 0.86 % in an urban area from 1994 to 2012. The percentage share of expenditure of salt to total consumption expenditure is below 0.1 in both rural and urban area.

## 6.9 Expenditure class of Kerala

The entire households in Kerala (4459) are divided into three on the basis of their expenditure. The bottom class is named as poor, and the upper level is designated as rich. There are 1486 households in the poor category.

Table 6.18

*Classification of expenditure class*

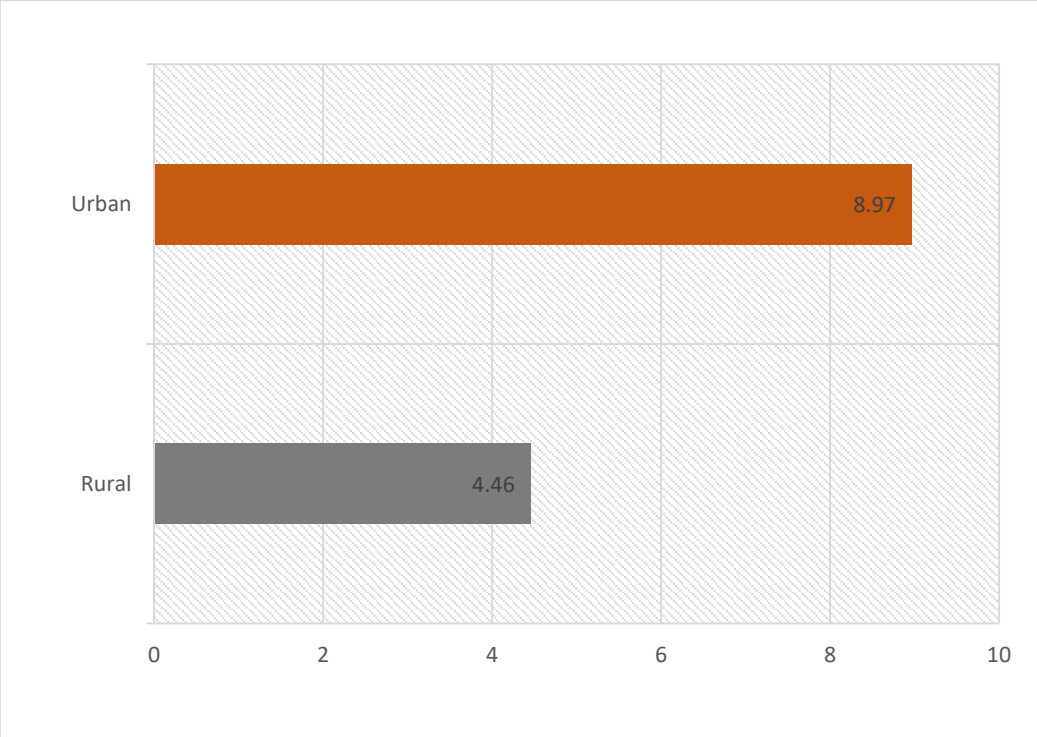
| | Exp_Kerala | | | Total |
|---|---|---|---|---|
| | Poor (%) | Middle Class (%) | Rich (%) | |
| Rural | 61.7 | 64 | 49 | 58 |
| Urban | 38.2 | 36 | 51 | 42 |
| Total | 100 | 100 | 100 | 100 |

Source: NSSO 68th Round

Table 6.18 shows the sector-wise expenditure classification of the sample households. Among the poor people, most of the poor live in the rural area. In the urban area, the majority of the sample households are from rich sections. In the following sections, let's discuss the characteristics of the poorer category in detail.

## 6.10 Landholdings of the poor in Kerala

Possession of land is an indicator of economic well-being. It may be used for cultivation and agricultural purposes. In this section, the landholdings of the poor people, especially the urban poor and rural poor, have been considered.




Source: 68th Round NSSO Data

*Figure 6.9*: Landless Poor in Sectors

Figure 6.9 shows the landholding of the urban and rural poor. From the figure, we can see that more urban people are landless compared to the rural poor. Among the poor landowners in the urban area, almost 70% possess homestead only. It is only 56% for the rural area.

## 6.11 Employment of Urban Poor

The type of employment of the people in the urban area is divided into four categories- self-employed, regular wage earners, casual labourers, and others.

Table 6.19

*Employment of urban households in Kerala*

| Type of employment | Poor (%) | Rich (%) |
|---|---|---|
| Self employed | 26.7 | 33.09 |
| Regular wage/salary earning | 17.8 | 35.86 |
| Casual labour | 47.8 | 7.68 |
| Others | 7.6 | 23.35 |

Source: 68th Round NSSO Data

Figure 6.19 displays the type of employment of urban households. From this table, we can see that most of the poor people in India depend mostly on casual labour, whereas the rich class earn their livelihood from regular salaried jobs. That means the urban poor are unstable and poorly remunerated.

## 6.12 The budget of the Poor People in Kerala

The total expenditure can be divided into two- expenditure on food and expenditure on non-food. Table 6.20 clearly explains the share of rich and poor people in Kerala on food and non-food items.

Table 6.20

*Share of food and non-food*

| Class | Sector | Non food | Food |
|---|---|---|---|
| Poor | Rural | 51 | 49 |
| | Urban | 51.2 | 48.8 |
| Rich | Rural | 75.5 | 24.5 |
| | Urban | 73.8 | 26.2 |

Source: NSSO 68th Round

From the table, we can see that the poor – both in the urban area and in the rural area spend almost half of their total expenditure on food items. But for rich people, it is about 75% of the total expenditure spent on non-food items. Engel's law can be applied here. That is when there is an increase in income, (from poor to rich), the share of food items shrinks, and the percentage of the non-food items expands.

## 6.13 Share of Each Food Items

Here the share of expenditure on each food item to total food expenditure of each expenditure class is examined. Table 6.21 reports the percentage of each item of the poor and wealthy households. The low-income families spend more on egg, fish and meat and cereals. From the expenditure class, the poor spend 18.7% on grains, and the rich spend only 13.3%. The poor pay more on cereal substitutes, pulses, salt and sugar, edible oil and spices compared to the rich. The wealthy households spend more on milk and milk products, egg, fish and meat, fruits, and also on processed food items. It is interesting to see that both the poor and rich spend almost 19% on egg, fish and meat. This pattern is related to the culture of Kerala people.

Table 6.21

*Share of the expenditure on food items of Rich and Poor in Kerala*

| | Poor (%) | Rich (%) |
|---|---|---|
| Cereals | 18.07 | 13.31 |
| Cereal Sub | 0.64 | 0.39 |
| Pulses | 5.16 | 4.19 |
| Milk and Milk Products | 8.42 | 12.68 |
| Salt and Sugar | 3.60 | 2.18 |
| Edible Oil | 5.95 | 3.93 |
| Egg Fish and Meat | 19.53 | 19.58 |
| Vegetables | 7.18 | 6.14 |
| Fruits | 8.68 | 10.38 |
| Dryfruits | 0.39 | 1.32 |
| Spices | 5.94 | 4.07 |
| Beverages | 4.53 | 4.43 |
| Served Processed Food | 8.33 | 13.32 |
| Packaged Processed Food | 3.57 | 4.08 |

Source: NSSO 68th Round

Table 6.22 shows the share of food items to total food expenditure of the poor households both in urban and in the rural area. Here the urban poor spend more on

cereals, milk and milk products, salt and sugar, edible oil and vegetables. The rural poor spend more on cereal substitutes like tapioca, spices, beverages, served processed food and packaged processed food. Both the urban and rural poor spend 19% of total food expenditure on egg, fish and meat.

Table 6.22

*Share of the expenditure on food items of Rich and Poor in Kerala*

| | Rural Poor | Urban Poor |
|---|---|---|
| Cereals | 17.89 | 18.35 |
| Cereal Sub | 0.72 | 0.51 |
| Pulses | 5.07 | 5.32 |
| Milk and Milk Products | 7.98 | 9.13 |
| Salt and Sugar | 3.53 | 3.73 |
| Edible Oil | 5.86 | 6.08 |
| Egg Fish and Meat | 19.51 | 19.56 |
| Vegetables | 7.33 | 6.93 |
| Fruits | 8.68 | 8.69 |
| Dryfruits | 0.46 | 0.30 |
| Spices | 6.05 | 5.76 |
| Beverages | 4.72 | 4.23 |
| Served Processed Food | 8.46 | 8.12 |
| Packaged Processed Food | 3.74 | 3.29 |

Source: NSSO 68th Round

The urban and rural poor spend an equal share for fruits and egg, fish and meat. Unlike the poor people in India, Kerala poor spend more on egg, fish and meat. It is a part of the culture of Kerala, where the majority of the population are non-vegetarians.

The above discussions give a detailed picture of the expenditure class, employment, land ownership, and the budget share of the poor people in Kerala. Thus, we can conclude that the urban poor is from the lowest expenditure class, who are engaged in unstable casual labour. They do not own much agricultural land, and they spend around 50% of the total expenditure on food items.

In the previous sections, the conditions of urban poor in Kerala was explained in detail. We concluded by looking at the socio-economic conditions of the urban are indeed pathetic. Most of them are socially backward along with their economic backwardness. Moreover, they spend more than half of their total expenditure on food items. So, in order to examine how the urban poor in Kerala respond to the price fluctuations QUAIDS model is used here also.

## 6.14 Estimated model for urban poor in Kerala

The estimated Quadratic Almost Ideal Demand System, in two-stage frameworks for the poor households in urban Kerala, is displayed in Table 6.23. In the first stage of QUAIDS, each household chooses in what way she should spend total expenditure on food and also on non-food commodities. And in the subsequent step, each of the low-income families chooses how to distribute the total spending on food among different food items. Like all India food demand system, the food groups are divided into six- cereals and cereal products, pulses and their products, milk and milk products, vegetables and fruits, egg, fish and meat and other food items.

Table 6.23

*Estimated QUAIDS model for Kerala*

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| alpha | | | | | | |
| alpha_1 | .2933648 | .0929173 | 3.16 | 0.002 | .1112503 | .4754793 |
| alpha_2 | .1749534 | .0446001 | 3.92 | 0.000 | .0875388 | .262368 |
| alpha_3 | -.2567817 | .0705536 | -3.64 | 0.000 | -.3950643 | -.1184991 |
| alpha_4 | .64215 | .0791224 | 8.12 | 0.000 | .487073 | .7972271 |
| alpha_5 | -.226578 | .087269 | -2.55 | 0.025 | -.183702 | .2583863 |
| alpha_6 | .1589713 | .0765861 | 2.08 | 0.038 | .0088654 | .3090773 |
| beta | | | | | | |
| beta_1 | .0625954 | .0273781 | 2.28 | 0.018 | -.0210646 | .0862555 |
| beta_2 | .044792 | .0133365 | 3.35 | 0.007 | -.02166 | .0506183 |
| beta_3 | .1062491 | .021261 | 5.00 | 0.000 | .0645783 | .1479199 |
| beta_4 | -.1767306 | .0218297 | -8.10 | 0.000 | -.2195161 | -.1339452 |
| beta_5 | .068911 | .0289354 | 2.38 | 0.029 | -.0178014 | .0956234 |
| beta_6 | -.0055041 | .0023914 | -2.39 | 0.029 | -.0523747 | .0413666 |

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| gamma | | | | | | |
| gamma_1_1 | .0423347 | .0058261 | 7.27 | 0.000 | .0309158 | .0537536 |
| gamma_2_1 | -.0098583 | .0018328 | -5.38 | 0.000 | -.0134505 | -.006266 |
| gamma_3_1 | -.0197844 | .0067984 | -2.91 | 0.031 | -.0201091 | .0265403 |
| gamma_4_1 | .055402 | .0127625 | 4.30 | 0.001 | -.0194738 | .0305542 |
| gamma_5_1 | -.0175994 | .0044449 | -3.96 | 0.000 | -.0263112 | -.0088876 |
| gamma_6_1 | -.0136328 | .0029501 | -4.62 | 0.000 | -.0194149 | -.0078507 |
| gamma_2_2 | .0362279 | .0023877 | 15.17 | 0.000 | .0315482 | .0409076 |
| gamma_3_2 | -.0531691 | .0035735 | -14.9 | 0.000 | -.0123209 | .0687121 |
| gamma_4_2 | -.02011 | .0061542 | -3.26 | 0.002 | -.013073 | .0210511 |
| gamma_5_2 | -.0116605 | .002252 | -5.18 | 0.000 | -.0160743 | -.0072467 |
| gamma_6_2 | -.0083812 | .0012328 | -6.80 | 0.000 | -.0107974 | -.0059651 |
| gamma_3_3 | -.0247242 | .010235 | -2.42 | 0.016 | -.0447844 | -.004664 |
| gamma_4_3 | .0464198 | .0095412 | 4.87 | 0.000 | .0277193 | .0651203 |
| gamma_5_3 | -.0183723 | .0076219 | -2.14 | 0.025 | -.023311 | .0656641 |
| gamma_6_3 | -.022219 | .006471 | -3.43 | 0.004 | -.0139049 | .011461 |
| gamma_4_4 | -.049941 | .0228205 | -2.19 | 0.029 | -.0946683 | -.0052137 |
| gamma_5_4 | .0407022 | .015278 | 2.66 | 0.022 | -.0192422 | .0486465 |
| gamma_6_4 | -.0217101 | .0106541 | -2.03 | 0.049 | -.0325918 | .091716 |
| gamma_5_5 | .0427869 | .0076053 | 5.63 | 0.000 | .0278808 | .0576929 |
| gamma_6_5 | -.0158568 | .0034256 | -4.63 | 0.000 | -.022571 | -.0091427 |
| gamma_6_6 | .0508029 | .0030907 | 16.44 | 0.000 | .0447453 | .0568605 |
| lambda | | | | | | |
| lambda_1 | -.0047388 | .0021339 | -2.22 | 0.026 | -.0089213 | -.0005564 |
| lambda_2 | -.0031534 | .0010892 | -2.90 | 0.004 | -.0052882 | -.0010186 |
| lambda_3 | -.0064715 | .0016351 | -3.96 | 0.000 | -.0096762 | -.0032669 |
| lambda_4 | .0185457 | .002357 | 7.87 | 0.000 | .0139262 | .0231653 |
| lambda_5 | -.0054306 | .0026439 | -2.05 | 0.040 | -.0106127 | -.0002486 |
| lambda_6 | .0042487 | .0020917 | 2.03 | 0.049 | -.0028509 | .0053482 |

Source: Author's own calculation

Stage 2 (Figure 6.24) presents the estimated parameters of quadratic almost ideal demand system. The intercept coefficients of $\alpha_i$ are significant for all commodities. The coefficients $\beta_i$s are also significant. It means that the proportionate change in aggregate price due to a change in the price of a particular commodity has

a considerable effect on the segment of total food expenditure in that specific commodity. Coefficients gamma, which represents the combined effect of the price of two commodities on the expenditure share of commodities, are also significant. The quadratic coefficients, which are denoted as lambda, are also significant. Thus, we can conclude that the model is suitable for explaining the food demand model of urban poor in Kerala.

### 6.15 First stage budgeting estimation results of Kerala Urban Poor

In the first budgeting framework, elasticities of two broad categories are estimated, that is food and non-food. Approximations of poor urban household's demand for food articles from the first phase budgeting framework specify a vital heterogeneousness characteristic in the pattern of food demand system across the income groups of poor households in urban Kerala consumers The expenditure elasticity of two product groups-food and non-food- are displayed in the table 6.24.

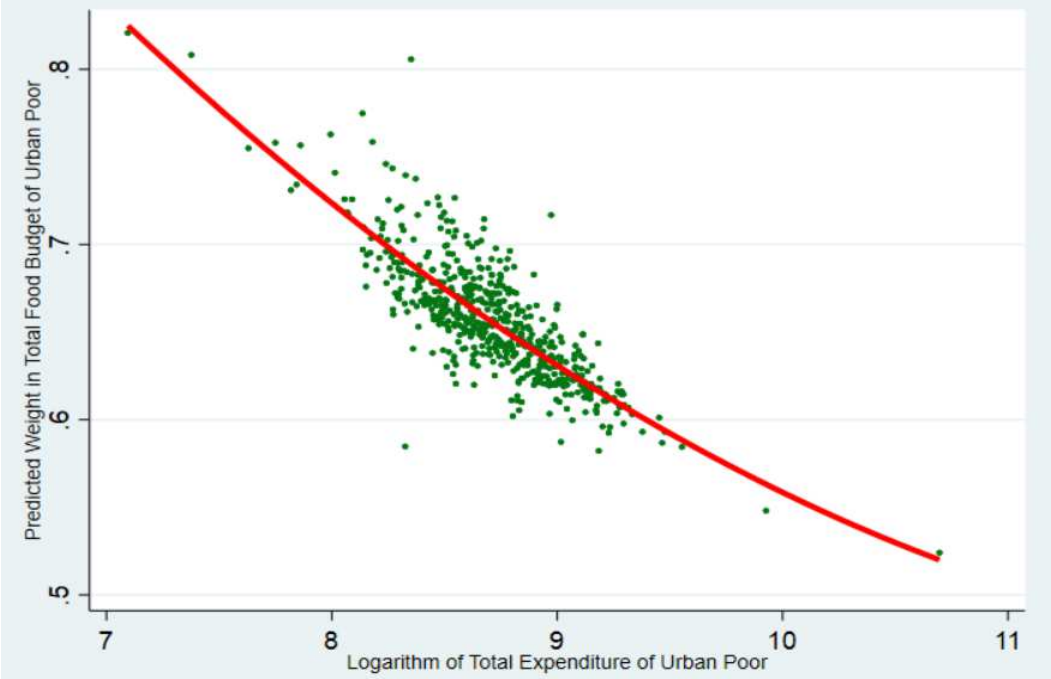
Table 6.24

*First budgeting stage result of Kerala urban poor*

| Food demand elasticities: the first budgeting stage | |
|---|---|
| Income elasticity of total expenditure | |
| 0.62 | |
| Uncompensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.75 | -0.885 |
| Compensated price elasticity of total expenditure | |
| Food | Non-Food |
| -0.409 | -0.546 |

Source: Author's own calculation

Table 6.24 shows the results of the first budgeting framework of urban poor in Kerala. The results of the estimation suggest that, when there is a one per cent increase in the per capita income of the consumer, the demand for food also increases by 0.62 per cent. In the same way, a one per cent rise in food prices reduces 0.75 per cent of total food expenditure, when the household is not compensated for the increase in price. But, if the household is compensated for the price hike, for maintaining its earlier level of welfare, the total food expenditure fell down by 0.409 per cent with a one per cent increase in food prices.




Source: Author's own calculation

*Figure 6.10*: Engel curve of urban poor in Kerala

Figure 6.10 plots the weights of food expenditure (predicted by the model) against the log of individual incomes (here total consumption expenditure is taken as the proxy for the income of the consumer). Its curve goes in line with the famous Engels' Law, which states that as income increases the share of food expenditure falls. The Engel curve of food products shows that urban poor in Kerala also spend a lesser share of food as the total consumption expenditure increases.

## 6.16 Second Stage budget estimation results

This part is also discussed in a similar way as in the estimation of urban poor in India. By using expenditure weights of a particular group of food articles and total expenditure on the food of a consumer, we can estimate the demand system for these food items. The estimates using econometric analysis of consumer demand for food, suggest that we can fundamentally categorize these analysed food categories into three, as in the previous sections, on the basis of the expenditure elasticities with regard to total expenditure on food.

The first category can be termed as high-income elasticity products, that is when there is an increase in income, the demand for the commodity also rises more than proportionate to the changes in income. The second categories of food items fall under the unit income elastic products, an increase in income leads to a proportional increase in quantity demanded of these commodities. That is average, the spending on such items (among all households) will increase at a constant rate as per the rise in total expenditure on food. In other words, as income increases, demand for the commodity also increases in the same proportion. The third category of food articles can be labelled as Less-than-unity income elasticity products that are on an average the expenses on these food categories, for all households, will rise comparatively not as much as the increase in total expenditure on food.

Table 6.25

*Expenditure elasticity of urban poor in Kerala*

| Food Variables | Expenditure Elasticity |
|---|---|
| Cereals and Products | 0.840467 |
| Pulses and Products | 0.321112 |
| Milk and Milk Products | 1.209668 |
| Egg, Fish and Meat | 1.253588 |
| Vegetables and Fruits | 0.832904 |
| Other Food Items | 1.036151 |

Source: Author's own calculation

Table 6.25 suggested that the cereals, vegetables and pulses are necessary products when compared with milk and milk products and egg, fish and meat which are counted as superior commodities. That is for cereals and pulses as income increases demand for the food items increases less than proportionately. But other food items like beverages, spices, sugar, processed food items etc. are showing a unitary elasticity. The things like egg, fish and meat and also milk and milk products are elastic products, that is, demand for these items increases more than proportionately when there is an increase in income.

Table 6.26

*Uncompensated price elasticity of urban poor in Kerala*

| Items | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.6929 | -0.0369 | 0.01695 | -0.0318 | -0.0514 | -0.0444 |
| Pulses and Products | -0.0346 | -0.2025 | -0.0426 | 0.011 | -0.0608 | 0.00828 |
| Milk and Milk Products | -0.0366 | -0.0616 | -1.0002 | 0.00242 | -0.0392 | -0.0745 |
| Egg, Fish and Meat | -0.0935 | -0.0465 | -0.0015 | -0.9187 | -0.0842 | -0.1092 |
| Vegetables and Fruits | -0.0483 | -0.044 | 0.01695 | -0.0143 | -0.6904 | -0.0529 |
| Other Food Items | -0.0588 | -0.0352 | -0.0114 | -0.0377 | -0.0675 | -0.8257 |

Source: Author's own calculation

Table 6.26 reports the uncompensated price elasticity of the food items of urban poor in Kerala. It provides some understanding of the degree of responsiveness of demand for particular food items with regard to its own prices. Here it can define as a one per cent increase in the price of cereals leads to 0.69 per cent decline in the demand for cereals. Similarly, a one per cent rise in the price of pulses leads to 0.20 per cent decline in the demand for pulses. From this, we can note that the pulses and cereals are inelastic products. For milk and milk products and vegetable, the price elasticity is almost one (unitary elastic). The own-price elasticity of egg, fish and meat is 0.9 per cent. For vegetables and fruits and also for other food items own price elasticity is less than one. That is, a change in price leads to less than proportionate change in quantity demanded. And here we can say that most of the food items are less elastic.

The uncompensated price elasticities are shown in table 6.26 also give some insights into the interdependence of different commodity groups. In the table, we can see that most of the products are complementary goods. A one per cent increase in the price of cereals leads to a 0.03% decline in the demand for pulses and milk and milk products and 0.04 per cent decline in the demand for vegetables and fruits. The one per cent upsurge in the price of cereals leads to 0.09 per cent decline in the demand for egg, fish and meat. A one per cent rise in the price of pulses changes the demand for milk and dairy products than any other commodities. All at once, changes in the price of milk and milk products do not affect the demand for egg, fish and meat.

The compensated price elasticities are described in table 6.27. In the compensated (Hicksian) price elasticities, we get a somewhat different idea about the food demand patterns of the urban poor in Kerala. Here the change in real income due to a change in the price is compensated. So that the welfare of the consumer may remain constant and only the substitution effect is considered in this compensated price elasticities. This compensation is done in order to achieve an initial level of welfare resulting from an upsurge in the price of the products.

Table 6.27

*Compensated price elasticity of urban poor in Kerala*

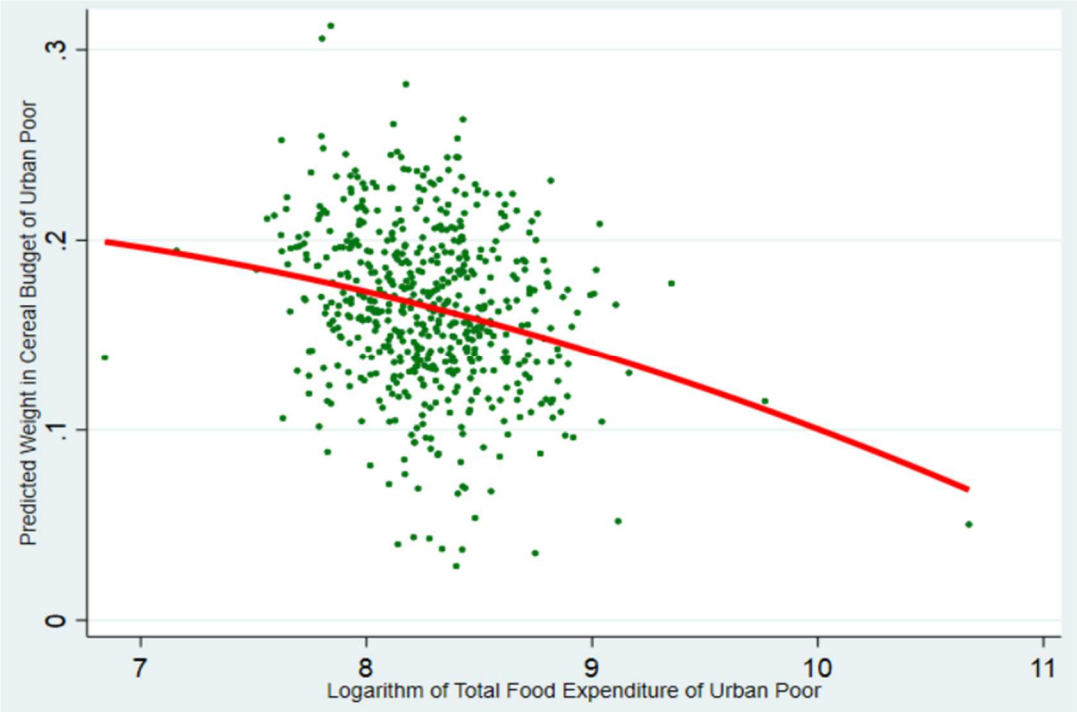
| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.55421 | 0.006095 | 0.120309 | 0.14672 | 0.092517 | 0.18857 |
| Pulses and Products | 0.018434 | -0.186022 | -0.003064 | 0.0792 | -0.005851 | 0.0973 |
| Milk and Milk Products | 0.163027 | 0.00031 | -0.851486 | 0.25936 | 0.167929 | 0.26086 |
| Egg, Fish and Meat | 0.113392 | 0.017676 | 0.152622 | -0.6524 | 0.130421 | 0.2383 |
| Vegetables and Fruits | 0.089156 | -0.001355 | 0.11937 | 0.1626 | -0.547796 | 0.17803 |
| Other Food Items | 0.112237 | 0.017855 | 0.115995 | 0.18243 | 0.109953 | -0.5385 |

Source: Author's own calculation

In the table, we can see that the own-price elasticities are less than one for all the food categories that are inelastic in nature. In this part, we can see that all the food categories appear as substitutes. That means when the price of cereals increased by 1%, then the demand for milk and milk products, vegetables and other food products increased by 0.16%. Likewise, a 1% increase in the milk and milk products leads to a 0.12% increase in the demand for cereals. Thus, in the compensated price elasticity, the majority act as substitutes for other commodities. Milk and pulses are complementary goods, whereas pulses and dairy products, pulses and vegetables, are unrelated products.

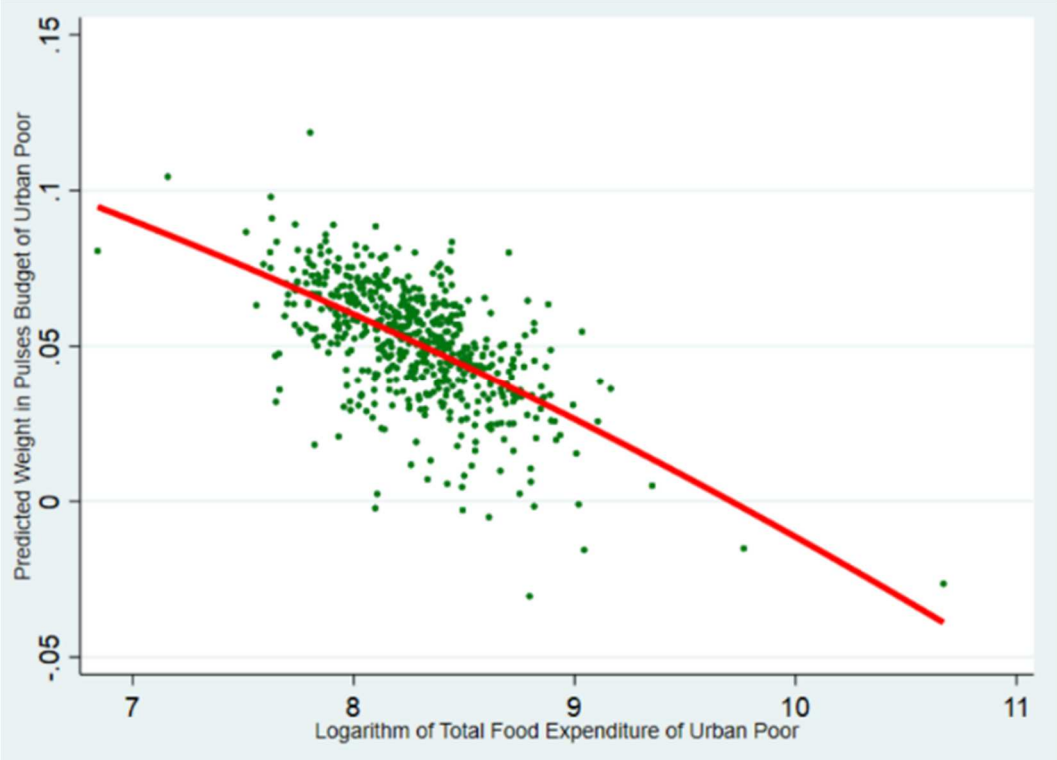
## 6.17 Fitted Engel Curve for Different Food Items

Engel's law tells us that as income increases (here consumption expenditure is taken as the proxy for income), households spend a lesser amount on food (estimated weights on food expenditure declines). In this section the estimated weight on the expenditure of each food items plots against the total expenditure devoted to food.



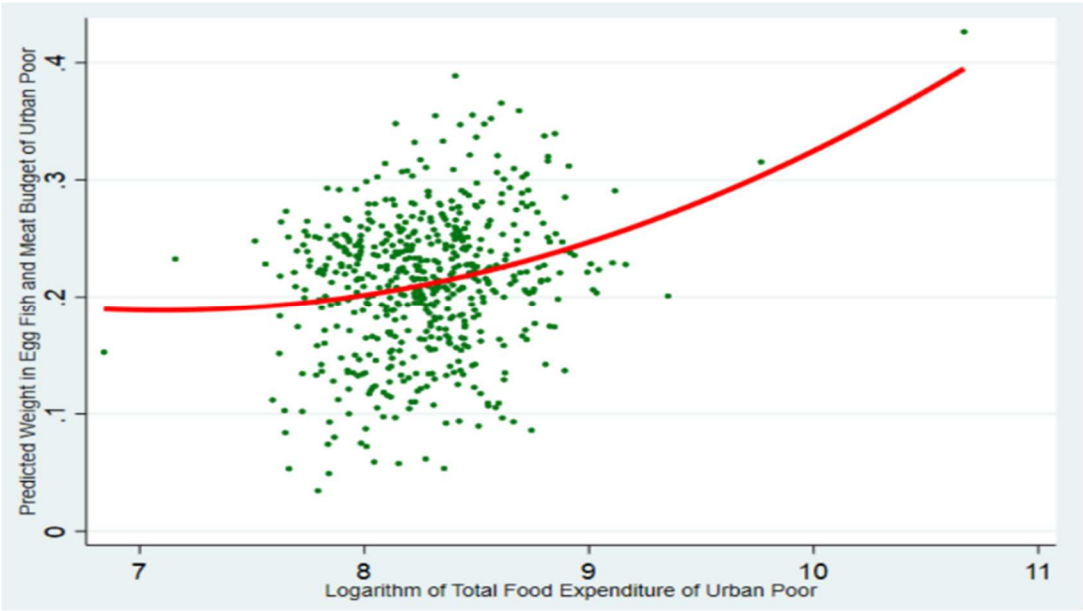

Source: Author's own calculation

*Figure 6.11*: fitted Engel curve for cereals of urban poor in Kerala



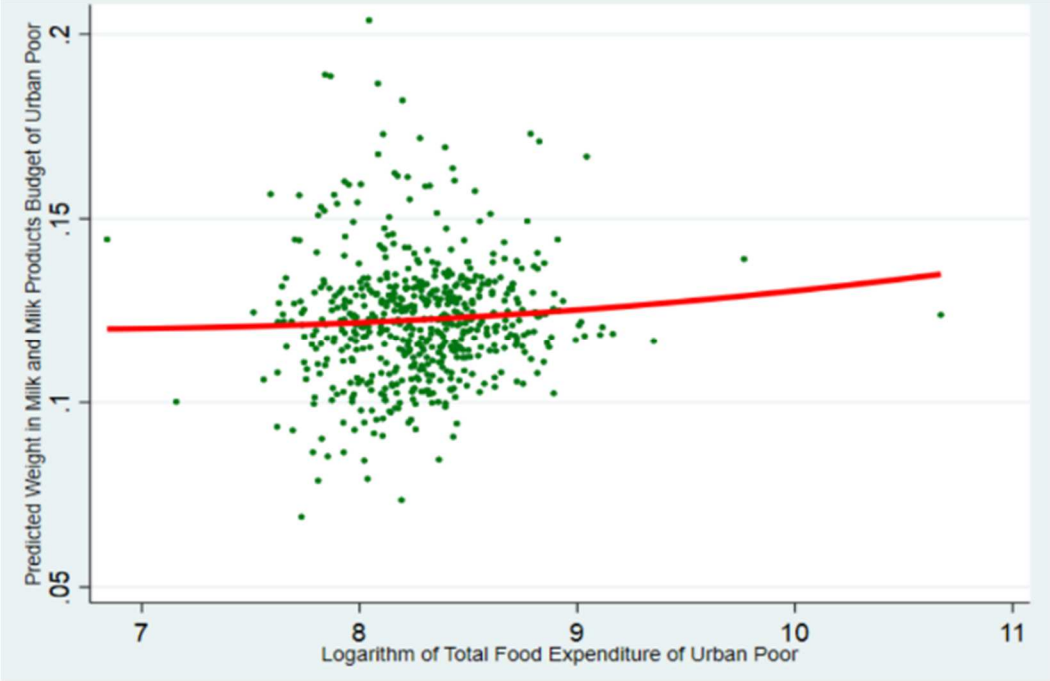

Source: Author's own calculation

*Figure 6.12*: Fitted the Engel curve for pulses of urban poor in Kerala



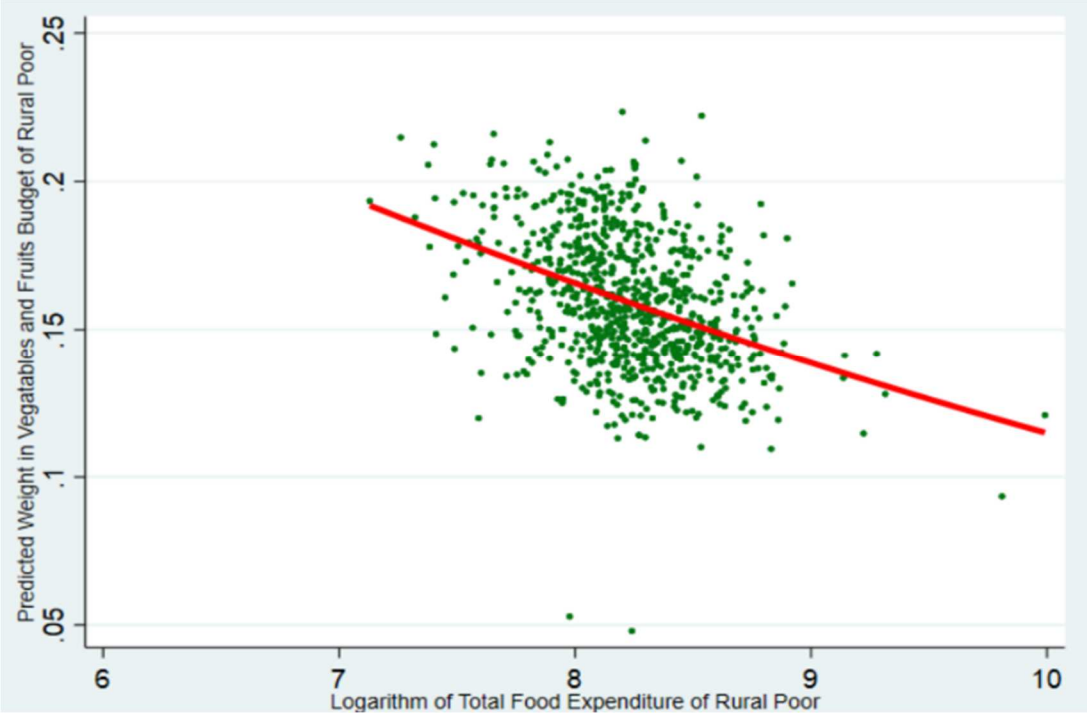

Source: Author's own calculation

*Figure 6.13*: fitted Engel curve for Egg, fish and meat of urban poor in Kerala



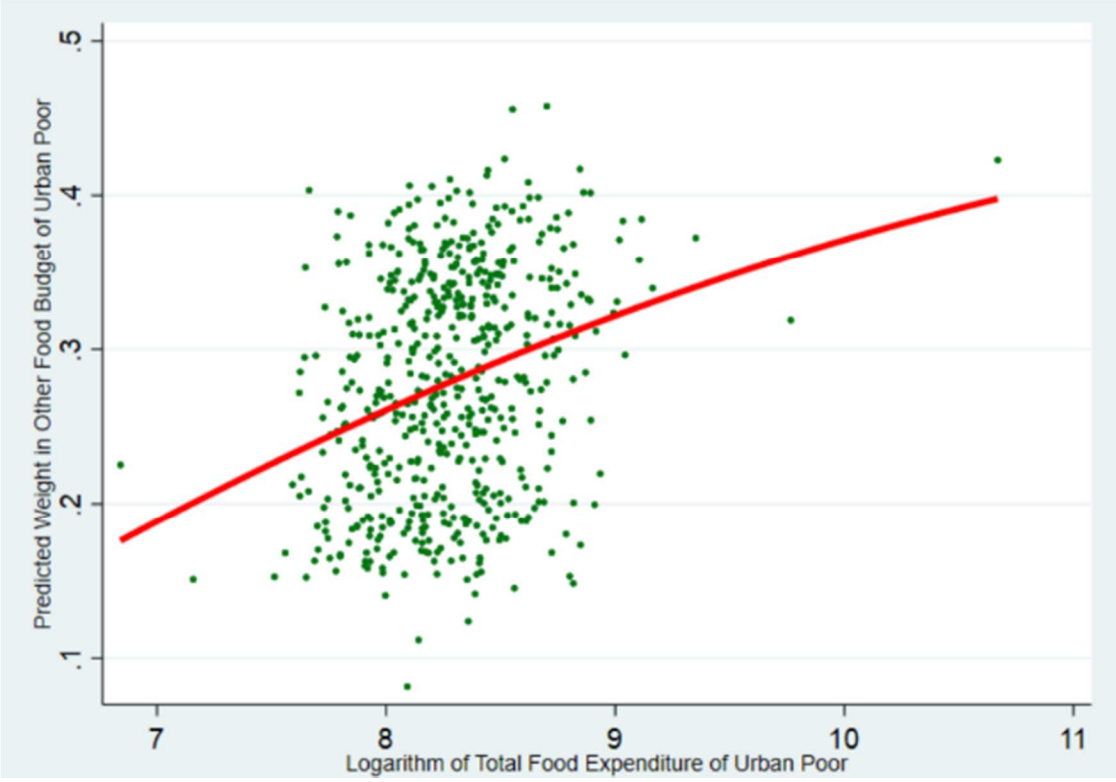

Source: Author's own calculation

*Figure 6.14*: Fitted Engel curve for milk and milk products of urban poor in Kerala




Source: Author's own calculation

*Figure 6.15*: Fitted Engel curve for vegetables and fruits of urban poor in Kerala




Source: Author's own calculation

*Figure 6.16*: Fitted Engel curve for other food items of urban poor in Kerala

The figures from 6.11 to 6.16 display the fitted angel curves of different food items against total food expenditure. Figure 6.11 shows the Engel curve of cereals and cereal products. As shown in the figure, the Engel curve falls downward from left to right. It indicates that as the total food expenditure increases the expenditure on cereals decreases. Here the consumers may substitute cereals for non- cereal products. A similar Engel curve can be seen in the case of pulses and pulse products in figure 6.12. These pulse products also may be substituted by the high valued products. Figure 6.13 shows the Engel curve of egg, fish and meat products which is upward sloping. As the food expenditure increases the expenditure on the egg, fish and meat products also increase for the urban poor in Kerala. As the income increases the egg, fish and meat products may be substituted for other low-priced cereal commodities. The Engel curve for milk and milk products is also showing an upward slope, as shown in figure 6.14. The other food items (figure 6.16) are also having an upward sloping Engel curve. The other food items in the urban area are increasing along with an increase in the

expenditure on food. Figure 6.15 displays the Engel curve for vegetables and fruits. It is showing a gradual decline in spending on vegetables and fruits as the expenditure on total food increases.

From the above discussion, we can conclude that for the commodities like cereals, pulses and vegetables and fruits Engel curve is falling. As the food budget increases, the share of these products decreases. But the share of other food items, egg, fish and meat and milk and milk products are increasing along with an increase in the food budget of the urban poor in India. In order to examine the impact of food prices on urban poor in India, we have to know the response of the rural poor in Kerala also. So, in the following section, the demand estimates of the rural poor are examined.

## 6.18 Food demand system of the Rural Poor in Kerala

From the previous discussions, it can be understood that the rural poor in Kerala also spend around 50% of their total expenditure on food items like the urban poor. So, in this part, the elasticity of the food items in the rural area have been estimated. Here also, the estimation is based on the two-stage budgeting framework. The estimated model is given in the appendix. In the first stage, the consumer allocates his income on food and non-food items. And in the next step, the total food expenditure is allocated across various food articles. The resulted elasticities (both compensated and uncompensated) are reported in the tables given below.

Table 6.28

*Uncompensated price elasticity of Rural poor in Kerala*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.6629 | -0.0489 | 0.01631 | -0.0329 | 0.02853 | -0.06751 |
| Pulses and Products | -0.0498 | -0.06 | -0.0204 | -0.0046 | 0.02107 | -0.03589 |
| Milk and Milk Products | -0.0395 | -0.063 | -1.0001 | 0.00639 | -0.0239 | -0.0247 |
| Egg, Fish and Meat | -0.1096 | -0.0602 | -0.0079 | -0.9271 | -0.0635 | -0.07927 |
| Vegetables and Fruits | 0.00079 | -0.0354 | 0.00598 | -0.0186 | -0.8273 | -0.06753 |
| Other Food Items | -0.093 | -0.057 | -0.0034 | -0.0213 | -0.0595 | -0.85974 |

Source: Author's own calculation

Table 6.28 presents the uncompensated price elasticity of the food items of urban poor in Kerala. It gives some understanding of the degree of responsiveness of demand for particular food items with respect to its own prices. Here it can define as a one per cent rise in the price of cereals leads to a 0.66 per cent fall in demand for cereals. Likewise, a 1% increase in the price of pulses leads to 0.06 per cent decline in the demand for pulses. From this, we can note that the pulses and cereals are inelastic products. For milk and milk products and vegetable, the price elasticity is almost one (unitary elastic). The own-price elasticity of egg, fish and meat is 0.92 per cent. For vegetables and fruits and also for other food items own price elasticity is less than one that is 0.827 per cent. And here we can say that most of the food items are less elastic.

The uncompensated price elasticities showed in table 6.28 also provide insights into the interdependence of different food commodity groups. In the table, we can see that most of the products are complementary goods. A one per cent increase in the price of cereals leads to 0.039 per cent decline in the demand for pulses and

milk and milk products and 0.049 per cent decline in the demand for pulses. The change in the price of cereals does not affect the demand for vegetables. The one per cent increase in the price of cereals leads to a 0.1 per cent decline in the demand for egg, fish and meat. A one per cent increase in the prices of pulses changes the demand for milk and milk products than any other commodities. At the same time, changes in the price of milk and milk products do not affect the demand for egg, fish and meat and also vegetables and fruits.

The compensated Hicksian price elasticities are reported in table 6.29. In the compensated (Hicksian) price elasticities, we get a somewhat different idea about the food demand patterns of the urban poor in Kerala. Here the change in real income due to a change in the price is compensated. So, the welfare of the consumer may remain constant, and only the substitution effect is considered in this compensated price elasticities. This compensation is done in order to achieve an initial level of welfare resulting from an upsurge in the price of the products.

Table 6.29

*Compensated price elasticity of Rural poor in Kerala*

| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
|---|---|---|---|---|---|---|
| Cereals and Products | -0.53264 | -0.007717 | 0.102963 | 0.12015 | 0.150866 | 0.16638 |
| Pulses and Products | -0.02438 | -0.051948 | -0.00352 | 0.02525 | 0.044905 | 0.00969 |
| Milk and Milk Products | 0.154777 | -0.001617 | -0.870815 | 0.23477 | 0.15865 | 0.32424 |
| Egg, Fish and Meat | 0.102138 | 0.006717 | 0.132951 | -0.6782 | 0.135367 | 0.301 |
| Vegetables and Fruits | 0.160647 | 0.015169 | 0.112347 | 0.16934 | -0.67708 | 0.21957 |
| Other Food Items | 0.092635 | 0.001708 | 0.120138 | 0.19697 | 0.114867 | -0.5263 |

Source: Author's own calculation

In table 6.29, we can see that the own-price elasticities are less than one for all the food categories that inelastic in nature. In this part, we can see that all the food categories appear as substitutes. That means when the price of cereals increased by 1%, then the demand for milk and milk products, vegetables and other food products increased by 0.16%. Likewise, a 1% increase in the milk and milk products lead to a 0.10% increase in the demand for cereals. Thus, in the compensated price elasticity, most of the commodities act as substitutes for other commodities. The pulses and cereals also are complementary goods, whereas the pulses and milk products, pulses and egg, fish and meat are unrelated products.

## 6.19 Comparison of the Urban and Rural Poor in Kerala

In the previous sections, we have discussed the food demand system of rural and urban Kerala. Now let's understand which sector is badly affected by food price fluctuations. From Chapter IV, it can be understood that the food price fluctuation is a critical problem prevailing in India. Majority of the food articles are subject to the price fluctuations. And the budget share of the poor people, both in urban and in rural Kerala has been analysed in the preceding discussions.

Table 6.30

*Uncompensated price elasticity of Rural and urban poor in Kerala*

| Items | Rural | Urban |
|---|---|---|
| Cereals and Products | -0.66287 | -0.6929 |
| Pulses and Products | -0.05997 | -0.20245 |
| Milk and Milk Products | -1.00009 | -1.00024 |
| Egg, Fish and Meat | -0.92706 | -0.91868 |
| Vegetables and Fruits | -0.82725 | -0.69042 |
| Other Food Items | -0.85974 | -0.82571 |

Source: Author's own calculation

For cereal products and pulses, the elasticity is lesser in a rural area compared to the urban area. The price fluctuations on cereals and pulses affect rural people and price fluctuations in the egg. But for egg, fish and meat and for other food items elasticity is lesser for the urban area. So, the price fluctuations in these items affect

the urban poor compared to the rural poor. Milk and milk products show a unitary elastic demand. From the analysis, we can see that food inflation affected both the rural and urban poor, depending on the food items.

## 6.20 Conclusion

From the analysis of elasticity, we can conclude that the urban poor in India suffers more from the price fluctuations. Since they do not change their demand for food following a change in price, the urban poor has spent more on these inflated food items. The rationales behind this conclusion are;

- Both the urban and rural poor in India are from the same expenditure class.
- The budget shares on food have an almost similar percentage for both urban and rural poor.
- The price elasticity is lesser for the urban poor, which means that they are not responding to a change in the price of food items.
- Hence, they have to pay more for these items.
- This may have reduced their consumption of other commodities and in turn their welfare.
- The rural poor possess land other than homestead compared to the urban poor. This land may be used for cultivating food items, and the rural area mainly depends on agricultural activities.
- Therefore, rural people can substitute their own cultivated or domestic products for inflated food items.
- Consequently, the price elasticity of the rural poor is more compared to the urban poor.

And from the analysis of the poor people in Kerala, we don't see much difference in the elasticity in the rural and urban area. Since Kerala is a consumer and non-agricultural state, most of the commodities are imported from neighbouring states. So, food price fluctuations affect both sectors as well.

# Chapter VII

# SUMMARY, FINDINGS AND CONCLUSION

# CHAPTER VII

# SUMMARY, FINDINGS AND CONCLUSION

## 7.1 Summary

The study - 'Food Inflation in India and Its Impact on Urban Poor'- analyses the effect of food inflation on urban poor in India. The first chapter of the study gives a design of the study, which includes context, problem statement, objectives, data source and methodology, limitations and organisation of chapters. The study is primarily based on three objectives. The first one is an analysis of the trend and pattern of food inflation in India, the second is about the budget share of the poor people and the third objective is to analyse the responses of the food expenditure of urban poor on change in its price. For the thesis, many existing works of literature have been reviewed, which are given in the second chapter. The entire reviewed literature has been classified into two heads, namely literature on the determinants of food inflation and literature analysing the impact of food inflation.

A detailed discussion of the theoretical and methodological framework is given in the third chapter. In the first part of the chapter, a brief explanation of the theories and methodologies associated with inflation are given. From the literature, it is seen that the Auto Regressive Distributed Lag model is useful for examining the long term relationship between food inflation and determining factors. The demand theories ranging from Engel's law to the modern theories on food demand system are also discussed in this chapter. From the methodological reviews, it is found that the Quadratic Almost Ideal Demand System (QUAIDS) is the suitable model for explaining the food demand system of India. Therefore, for examining the responses towards the price fluctuations, the QUAIDS model has been used for the present study. A detailed explanation and derivation of this model are given in the third chapter.

Forth chapter gives the trend and pattern of food inflation in India. The trend of WPI_ Food and CPI new series have been analysed in the chapter. The factors affecting food inflation are explored by using the Auto Regressive Distributed Lag Model. Here the growth in WPI_F is taken as the dependent variable. The variables like Minimum support price, per capita income, fuel price inflation, overall inflation and money supply have been used as the independent variables. Almost all the variables are showing a significant relationship with food inflation in the long run.

Chapter five analyses the budget share, in which the first part is dealing with the allocation of food and non-food expenditure to total expenditure. From the analysis, it is seen that irrespective of urban-rural difference, poor in India spend more than 50% of their total expenditure on purchasing food articles. In the second part of the chapter analyses the share of expenditure of each food items to total food expenditure. From the research, it is seen that poor people spend more money on cereals consumption.

Since the central part of the consumption expenditure of the poor is on food, food price fluctuation is having more impact on them. Hence the sixth chapter analysed the effect of food price inflation on poor, mostly urban poor who are not having food substitutes like rural poor. From the analysis, it is clear that the elasticity of urban poor is lesser than rural poor, which shows that urban poor is the most affected section for any price fluctuation. This difference in rural and urban is essential as far as India is concerned because rural poor is having their land cultivation of food items. Hence they can substitute it for a market product if there is a price hike, but that is not possible in the case of urban. But in the case of Kerala where the rural-urban difference is not that much visible, there is not much rural-urban difference can be seen in price elasticity of food.

## 7.2 Findings

Major findings of the study are discussed under three heads based on the three objectives, namely, food price inflation scenario, budget share and the response of the poor towards a change in price.

### 7.2.1 Food price Inflation Scenario

From the trend analysis of WPI_F and CPI_IW_F from 1972 onwards, it is seen that the food inflation was moderate in India till 1990. Then it has increased up to 2005, and after that, the food price inflation has increased alarmingly high.

The inflation of food was not much significant during 1980 to 1990 due to government policy interventions like the Green Revolution. The short-term fluctuations in food prices of that period were either due to international oil prices, causing a general spout in prices or drought conditions leading to a shortage in the availability of food and raw materials. After 1990 the price index for food articles started rising sharply. Agricultural product's supply growth was decelerated throughout and be an average of about 3.5 per cent per year during1990s and 2000s. In comparison, the production of cereals grew by only 1.5 per cent annually in the 2000s. Although consumer demand was increasing quickly, running down buffer stocks helped to cover food price inflation during the early 2000s, and growth of Minimum Support Price was moderate.

It is important to note that, after 2005, WPI_F and CPI-IW_F grew disturbingly high. Efforts of the Union government to control the effect of global food price inflation of 2007-08, in domestic economy facilitated to limit the influence on food prices domestically. However, buffer stocks decreased continuously and also falling eventually at a significant rate below recognised norms.

From 2011 onwards Government of India adopted CPI of new series as the key measure of inflation. When examining the trend of WPI_All commodity and CPI, it was understood that WPI-AC is less than CPI overall and CPI food. When we are looking at the growth rate of WPI and CPI, in most of the year, CPI exceeds the growth of WPI. Since a higher weight is given to food in CPI, higher growth of CPI shows an increase in food prices. CPI and CPI food were generally showing an upward trend. In most of the year, they are moving together. It is because of the fact that food is a commodity with the highest weightage in CPI.

Though the overall inflation is high in rural areas, food inflation is higher in the urban area. The urban food inflation is more than rural food inflation. The reason is that agriculture production is mainly concentrated in the rural area and so typically, food price is more in urban area.

When analysing the commodity wise Consumer Price Index, in most of the years, prices of cereals and cereal products lie below overall food prices, though both of them show an increasing trend. After the implementation of the green revolution, the production of cereal products like wheat and rice are showing stable growth. As a result, India becomes not only self-sufficient but also a net exporter of food grains and the largest export of rice in the world. The cereal products are distributed through the Public Distribution System at a lower price. Consequently, the market price can be controlled by the government. Therefore, it may not contribute much to the short-term spikes in food price inflation. From this, we can conclude that other food products are significant contributors to food price inflation.

For Pulses and pulses products, the Consumer Price Index is not showing any particular trend. It lies below overall CPI food up to 2014, and after that, it lies above overall CPI (food). Then after 2017 again it falls below the overall CPI (food). India is the largest producer and consumer of pulses in the world. Though there is a gap between total production and consumption of pulses, this excess demand has been met through import of pulses. In 2012, the price of pulses fell down and then began to increase steadily after October 2013 and peaked at around 46 per cent in November 2015. A rise in prices of pulses and pulses products are provoked by several factors, for example, terrible conditions of weather, increasing cost of transportation, false shortage because of black marketing and hoarding. In 2017 the country experienced good monsoon, which, led to record production of pulses, and the price of pulses began to fall. After 2017, the price index of pulses remains less than overall food CPI.

The vegetable prices are highly fluctuating in nature. In many years the prices of vegetables were higher than the overall food price. Onion, potato, cauliflower, tomato etc. are main vegetables which led to an increase in vegetable prices. The primary reasons behind these fluctuated vegetable prices are the problems of storage

and transportation and the consequent post-harvest losses, which pose a challenge to marketing the product. Consumers, therefore, are subject to wide price fluctuations in the market. The changes are also subject to the harvesting seasons.

Up to 2015-16, CPI food and CPI-Meat and Fish move together with Consumer Price Index of overall food items. But after that, CPI-meat and fish have increased and lie above CPI food. This increase in price is due to increase in demand for these commodities. Here the people demand more high protein food like meat and fish after 2015. Thus, it is argued that the higher demand leads to an increase in the price of these products

There is a positive trend for milk and milk products. They moved along with the movement of the Consumer Price Index of overall food items. The CPI_fruits also shows an increasing trend, and it is moving ahead with CPI_food. When the trend of CPI food is analysed, it can be seen that there are considerable spikes over the years. This may be due to changes in demand for fruits, fluctuations in production, weather conditions etc.

From the previous analysis, it can be concluded that most of the food items are subject to price fluctuations. And the factors like crop failure due to bad weather conditions, changes in income, cost of production, overall inflation, fuel prices, government policies etc. are responsible for food price fluctuations. So, the study also examined the long-term relationship of these factors with food price fluctuations.

The coefficients of all the independent variables are significant at 5% level in the short run. The analysis shows that there is a long-run relationship between all these variables and their lagged values with food inflation.

### 7.2.2 Budget Share

The present study analysed the samples after classifying it into three categories based on monthly per capita expenditure of households. Monthly per capita expenditure of a household is below Rs. 1197 is termed as poor. Those who belong to the expenditure class in between Rs. 1197 and Rs. 2020 is termed as the middle-income group. And for all the others who have consumption expenditure above

Rs.2020 are considered as rich. The analysis of the budget share of the poor people in India is included in chapter five. The socio-economic characteristics of these expenditure classes have also been examined in this chapter.

It is interesting to note that majority of the individuals from the poor category are illiterate. At the same time, the richer groups are highly educated. Eighty per cent of the poor people belong to the socially backward community like SC, ST and other backwards communities, whereas the representation of this group is insignificant among rich. At the same time majority of the general categories of households, who are considered as a socially developed group are from the more affluent section.

While considering the employment status, it is seen that around 40% of the poorer sections in the rural area are working in the agriculture sector, out of which 27% of rural poor are engaged in self-employment in agriculture, and 13% are casual labourers in the agriculture sector. At the same time, though 35% of middle-income group earn their livelihood from agriculture, only 6% are engaged in casual labour in the agriculture sector. Another notable thing is that the majority of the poor engaged in casual works, both in agriculture and non-agriculture. But the majority of the richer sections in rural areas are regular salaried people.

Majority of urban poor are working either as casual workers or as self-employed. At the same time, the majority of urban rich are regular wage/salary earners. The engagement of rich as casual work is negligible. Another notable point is that around 38% of the poor households are not having BPL or AAY ration card, and 15.8% of poor people do not possess ration card. Consequently, they couldn't enjoy the benefits of fair price shops. So increased food prices hit them the hardest.

When analysing the land ownership, it is clear that the poor households with no land are higher in an urban area compared rural area. Within the land-owning people, about 64.59% urban poor possessed only homestead land. But in the rural area, most of the poor (64.83%) households owned another land along with homestead. That may be the reason for the majority of rural poor to engage in agricultural activities and thereby producing some amount of food for their consumption. This option does not exist in the case of the urban poor. They have to

depend entirely on the market for their food consumption. This is the reason for the rural-urban difference in price elasticity of food articles.

From the above discussions, it can be concluded that the poor people are not just vulnerable economically but socially as well. Most of the urban poor are engaged in highly unstable and poorly remunerated casual employment. They do not possess much land apart from their homestead.

By analysing the expenditure share of food items for entire sample households, it can be noticed that during the period 1993-94 to 2011-12, the share of essential food items like cereals, pulses, vegetables, salt and sugar etc. is falling along with an increase in income. But the high protein high priced commodities (like egg, meat and fish, milk and dairy products and also for the processed food items) share of consumption expenditure is showing an increasing trend over the years. Poor spend more on food items compared to the rich, which is consistent with Engel's law. Irrespective of rural-urban difference more than half of their expenditure is on purchasing food articles.

For examining the total expenditure on all commodities, the total expense is more for rich and middle-class households compared to the poor. The poor people spend more on cereal products because cereals are the primary source of energy of the poor people. It is followed by milk and milk products and vegetables. The middle-class people also spend more on cereals, but the share is less than the poor people. The middle class pay 19% of their total food expenditure on milk and milk products, and it is followed by vegetables and egg, fish and meat. They spend more on packaged processed food items than poor people. They devote a lesser portion to salt and sugar compared to the poor class. The richer sections of the society spend more on milk and milk products followed by cereals. The expenditure on egg, fish and meat is higher for the rich compared to the other groups. They spend more on beverages, packaged food items and fruits and dry fruits. From these, we can conclude that the more affluent section spend more on the high protein, high valued products.

When the item share of expenditure of the poor people in different sectors is analysed, we can see that the cereals and cereal products occupy a major share in the

total food expenditure of the poor people irrespective of urban-rural difference. It is 30.4% in the rural area and 29.3% in the urban area. Pulses and vegetables have almost equal share both rural and urban poor. There is a slight difference in the share of egg, fish and meat, fruits and dry fruits, packaged food products etc. Milk and milk products also marked the small difference in the claim that is more in the urban area. No much disparity can be seen in the item-wise share of consumption expenditure for rural and urban poor. That means the people with the same income have almost similar consumption basket irrespective of sectoral differences.

### 7.2.3 The response towards price change

Chapter VI analysed the responses of poor people, especially the urban poor, towards a rise in the price of food items. The demand system of the urban poor in India shows that the pulses and cereals are highly inelastic products. For milk and milk products (0.99%) and vegetable (0.95%), the price elasticity is almost one (unitary elastic). That is, a change in price leads to proportionate change in quantity demanded by the urban poor. Especially, figures of the uncompensated price elasticities show the cereal products are the major substitutes for protein-based food items like milk and dairy products and egg, meat and fish, and also pulses and pulses products. In other words, when there is an increase in the prices of protein-based commodities, while foods budgets remain unaffected, then the consumption is relocated to cereals and other related products. This is because the poor may not consider these products as necessary commodities like cereals.

Here the own-price elasticities are less than one for all the food categories that are they are inelastic. It is worth noting that most of the food categories appear as substitutes. Changes in the price of pulses do not affect the demand for all the other types. And some products have no effect due to a change in the price of other commodities. For example, when the price of vegetables is increasing or decreasing it does not affect the demand for egg, fish and meat. But changes in the price of egg, fish and meat have a positive effect on the demand for vegetables.

We can conclude that for commodities like cereals and pulses, the Engel curve is falling. As the food budget increases, the share of these products decreases. But the

share of other food items, egg, meat and fish and milk and related products are growing along with an increase in the food budget of the urban poor in India. To examine the impact of food prices on urban poor in India, we have to know the response of the rural poor also.

From the analysis, we can understand that the urban poor has a low-price elasticity compared to the rural poor. That is if there is an increase in the price of the food items, the urban poor will not change their demand. It leads to a rise in expenditure on food items. When the spending on food items increases it, in turn, leads to a decrease in the consumption of other non-food items, which in turn reduce their welfare.

But at the same time the price elasticity of the rural poor is more than that of the urban poor, which means if there is an increase in the price of food items, the rural poor will respond by reducing the consumption of the particular commodity. Most of the food items are produced in the rural area, and the rural poor possess land other than homestead, which can be used for cultivation of food items. Hence, for the rural poor, there may be domestic availability of food items, and they may substitute the high-priced commodities for domestically available food items. But at the same time, the urban poor has to spend more on inflated food items. This will reduce the consumption of other things. So, the welfare of urban people falls as a result of price change more than the rural poor.

While analysing the demand for food in India is diagnosed, we have to consider Kerala separately because Kerala has a unique place in India concerning characteristics, both social and economic. Kerala is a consumer state and also a non-agricultural state. For most of the agricultural commodities, especially food items, Kerala depends on other neighbouring states. So, whenever there is a change in price, it will have an immediate impact on Kerala. And another notable feature is that Kerala has a high rate of urbanisation, and it is the state where urban poverty is more than rural poverty. Moreover, Kerala is much different from any other Indian state and from India itself in terms of its development experience

For cereal products and pulses, the elasticity is lesser in rural area compared to the urban area. The price fluctuations on cereals and pulses affect rural people more than urban. But for egg, fish and meat and other food items elasticity are lesser for the urban area. So, the price fluctuations in these items affect urban poor compared to the rural poor. The milk and milk products show unitary elastic demand. From the analysis, we can see that the food inflation affected both the rural and urban poor in Kerala, depending on the food items.

From the analysis of elasticity, we can conclude that the urban poor in India suffers more from the price fluctuations. Since they do not change their demand for food following a change in price, the urban poor has spent more on these inflated food items. The rationales behind this conclusion are;

- Most of the food items are subject to food inflation. So, it is a severe problem as far as a country like India is concerned.
- Both the urban and rural poor in India are from the same expenditure class.
- The budget shares on food have an almost similar percentage for both urban and rural poor.
- But the price elasticity is lesser for urban poor, means they are not responding to a change in the price of food items. So, they have to pay more for these items.
- This may have reduced their consumption of other commodities and in turn their welfare.
- The rural poor possess land other than homestead compared to the urban poor. That may be used for cultivating food items, and the rural area mainly depends on agricultural activities.
- Therefore, rural people may substitute their own cultivated or domestic products for inflated food items.

- Consequently, the price elasticity of the rural poor is more compared to the urban poor and food price inflation affect the urban poor more compared to the rural poor.

- And from the analysis of poor people in Kerala, there we cannot see much difference in the elasticity in rural and urban areas, where there is no such clear distinction between rural and urban area.

- Since Kerala is a consumer and non-agricultural state, most of the commodities are imported from neighbouring states. So, food price fluctuations affect both sectors as well.

## 7.3 Policy Implications and Suggestions

Food inflation in India is a severe problem in the economy since it affects poor people very severely. So, the suggestions and policy recommendations of the study are;

- The government should intervene in the economy by controlling fuel price fluctuations because this variable highly influences food price.

- Support may be given to the farmers for reducing the cost of production in the agriculture sector, giving more subsidies on fertiliser, providing more irrigation and other infrastructure facilities and also by providing financial support through government organisations.

- Since the majority of the poor are out of the targeted category, it is necessary to provide ration card for all the vulnerable groups.

- The government should distribute more food items, including high valued commodities at a subsidised rate through fair price shops.

- Much more policies can be adopted for the upliftment of urban poor along with the rural poor like implementing programmes like MNREGP in the urban sector also.

## 7.4 Scope for Further Research

- The study focused on commodity consumption of food items. The impact of Unaccounted/ own consumption is not examined here. So, there is a scope for analysing unaccounted or own consumption of food in the future.
- The differences in responses of urban and rural poor towards a price fluctuation in all the states in India can be analysed.
- New series of Consumer Price Index can be used for examining food price inflation in future.
- The same problem can be examined with the help of upcoming NSO data.
- A comparison of food piece inflation of different states can be analysed by taking state-level Consumer Price Index.
- Protein intake and related health status can be studied.

## 7.5 Conclusion

The study focused on the impact of food inflation on the urban poor. Majority of the food items are subject to food price inflation, and both demand and supply-side factors are responsible for this. Among the people of India, the urban poor in India are badly affected due to this price fluctuations compared to the rural poor. Therefore, the government should take initiatives to implement certain specific programmes and policies to solve the problems of poor people, particularly urban poor.

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# APPENDICES

**APPENDIX I**

# SAMPLE DESIGN AND ESTIMATION PROCEDURE OF NSS 68th ROUND

The National Sample Survey (NSS), set up by the Government of India in 1950 to collect socio-economic data employing scientific sampling methods, started its sixty-eighth round from 1st July 2011. The survey will continue up to 30th June 2012. The 68th round (July 2011-June 2012) of NSS is earmarked for surveys on ‗Household Consumer Expenditure and ‗Employment and Unemployment '. The last survey on these subjects was conducted in 66th round of NSS (2009-10) which was the eighth *quinquennial* survey in the series on ‗Household consumer expenditure and ‗Employment and Unemployment. Current survey is similar to a quinquennial survey as far as subjects of enquiry, design, questionnaires and sample sizes are concerned. The period of survey is of one-year duration starting on 1st July 2011 and ending on 30th June 2012. The survey period of this round was divided into four sub-rounds of three months duration each as follows:

Sub-round 1 : July - September 2011
Sub-round 2 : October - December 2011
Sub-round 3 : January - March 2012
Sub-round 4 : April - June 2012

In each of these four sub-rounds equal number of sample villages/ blocks (First Stage Units, FSU's) allotted for survey with a view to ensuring uniform spread of sample FSUs over the entire survey period. Attempt will be made to survey each of the FSUs during the sub-round to which it is allotted. During this round, the following schedules of enquiry are being canvassed:

Schedule 0.0 : List of households
Schedule 1.0 : Consumer expenditure
Schedule 10 : Employment and unemployment

Two types of Schedule 1.0 viz. Schedule Type 1 and Schedule Type 2 are being canvassed in this round. The reference periodis the period of time to which the information collected relates. In NSS surveys, the reference period often varies from item to item. Data collected with different reference periods are known to exhibit certain systematic differences. In this round, two schedule types have been drawn up to study these differences in detail. Sample households will be divided into two sets – Schedule Type 1 will be canvassed in one set and Schedule Type 2 in the other. The reference periods to be used for different groups of consumption items are given below, separately for each schedule type.

| Cate-gory | Item groups | Reference period for | |
|---|---|---|---|
| | | Schedule Type 1 | Schedule Type 2 |
| I | Clothing, bedding, footwear, education, medical (institutional), durable goods | 'Last 30 days' and 'Last 365 days' | Last 365 days |
| II (F2+) | Edible oil; egg, fish & meat; vegetables, fruits, spices, beverages and processed foods; pan, tobacco & intoxicants | Last 30 days | Last 7 days |
| III | All other food (F1), fuel and light, miscellaneous goods and services including non-institutional medical; rents and taxes | Last 30 days | Last 30 days |

**Sample Design**

A stratified multi-stage design has been adopted for the 68th round survey. The First Stage Units (FSU) are the 2001 census villages (in the rural sector and Urban Frame Survey (UFS) blocks in the urban sector. The Ultimate Stage Units (USU) are households in both the sectors. In case of large FSUs, one intermediate stage of sampling is the selection of two hamlet-groups (hgs)/ sub-blocks (sbs) from each rural/ urban FSU.

For the rural sector, the list of 2001 census constitutes the sampling frame. For the urban sector, the list of UFS blocks (2007-12) is considered as the sampling frame. Within each district of a State/ UT, generally speaking, two basic strata have been formed: i) rural stratum comprising of all rural areas of the district and (ii) urban stratum comprising of all the urban areas of the district. However, within the urban areas of a district, if there are one or more towns with population 10 lakhs or more as per population census 2001 in a district, each of them forms a separate basic stratum and the remaining urban areas of the district are considered as another basic stratum.

**Rural sector r:** If 'r' be the sample size allocated for a rural stratum, the number of sub-strata formed would be 'r/4'. The villages within a district as per frame were first arranged in ascending order of population. Then sub-strata 1 to _r/4' have been demarcated in such a way that each sub-stratum comprised a group of villages of the arranged frame and have more or less equal population.

**Urban sector:** If _u' be the sample size for an urban stratum, _u/4' number of substrata has been formed. In case u/4 is more than 1, implying formation of 2 or more sub-strata, this is done by first arranging the towns in ascending order of total number of households in the town as per UFS phase 2007-12 and then arranging the IV units of each town and blocks within each IV unit in ascending order of their numbers. From this arranged frame of UFS blocks of all the towns/million plus city of a stratum, _u/4' number of sub- strata formed in such a way that each substratum has more or less equal number of households as per UFS 2007-12. The total number of sample FSUs has allocated to the States in proportion to population as per census 2001 subject to a minimum sample allocation to each State/ UT.

**Allocation of State level sample to rural and urban sectors:** State level sample size has been allocated between two sectors in proportion to population as per *census 2001* with double weightage to urban sector. However, if such weighted allocation resulted in too high sample size for the urban sector was restricted to that of the rural sector. A minimum of 16 FSUs (minimum 8 each for rural and urban sector separately) is allocated to each state/ UT.

**Allocation to strata/ sub-strata:** Within each sector of the State, the respective sample size has been allocated to the different strata/ sub-strata in proportion to the population as per census 2001. Allocations at stratum level are adjusted to multiples of 4 with a minimum sample size of 4. Allocation for each sub-stratum is 4. Equal number of samples has been allocated among the four sub-rounds.

**Selection of FSUs:** For the rural sector, from each stratum/ sub-stratum, required number of sample villages has been selected by probability proportional to size with replacement (PPSWR), size being the population of the village as per Census 2001. For the urban sector, UFS 2007-12 phase has been used for all towns and cities and FSUs have been selected from each stratum/sub-stratum by using Simple Random Sampling Without Replacement (SRSWOR). Both rural and urban samples are to be drawn in the form of two independent subsamples and equal numbers of samples have been allocated among the four sub rounds.

## CONCEPTS AND DEFINITIONS

Important concepts and definitions used in different schedules of this survey are explained below.

**Population coverage:** The following rules regarding the population to be covered are to be remembered in listing of households and persons:

1. Under-trial prisoners in jails and indoor patients of hospitals, nursing homes etc., are to be excluded, but residential staff therein will be listed while listing is done in such institutions. The persons of the first category will be considered as normal members of their parent households and will be counted there. Convicted prisoners undergoing sentence will be outside the coverage of the survey.

2. Floating population, i.e., persons without any normal residence will not be listed. But households residing in open space, roadside shelter, under a bridge, etc., more or less regularly in the same place, will be listed.

3. Foreign nationals will not be listed, nor their domestic servants, if by definition the latter belong to the foreign national's household. If, however, a foreign national becomes an Indian citizen for all practical purposes, he or she will be covered.

4. Persons residing in barracks of military and paramilitary forces (like police, BSF, etc.) will be kept outside the survey coverage due to difficulty in conduct of survey therein. However, civilian population residing in their neighbourhood, including the family quarters of service personnel, are to be covered. Permission for this may have to be obtained from appropriate authorities.

5. Orphanages, rescue homes, *ashrams* and vagrant houses are outside the survey coverage. However, persons staying in old age homes, students staying in *ashrams*/ hostels and the residential staff (other than monks/ nuns) of these ashrams may be listed. For orphanages, although orphans are not to be listed, the persons looking after them and staying there may be considered for listing.

**House:** Every structure, tent, shelter, etc. is a house irrespective of its use. It may be used for residential or non-residential purpose or both or even may be vacant.

**Household:** A group of persons normally living together and taking food from a common kitchen will constitute a household. It will include temporary stay-always (those whose total period of absence from the household is expected to be less than 6 months) but exclude temporary visitors and guests (expected total period of stay less than 6 months). Even though the determination of the actual composition of a household will be left to the judgment of the head of the household, the following procedures will be adopted as guidelines.

Each inmate (including residential staff) of a hostel, mess, hotel, boarding and lodging house, etc., will constitute a single-member household. If, however, a group of persons among them normally pool their income for spending, they will together be treated as forming a single household. For example, a family living in a hotel will be treated as a single household.

In deciding the composition of a household, more emphasis is to be placed on 'normally living together' than on 'ordinarily taking food from a common kitchen'. In case the place of residence of a person is different from the place of boarding, he or she will be treated as a member of the household with whom he or she resides.

A resident employee, or domestic servant, or a paying guest (but not just a tenant in the household) will be considered as a member of the household with whom he or she resides even though he or she is not a member of the same family.

When a person sleeps in one place (say, in a shop or in a room in another house because of space shortage) but usually takes food with his or her family, he or she should be treated not as a single member household but as a member of the household in which other members of his or her family stay.

If a member of a family (say, a son or a daughter of the head of the family) stays elsewhere (say, in hostel for studies or for any other reason), he/ she will not be considered as a member of his/ her parent's household. However, he/ she will be listed as a single member household if the hostel is listed.

**Household size:** The number of members of a household is its size.

**Household type:** The household type, based on the means of livelihood of a household, is decided on the basis of the sources of the household's income during the 365 days preceding the date of survey. For this purpose, only the household's income (net income and not gross income) from economic activities is to be considered; but the incomes of servants and paying guests are not to be taken into account.

In **rural** areas, a household will belong to any one of the following six household types: self-employed in agriculture, self-employed in non-agriculture, regular wage/salary earning, casual labour in agriculture, casual labour in non-agriculture and others. For **urban** areas, the household types are: Self-employed, regular wage/salary earning, casual labour and others

**Procedure for determining household type in rural sector**: The broad household types in rural areas to be used in this round are *self-employed*, *regular wage/salary*

*earning, casual labour* and *others*. A household which does not have any income from economic activities will be classified under *others.* Within each of the broad category of *self-employed* and *casual labours* two specific household types will be distinguished, depending on their major income from agricultural activities (sections A of NIC-2008) and non-agricultural activities (rest of the NIC- 2008 sections, excluding section A). The specific household types for self employed are: s*elf-employed in agriculture* and *self-employed in non-agriculture.* For casual labour, the specific household types are: *casual labour in agriculture* and *casual labour in non-agriculture*. In the determination of the household type in the rural areas, first the household's income from economic activities will be considered. Rural household will be first categorized as _*self-employed*', _*regular wage/salary earning*' or _*casual labour*' depending on the single major source of its income from economic activities during last 365 days. Further, for those households which are categorized either as *self-employed* or *casual labours*, specific household types (s*elf-employed in agriculture or self-employed in nonagriculture* and *casual labour in agriculture or casual labour in non-agriculture*) will be assigned depending on the single major source of income from agricultural or non-agricultural activities.

For **urban** areas the different urban types correspond to four sources of household income, unlike the rural sector where five sources are considered. An urban household will be assigned the type *self-employed, regular wage/salary earning, casual labour* or *others* corresponding to the major source of its income from economic activities during the last 365 days. A household which does not have any income from economic activities will be classified under *others*.

**Land owned:** A piece of land is considered _owned by the household if permanent heritable possession with or without the right to transfer the title is vested in a member or members of the household. Land held in owner-like possession under long-term lease or assignment is also considered as land owned.

**Household monthly per capita expenditure:** Household consumer expenditure is measured as the expenditure incurred by a household on domestic account during a specified period, called reference period. It also includes the imputed values of goods

and services, which are not purchased but procured otherwise for consumption. In other words, it is the sum total of monetary values of all the items (i.e. goods and services) consumed by the household on domestic account during the reference period. The imputed rent of owner-occupied houses is excluded from consumption expenditure. Any expenditure incurred towards the productive enterprises of the households is also excluded from the household consumer expenditure. Monthly per capita expenditure (MPCE) is the household consumer expenditure over a period of 30 days divided by household size. involving the production of primary commodities for own consumption and own account production of fixed assets.

**Economic activity:** The entire spectrum of human activity falls into two categories: economic activity and non-economic activity. Any activity that results in production of goods and services that adds value to national product is considered as an economic activity. The economic activities have two parts - market activities and non-market activities. Market activities are those that involve remuneration to those who perform it, i.e., activity performed for pay or profit. Such activities include production of all goods and services for market including those of government services, etc. Non-market activities are those. The full spectrum of economic activities as defined in the UN System of National

**Different approaches for determining activity status:** The persons surveyed are to be classified into various activity categories on the basis of activities pursued by them during certain specified reference periods. There are three reference periods for this survey viz. (i) one year, (ii) one week and (iii) each day of the reference week. Based on these three periods, three different measures of activity status are arrived at. These are termed respectively as usual status, current weekly status and current daily status. The activity status determined on the basis of the reference period of 1 year is known as the usual activity status of a person, that determined on the basis of a reference period of 1 week is known as the current weekly status (CWS) of the person and the activity status determined on the basis of each day of the reference week is known as the current daily status (CDS) of the person. Identification of each individual into a unique situation poses a problem when more than one of three types of broad activity

status viz. _employed‘, _unemployed‘ and _not in labour force‘ is concurrently obtained for a person. In such an eventuality, unique identification under any one of the three broad activity statuses is done by adopting either the major time criterion or priority criterion. The former is used for classification of persons under 'usual activity status' and, the latter, for classification of persons under _current activity status‘. If, by adopting one of these two criteria, a person categorized as engaged in economic activity is found to be pursuing more than one economic activity during the reference period, the appropriate detailed activity status category will relate to the activity in which relatively more time has been spent. Similar approach is adopted for noneconomic activities also.

**Usual activity status:** The usual activity status relates to the activity status of a person during the reference period of 365 days preceding the date of survey. The activity status on which a person spent relatively long time (major time criterion) during the 365 days preceding the date of survey is considered the *usual principal activity status* of the person. To decide the usual principal activity of a person, he or she is first categorised as belonging to the labour force or not, during the reference period **on the basis of major time criterion**. Persons, thus adjudged as not belonging to the labour force are assigned the broad activity status 'neither working nor available for work'. For the persons belonging to the labour force, the broad activity status of either 'working' or _not working but seeking and/ or available for work‘ is then ascertained again on the basis of the relatively long time spent in the labour force during the 365 days preceding the date of survey. Within the broad activity status so determined, the detailed activity status category of a person pursuing more than one such activity will be determined again on the basis of the _relatively long time spent‘ criterion.

**Subsidiary economic activity status:** A person whose principal usual status is determined on the basis of the major time criterion may have pursued some economic activity **for 30 days or more** during the reference period of 365 days preceding the date of survey. The status in which such economic activity is pursued during the reference period of 365 days preceding the date of survey is the subsidiary economic activity status of the person. In case of multiple subsidiary economic activities, the

major activity and status based on the ‗relatively long time spent' criterion will be considered. It may be noted that engagement in work in subsidiary capacity may arise out of the two following situations:

i) a person may be engaged for a relatively long period during the 365 days in an economic (a non-economic activity) and for a relatively small period, which is not less than 30 days, in another economic activity (any economic activity).

ii) a person may be pursuing an economic activity (non-economic activity) almost throughout the year in the principal status and also simultaneously pursuing another economic activity (any economic activity) for relatively small period in a subsidiary capacity. In such cases, since both the activities are being pursued throughout the year and the duration of both the activities is more than 30 days, the activity which is being pursued for a relatively small period will be considered as his/ her subsidiary activity.

**Current weekly activity status:** The current weekly activity status of a person is the activity status obtaining for a person during a reference period of 7 days preceding the date of survey. It is decided **on the basis of a certainpriority cum major time criterion**. According to the priority criterion, the status of 'working' gets priority over the status of 'not working but seeking or available for work', which in turn gets priority over the status of 'neither working nor available for work'.

*A person is considered working (or employed)) if he/ she, while pursuing any economic activity, had worked for at least one hour on at least one day during the 7 days preceding the date of survey.* A person is considered 'seeking or available for work (or unemployed)' if during the reference week no economic activity was pursued by the person but he/ she made efforts to get work or had been available for work any time during the reference week though not actively seeking work in the belief that no work was available.

A person who had neither worked nor was available for work any time during the reference week, is considered to be engaged in non-economic activities (or not in labour force). Having decided the broad current weekly activity status of a person on

the basis of 'priority' criterion, the detailed current weekly activity status is again decided **on the basis of 'major time' criterion if a person is pursuing multiple economic activities**. **Current daily activity status:** The activity pattern of the population, particularly in the unorganised sector, is such that during a week, and sometimes, even during a day, a person can pursue more than one activity. Moreover, many people can even undertake both economic and non-economic activities on the same day of a reference week. The current daily activity status for a person is determined on the basis of his/ her activity status on each day of the reference week **using a priority-cum-major time criterion** (day to day labour time disposition). The following points may be noted for determining the current daily status of a person:

i) Each day of the reference week is looked upon as comprising either two 'half days' or a 'full day' for assigning the activity status.

ii) A person is considered 'working' (employed) for the entire day if he/ she had worked for 4 hours or more during the day.

*iii)* If a person was engaged in more than one economic activity for *4 hours or more* on a day, he/ she would be assigned two economic activities out of the different economic activities according to descending order of time spent on these on the reference day. In such cases, one 'half day' work will be considered for each of those two economic activities.

iv) If the person had worked for *1 hour or more but less than 4 hours on a day*, he/ she is considered 'working' (employed) for half-day and 'seeking or available for work' (unemployed) or 'neither seeking nor available for work' (not in labour force) for the other half of the day depending on whether he was seeking/ available for work or not.

v) If a person was not engaged in 'work' even for 1 hour on a day but was seeking/ available for work even for 4 hours or more, he/ she is considered 'unemployed' for the entire day. However, if a person was not engaged in 'work' even for 1 hour on a day but was 'seeking/ available for work' for more

than 1 hour and less than 4 hours only, he/ she is considered 'unemployed' for half day and 'not in labour force' for the other half of the day.

vi) A person who neither had any 'work' to do nor was available for 'work' even for half a day was considered 'not in labour force' for the entire day and is assigned one or two of the detailed non-economic activity status depending upon the activities pursued by him/her during the reference day. It may be noted that while assigning intensity, an intensity of 1.0 will be given against an activity which is done for ‗full day' and 0.5, if it is done for ‗half day'.

**Homestead land**: (i) Homestead of a household is defined as the dwelling house of the household together with the courtyard, compound, garden, out-house, place of worship, family graveyard, guest house, shop, workshop and offices for running household enterprises, tanks, wells, latrines, drains and boundary walls *annexed* to the dwelling house. All land coming under homestead is defined as homestead land. (ii) Homestead may constitute only a part of a plot. Sometimes, gardens, orchards or plantations, though adjacent to the homestead and lying within the boundary walls, may be located on a clearly distinct piece of land. In such cases, land under garden, orchard or plantation will not be considered as homestead land.

**APPENDIX II**

# BAI-PARRON TEST RESULT

Multiple breakpoint tests

Bai-Perron tests of L+1 vs. L sequentially determined breaks

Date: 09/19/20 Time: 10:01

Sample: 1 32

Included observations: 32

Breaking variables: GR__WPI_FA

Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

| Sequential F-statistic determined breaks: | | | 0 |
|---|---|---|---|
| Break Test | F-statistic | Scaled F-statistic | Critical Value** |
| 0 vs. 1 | 5.778628 | 5.778628 | 8.58 |

* Significant at the 0.05 level.

** Bai-Perron (Econometric Journal, 2003) critical values.

**APPENDIX III**

## 1 Poor: Quadratic Almost Ideal Demand System (QUAIDS) Analysis on Food Expenditure

### 1.1 Food demand elasticity: first budgeting stage

| **Food demand elasticities: first budgeting stage** | | |
|---|---|---|
| **Income elasticity of total expenditure** | | |
| | 0.753 | |
| | | |
| **Uncompensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.983** | | -0.980 |
| | | |
| **Compensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.515** | | -0.451 |

### 1.2 Estimates

Quadratic AIDS model

Number of obs = 19671

Number of demographics = 1

Alpha_0 = 5

Log-likelihood = 108137.92

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| alpha | | | | | | |
| alpha_1 | .3687655 | .014097 | 26.16 | 0.000 | .3411359 | .3963952 |
| alpha_2 | .2211213 | .0074569 | 29.65 | 0.000 | .2065059 | .2357366 |
| alpha_3 | -.0641568 | .0192116 | -3.34 | 0.001 | -.1018108 | -.0265027 |
| alpha_4 | .1418161 | .0101753 | 13.94 | 0.000 | .1218728 | .1617594 |
| alpha_5 | .1324953 | .0088142 | 15.03 | 0.000 | .1152197 | .1497709 |
| alpha_6 | .1999585 | .0134439 | 14.87 | 0.000 | .1736089 | .2263082 |
| beta | | | | | | |
| beta_1 | .0103079 | .0085144 | 1.21 | 0.226 | -.0063801 | .0269959 |

| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| beta_2 | -.033182 | .0030407 | -10.91 | 0.000 | -.0391417 | -.0272224 |
| beta_3 | .0730528 | .0082491 | 8.86 | 0.000 | .0568849 | .0892208 |
| beta_4 | -.0296043 | .0058135 | -5.09 | 0.000 | -.0409985 | -.01821 |
| beta_5 | .0034655 | .0051752 | 0.67 | 0.503 | -.0066778 | .0136088 |
| beta_6 | -.02404 | .0076385 | -3.15 | 0.002 | -.0390111 | -.0090688 |
| gamma | | | | | | |
| gamma_1_1 | .0252365 | .0010966 | 23.01 | 0.000 | .0230872 | .0273859 |
| gamma_2_1 | -.0138373 | .0005813 | -23.80 | 0.000 | -.0149766 | -.0126979 |
| gamma_3_1 | .005566 | .0014984 | 3.71 | 0.000 | .0026291 | .0085029 |
| gamma_4_1 | -.0060226 | .0005452 | -11.05 | 0.000 | -.0070911 | -.0049541 |
| gamma_5_1 | -.0025509 | .0004547 | -5.61 | 0.000 | -.0034422 | -.0016597 |
| gamma_6_1 | -.0083917 | .0006862 | -12.23 | 0.000 | -.0097367 | -.0070467 |
| gamma_2_2 | .0357081 | .0005694 | 62.71 | 0.000 | .0345921 | .0368242 |
| gamma_3_2 | .001482 | .0008315 | 1.78 | 0.075 | -.0001478 | .0031118 |
| gamma_4_2 | -.0059521 | .0003785 | -15.73 | 0.000 | -.0066939 | -.0052102 |
| gamma_5_2 | -.0058056 | .0003268 | -17.77 | 0.000 | -.0064461 | -.0051651 |
| gamma_6_2 | -.0115952 | .0004833 | -23.99 | 0.000 | -.0125424 | -.010648 |
| gamma_3_3 | -.0147511 | .0026059 | -5.66 | 0.000 | -.0198586 | -.0096436 |
| gamma_4_3 | .0028233 | .0010424 | 2.71 | 0.007 | .0007803 | .0048664 |
| gamma_5_3 | .0029053 | .0008525 | 3.41 | 0.001 | .0012345 | .004576 |
| gamma_6_3 | .0019745 | .0012723 | 1.55 | 0.121 | -.0005191 | .0044682 |
| gamma_4_4 | .0147963 | .0005807 | 25.48 | 0.000 | .0136582 | .0159344 |
| gamma_5_4 | -.0010222 | .0003258 | -3.14 | 0.002 | -.0016609 | -.0003836 |
| gamma_6_4 | -.0046228 | .0004754 | -9.72 | 0.000 | -.0055545 | -.003691 |
| gamma_5_5 | .0044163 | .0003554 | 12.43 | 0.000 | .0037196 | .0051129 |
| gamma_6_5 | .0020573 | .00039 | 5.28 | 0.000 | .0012929 | .0028216 |
| gamma_6_6 | .0205778 | .0008311 | 24.76 | 0.000 | .0189488 | .0222068 |
| lambda | | | | | | |
| lambda_1 | .0030575 | .0011941 | 2.56 | 0.010 | .0007171 | .005398 |
| lambda_2 | -.0001593 | .0003753 | -0.42 | 0.671 | -.000895 | .0005763 |
| lambda_3 | -.010072 | .0008591 | -11.72 | 0.000 | -.0117558 | -.0083883 |
| lambda_4 | .004055 | .0008346 | 4.86 | 0.000 | .0024193 | .0056907 |
| lambda_5 | .0002272 | .0007484 | 0.30 | 0.761 | -.0012396 | .0016939 |
| lambda_6 | .0028917 | .0010499 | 2.75 | 0.006 | .000834 | .0049495 |

| Food Variables | Expenditure Elasticity |
|---|---|
| **Cereals and Products** | 0.9970159 |
| **Pulses and Products** | 0.3956304 |
| **Milk and Milk Products** | 1.2005085 |
| **Egg, Fish and Meat** | 1.0417249 |
| **Vegetables and Fruits** | 0.9953461 |
| **Other Food Items** | 1.0073376 |

### 1.3 Uncompensated Elasticity

| **Uncompensated price elasticity:** | | | | | | |
|---|---|---|---|---|---|---|
| | Cereals and Products | Pulses and Products | Milk and Milk Products | Egg, Fish and Meat | Vegetables and Fruits | Other Food Items |
| **Cereals and Products** | -0.895469 | -0.050382 | 0.010104 | -0.020894 | -0.009537 | -0.030837 |
| **Pulses and Products** | -0.027786 | -0.372447 | 0.003980 | 0.004785 | 0.003930 | -0.008092 |
| **Milk and Milk Products** | -0.039303 | -0.047015 | -1.018997 | -0.027924 | -0.015135 | -0.052135 |
| **Egg, Fish and Meat** | -0.082815 | -0.067423 | -0.014685 | -0.792996 | -0.018894 | -0.064912 |
| **Vegetables and Fruits** | -0.016260 | -0.039407 | 0.018691 | -0.006108 | -0.968235 | 0.015974 |
| **Other Food Items** | -0.030079 | -0.038887 | -0.002917 | -0.015301 | 0.006492 | -0.926645 |

## 1.4 Compensated Elasticity

| Compensated Price Elasticity | | | | | | |
|---|---|---|---|---|---|---|
| | **Cereals and Products** | **Pulses and Products** | **Milk and Milk Products** | **Egg, Fish and Meat** | **Vegetables and Fruits** | **Other Food Items** |
| **Cereals and Products** | -0.646845 | 0.017612 | 0.196561 | 0.052563 | 0.132289 | 0.247819 |
| **Pulses and Products** | 0.070871 | -0.345466 | 0.077969 | 0.033934 | 0.060208 | 0.102483 |
| **Milk and Milk Products** | 0.260066 | 0.034858 | -0.794484 | 0.060526 | 0.155638 | 0.283395 |
| **Egg, Fish and Meat** | 0.176959 | 0.003621 | 0.180133 | -0.716244 | 0.129292 | 0.226239 |
| **Vegetables and Fruits** | 0.231948 | 0.028474 | 0.204836 | 0.067226 | -0.826647 | 0.294164 |
| **Other Food Items** | 0.221119 | 0.029812 | 0.185471 | 0.058917 | 0.149787 | -0.645105 |

**APPENDIX IV**

## 2 Rural Poor: Quadratic Almost Ideal Demand System (QUAIDS) Analysis on Food Expenditure

### 2.1 Food demand elasticity: first budgeting stage

| **Food demand elasticities: first budgeting stage** | | |
|---|---|---|
| **Income elasticity of total expenditure** | | |
| | 0.799 | |
| | | |
| **Uncompensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.981** | | -0.975 |
| | | |
| **Compensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.487** | | -0.478 |

### 2.2 Estimates

Quadratic AIDS model

Number of obs = 10592

Number of demographics = 0

Alpha_0 = 5

Log-likelihood = 59473.298

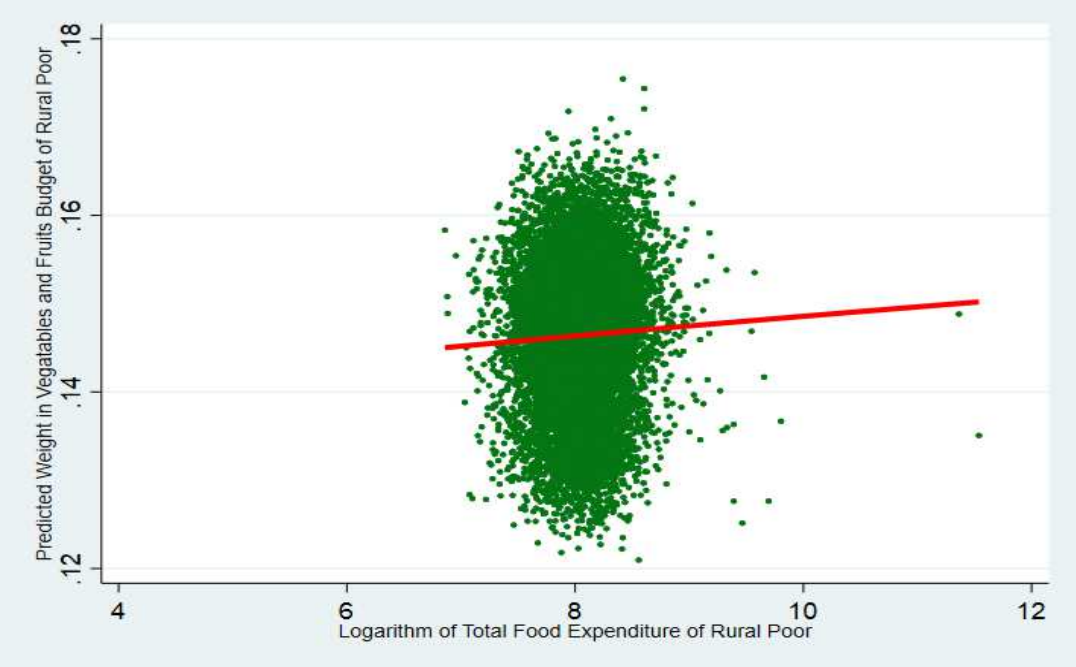
| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| alpha | | | | | | |
| alpha_1 | .2162759 | .0278521 | 7.77 | 0.000 | .1616867 | .270865 |
| alpha_2 | .2673868 | .0099677 | 26.83 | 0.000 | .2478505 | .286923 |
| alpha_3 | -.0433297 | .0212217 | -2.04 | 0.041 | -.0849235 | -.0017358 |
| alpha_4 | .2928391 | .0178676 | 16.39 | 0.000 | .2578192 | .3278589 |
| alpha_5 | .1183341 | .0159254 | 7.43 | 0.000 | .0871208 | .1495473 |
| alpha_6 | .1484939 | .0239567 | 6.20 | 0.000 | .1015397 | .1954481 |
| beta | | | | | | |

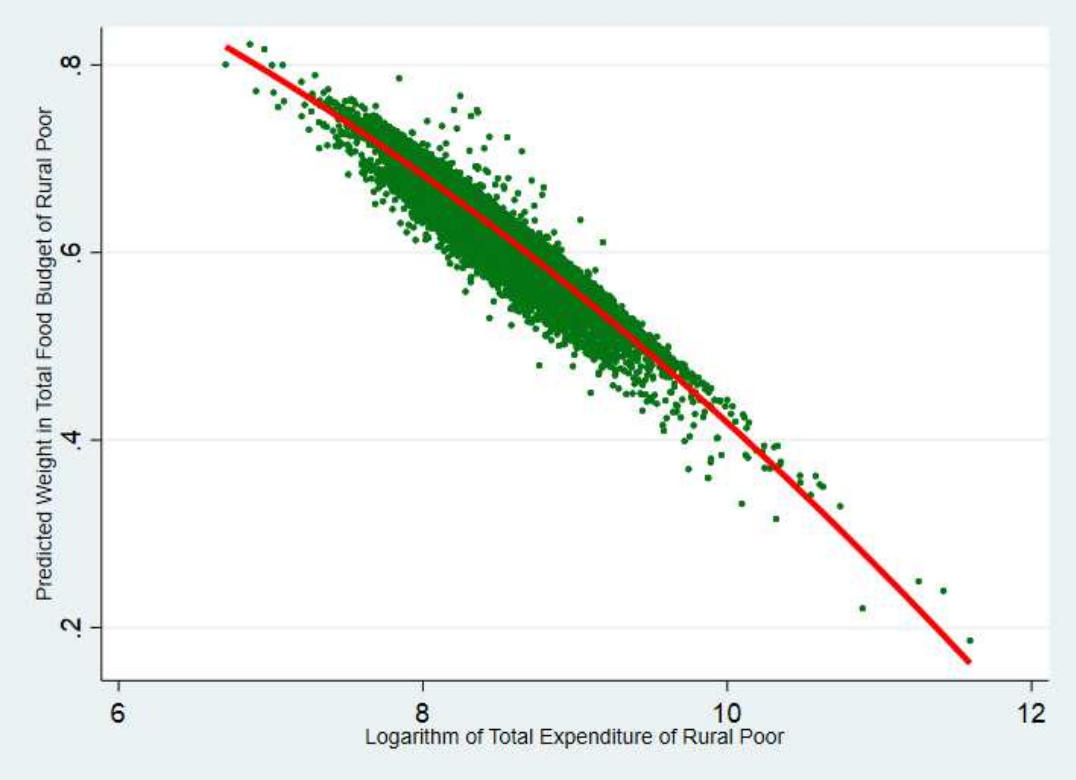
| | | | | | | |
|---|---|---|---|---|---|---|
| beta_1 | .0454288 | .0122688 | 3.70 | 0.000 | .0213823 | .0694752 |
| beta_2 | -.0478948 | .004294 | -11.15 | 0.000 | -.0563109 | -.0394787 |
| beta_3 | .0721336 | .0092794 | 7.77 | 0.000 | .0539464 | .0903208 |
| beta_4 | -.0939201 | .0075484 | -12.44 | 0.000 | -.1087146 | -.0791256 |
| beta_5 | .0063116 | .0071044 | 0.89 | 0.374 | -.0076126 | .0202359 |
| beta_6 | .0179409 | .0107207 | 1.67 | 0.094 | -.0030713 | .0389532 |
| gamma | | | | | | |
| gamma_1_1 | .0176392 | .0025047 | 7.04 | 0.000 | .0127301 | .0225483 |
| gamma_2_1 | -.0096162 | .0011529 | -8.34 | 0.000 | -.0118759 | -.0073565 |
| gamma_3_1 | -.0003753 | .0014605 | -0.26 | 0.797 | -.0032379 | .0024873 |
| gamma_4_1 | .0015269 | .002331 | 0.66 | 0.512 | -.0030418 | .0060956 |
| gamma_5_1 | -.0024504 | .0008457 | -2.90 | 0.004 | -.004108 | -.0007928 |
| gamma_6_1 | -.0067242 | .0012757 | -5.27 | 0.000 | -.0092245 | -.0042239 |
| gamma_2_2 | .0349921 | .0009376 | 37.32 | 0.000 | .0331544 | .0368297 |
| gamma_3_2 | .0009702 | .0009889 | 0.98 | 0.327 | -.000968 | .0029084 |
| gamma_4_2 | -.0119408 | .0010159 | -11.75 | 0.000 | -.0139319 | -.0099497 |
| gamma_5_2 | -.0054188 | .0006493 | -8.35 | 0.000 | -.0066913 | -.0041462 |
| gamma_6_2 | -.0089865 | .0010176 | -8.83 | 0.000 | -.0109811 | -.006992 |
| gamma_3_3 | -.01408 | .0024221 | -5.81 | 0.000 | -.0188271 | -.0093328 |
| gamma_4_3 | .0117961 | .0018016 | 6.55 | 0.000 | .008265 | .0153271 |
| gamma_5_3 | .0020509 | .0009989 | 2.05 | 0.040 | .000093 | .0040087 |
| gamma_6_3 | -.0003619 | .0014977 | -0.24 | 0.809 | -.0032972 | .0025735 |
| gamma_4_4 | -.0006343 | .0026736 | -0.24 | 0.812 | -.0058745 | .004606 |
| gamma_5_4 | -.000058 | .0012702 | -0.05 | 0.964 | -.0025476 | .0024316 |
| gamma_6_4 | -.0006899 | .0019914 | -0.35 | 0.729 | -.004593 | .0032131 |
| gamma_5_5 | .0038129 | .0004831 | 7.89 | 0.000 | .002866 | .0047597 |
| gamma_6_5 | .0020634 | .0005341 | 3.86 | 0.000 | .0010167 | .0031102 |
| gamma_6_6 | .0146991 | .0011877 | 12.38 | 0.000 | .0123712 | .0170269 |
| lambda | | | | | | |
| lambda_1 | -.0032322 | .0013595 | -2.38 | 0.017 | -.0058968 | -.0005676 |
| lambda_2 | .0006127 | .0004849 | 1.26 | 0.206 | -.0003378 | .0015632 |
| lambda_3 | -.0066147 | .0010137 | -6.53 | 0.000 | -.0086015 | -.0046278 |

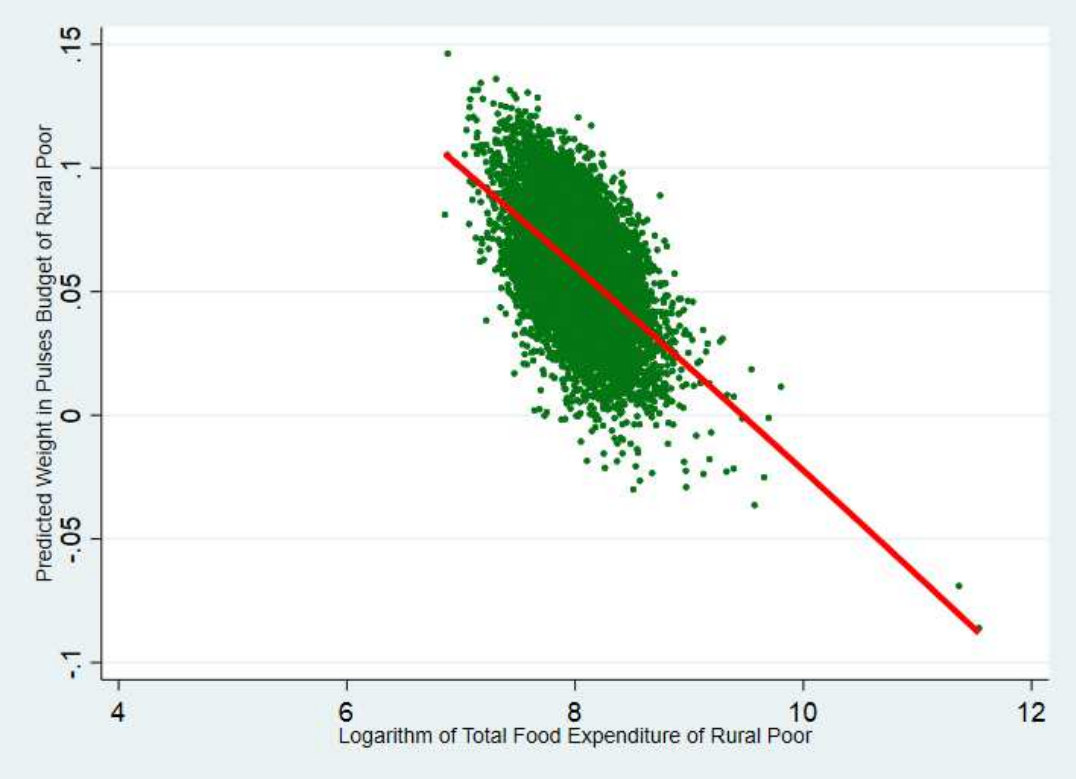
| | | | | | | |
|---|---|---|---|---|---|---|
| lambda_4 | .0113736 | .0008715 | 13.05 | 0.000 | .0096655 | .0130818 |
| lambda_5 | -.000617 | .000816 | -0.76 | 0.450 | -.0022163 | .0009824 |
| lambda_6 | -.0015225 | .0012495 | -1.22 | 0.223 | -.0039714 | .0009264 |

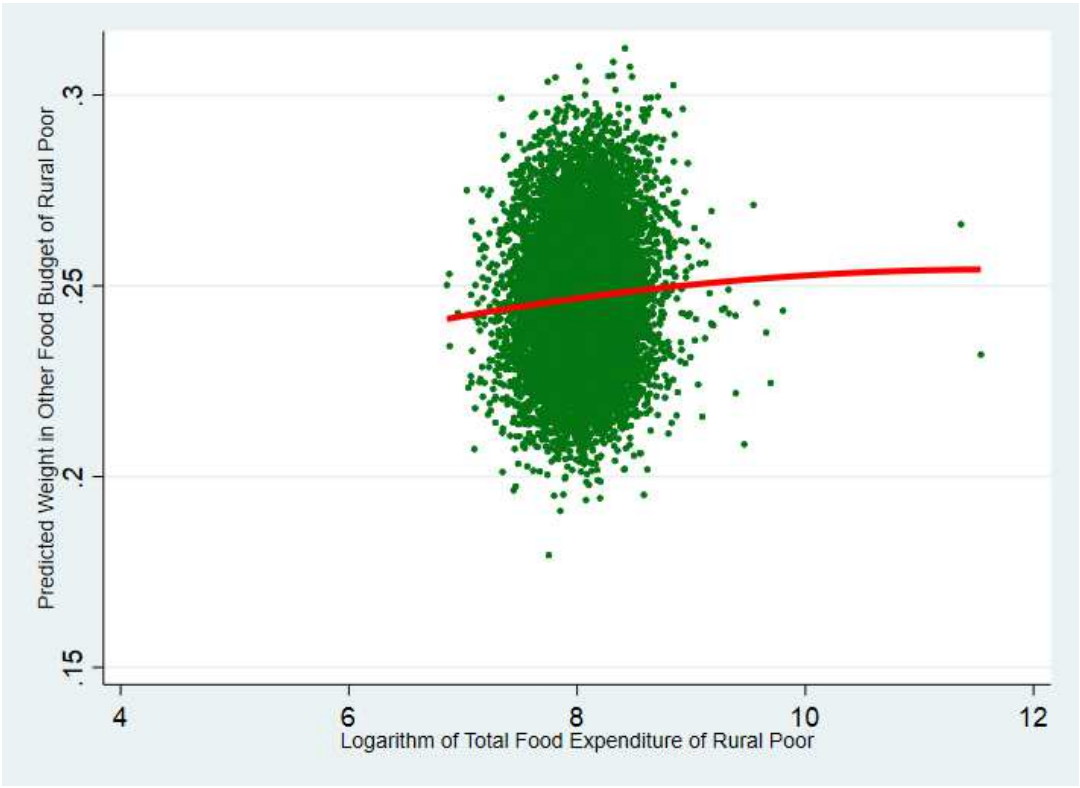
**APPENDIX V**

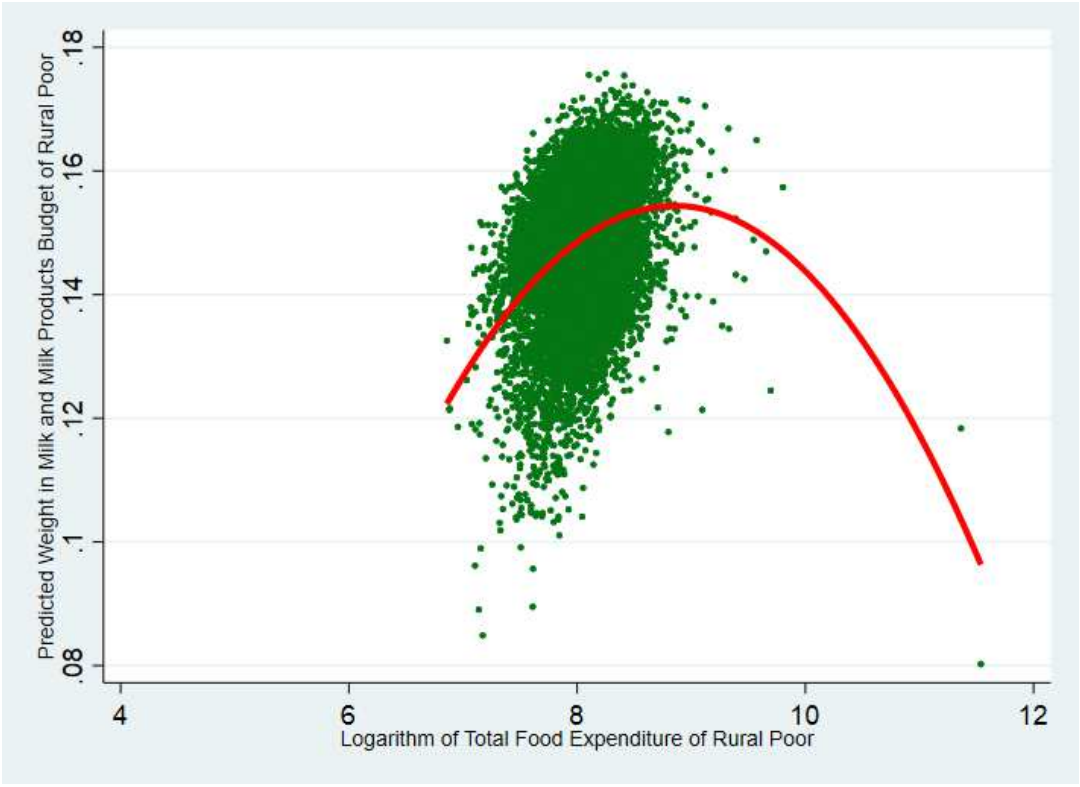
# ENGEL CURVES- RURAL FOOD DEMAND SYSTEM

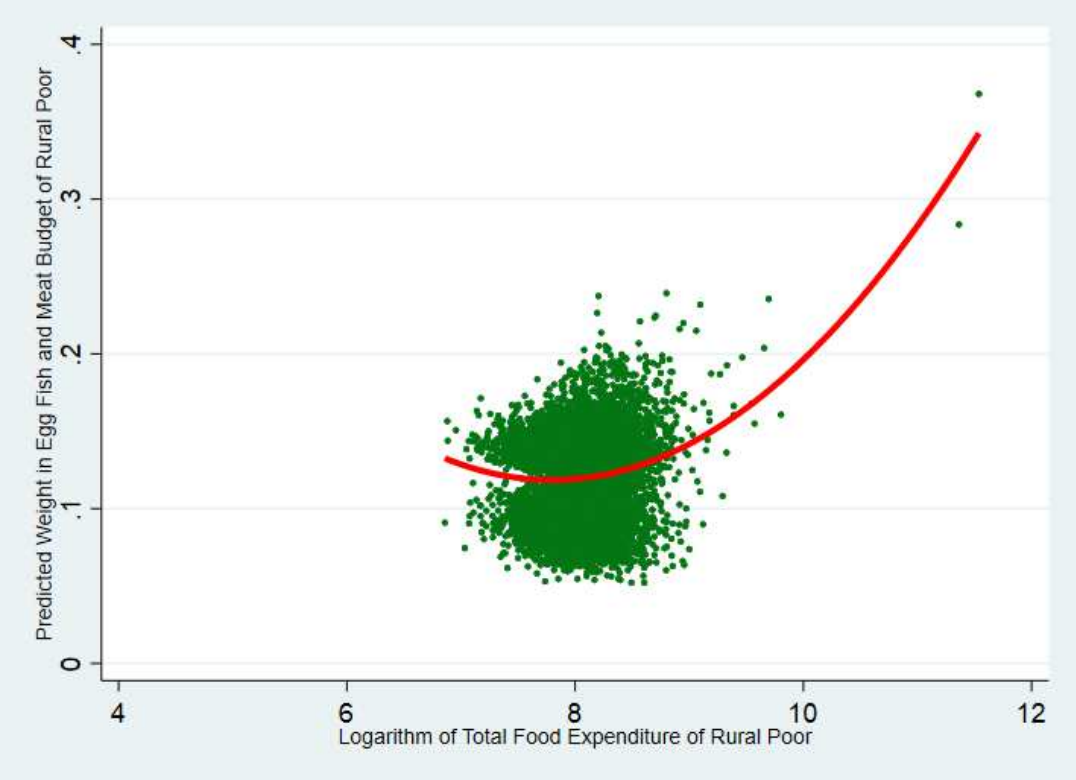


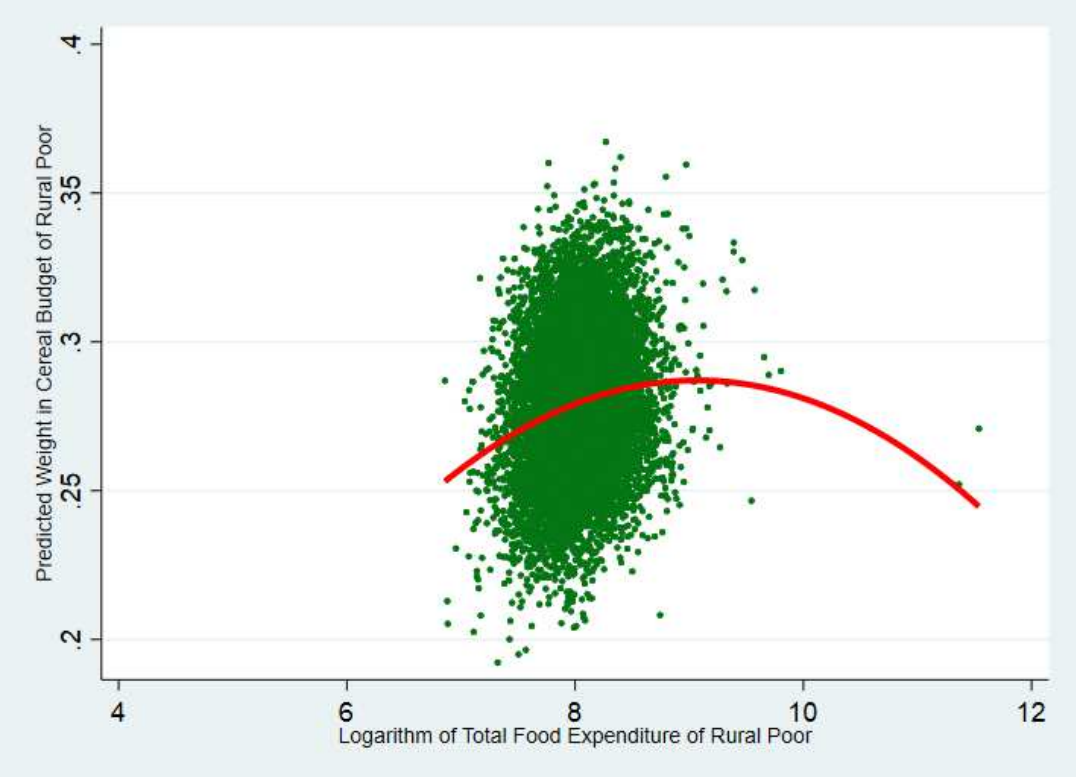

Predicted Weight in Total Food Budget of Rural Poor
.2
.4
.6
.8
6
8
10
12
Logarithm of Total Expenditure of Rural Poor


Predicted Weight in Pulses Budget of Rural Poor
-.1
-.05
0
.05
.1
.15
4
6
8
10
12
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Other Food Budget of Rural Poor
.15
.2
.25
.3
4
6
8
10
12
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Milk and Milk Products Budget of Rural Poor
.08
.1
.12
.14
.16
.18
4
6
8
10
12
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Egg Fish and Meat Budget of Rural Poor
0
.1
.2
.3
.4
4
6
8
10
12
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Cereal Budget of Rural Poor
.2
.25
.3
.35
.4
4
6
8
10
12
Logarithm of Total Food Expenditure of Rural Poor

## APPENDIX VI

### Unit root test result for Money Supply

Null Hypothesis: GR__MONEY_SUPPLY has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.514532 | 0.0001 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR__MONEY_SUPPLY)
Method: Least Squares
Date: 06/28/20 Time: 10:45
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR__MONEY_SUPPLY(-1) | -1.023818 | 0.185658 | -5.514532 | 0.0000 |
| C | 0.148175 | 0.029058 | 5.099244 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.511867 | Mean dependent var | -3.44E-05 |
| Adjusted R-squared | 0.495035 | S.D. dependent var | 0.086561 |
| S.E. of regression | 0.061511 | Akaike info criterion | -2.676850 |
| Sum squared resid | 0.109726 | Schwarz criterion | -2.584335 |
| Log likelihood | 43.49117 | Hannan-Quinn criter. | -2.646692 |
| F-statistic | 30.41006 | Durbin-Watson stat | 1.987400 |
| Prob(F-statistic) | 0.000006 | | |

## Unit root test result for Percapita Income

Null Hypothesis: GR__PCI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.436555 | 0.0014 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR__PCI)
Method: Least Squares
Date: 06/28/20 Time: 10:49
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR__PCI(-1) | -0.748879 | 0.168797 | -4.436555 | 0.0001 |
| C | 0.037479 | 0.008903 | 4.209581 | 0.0002 |

| | | | |
|---|---|---|---|
| R-squared | 0.404310 | Mean dependent var | 0.001586 |
| Adjusted R-squared | 0.383769 | S.D. dependent var | 0.026365 |
| S.E. of regression | 0.020696 | Akaike info criterion | -4.855381 |
| Sum squared resid | 0.012422 | Schwarz criterion | -4.762866 |
| Log likelihood | 77.25841 | Hannan-Quinn criter. | -4.825224 |
| F-statistic | 19.68302 | Durbin-Watson stat | 1.670173 |
| Prob(F-statistic) | 0.000121 | | |

## Unit root test result for Production of food grains

Null Hypothesis: GR__PRODUCTION__FOOD_GRAINS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -10.45098 | 0.0000 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR__PRODUCTION__FOOD_GRAINS)
Method: Least Squares
Date: 06/28/20 Time: 10:50
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR__PRODUCTION__FOOD_GRAINS(-1) | -1.576389 | 0.150836 | -10.45098 | 0.0000 |
| C | 0.040818 | 0.012550 | 3.252336 | 0.0029 |

| | | | |
|---|---|---|---|
| R-squared | 0.790194 | Mean dependent var | 0.000684 |
| Adjusted R-squared | 0.782959 | S.D. dependent var | 0.142796 |
| S.E. of regression | 0.066525 | Akaike info criterion | -2.520125 |
| Sum squared resid | 0.128343 | Schwarz criterion | -2.427610 |
| Log likelihood | 41.06194 | Hannan-Quinn criter. | -2.489968 |
| F-statistic | 109.2230 | Durbin-Watson stat | 1.847588 |
| Prob(F-statistic) | 0.000000 | | |

## Unit root test result for WPI_Food Article

Null Hypothesis: GR__WPI_FA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.433248 | 0.0173 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR__WPI_FA)
Method: Least Squares
Date: 06/28/20 Time: 10:51
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR__WPI_FA(-1) | -0.610512 | 0.177823 | -3.433248 | 0.0018 |
| C | 0.044725 | 0.016355 | 2.734583 | 0.0105 |

| | | | |
|---|---|---|---|
| R-squared | 0.288992 | Mean dependent var | -0.002786 |
| Adjusted R-squared | 0.264475 | S.D. dependent var | 0.056592 |
| S.E. of regression | 0.048535 | Akaike info criterion | -3.150718 |
| Sum squared resid | 0.068314 | Schwarz criterion | -3.058202 |
| Log likelihood | 50.83612 | Hannan-Quinn criter. | -3.120560 |
| F-statistic | 11.78719 | Durbin-Watson stat | 2.016708 |
| Prob(F-statistic) | 0.001816 | | |

## Unit root test result WPI_All commodities

Null Hypothesis: D(GR__WPI_AC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -7.076092 | 0.0000 |
| Test critical values: | 1% level | -3.670170 | |
| | 5% level | -2.963972 | |
| | 10% level | -2.621007 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR__WPI_AC,2)
Method: Least Squares
Date: 06/28/20 Time: 10:52
Sample (adjusted): 3 32
Included observations: 30 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(GR__WPI_AC(-1)) | -1.285872 | 0.181721 | -7.076092 | 0.0000 |
| C | -0.001597 | 0.005574 | -0.286437 | 0.7767 |

| | | | |
|---|---|---|---|
| R-squared | 0.641352 | Mean dependent var | 0.000629 |
| Adjusted R-squared | 0.628544 | S.D. dependent var | 0.050013 |
| S.E. of regression | 0.030482 | Akaike info criterion | -4.079042 |
| Sum squared resid | 0.026016 | Schwarz criterion | -3.985628 |
| Log likelihood | 63.18562 | Hannan-Quinn criter. | -4.049158 |
| F-statistic | 50.07107 | Durbin-Watson stat | 2.071657 |
| Prob(F-statistic) | 0.000000 | | |

## Unit root test result for WPI_Fuel

Null Hypothesis: GR_WPI_FUEL has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.778018 | 0.0075 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GR_WPI_FUEL)
Method: Least Squares
Date: 06/28/20 Time: 10:53
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| GR_WPI_FUEL(-1) | -0.659489 | 0.174560 | -3.778018 | 0.0007 |
| C | 0.051493 | 0.019023 | 2.706910 | 0.0113 |

| | | | |
|---|---|---|---|
| R-squared | 0.329843 | Mean dependent var | 0.002646 |
| Adjusted R-squared | 0.306734 | S.D. dependent var | 0.093306 |
| S.E. of regression | 0.077689 | Akaike info criterion | -2.209862 |
| Sum squared resid | 0.175032 | Schwarz criterion | -2.117346 |
| Log likelihood | 36.25286 | Hannan-Quinn criter. | -2.179704 |
| F-statistic | 14.27342 | Durbin-Watson stat | 1.884160 |
| Prob(F-statistic) | 0.000728 | | |

## Unit root test result for Minimum Support Price

Null Hypothesis: MSP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.420614 | 0.0015 |
| Test critical values: | 1% level | -3.661661 | |
| | 5% level | -2.960411 | |
| | 10% level | -2.619160 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MSP)
Method: Least Squares
Date: 06/28/20 Time: 10:53
Sample (adjusted): 2 32
Included observations: 31 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| MSP(-1) | -0.802024 | 0.181428 | -4.420614 | 0.0001 |
| C | 0.065645 | 0.020110 | 3.264297 | 0.0028 |

| | | | |
|---|---|---|---|
| R-squared | 0.402577 | Mean dependent var | 0.000592 |
| Adjusted R-squared | 0.381976 | S.D. dependent var | 0.097071 |
| S.E. of regression | 0.076312 | Akaike info criterion | -2.245638 |
| Sum squared resid | 0.168881 | Schwarz criterion | -2.153123 |
| Log likelihood | 36.80739 | Hannan-Quinn criter. | -2.215481 |
| F-statistic | 19.54183 | Durbin-Watson stat | 1.954367 |
| Prob(F-statistic) | 0.000126 | | |

# Lag Selection

VAR Lag Order Selection Criteria
Endogenous variables: GR__MONEY_SUPPLY GR__PCI GR__PRODUCTION__FOOD_GRAINS GR__WPI_AC GR__WPI_FA GR_WPI_FUEL
Exogenous variables: C
Date: 06/28/20 Time: 11:11
Sample: 1 32
Included observations: 29

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 310.9245 | NA | 2.97e-17 | -21.02927 | -20.74638* | -20.94068 |
| 1 | 355.5915 | 67.77066* | 1.73e-17 | -21.62700 | -19.64678 | -21.00682 |
| 2 | 401.6332 | 50.80466 | 1.23e-17* | -22.31953 | -18.64198 | -21.16777 |
| 3 | 449.7055 | 33.15332 | 1.67e-17 | -23.15211* | -17.77722 | -21.46876* |

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

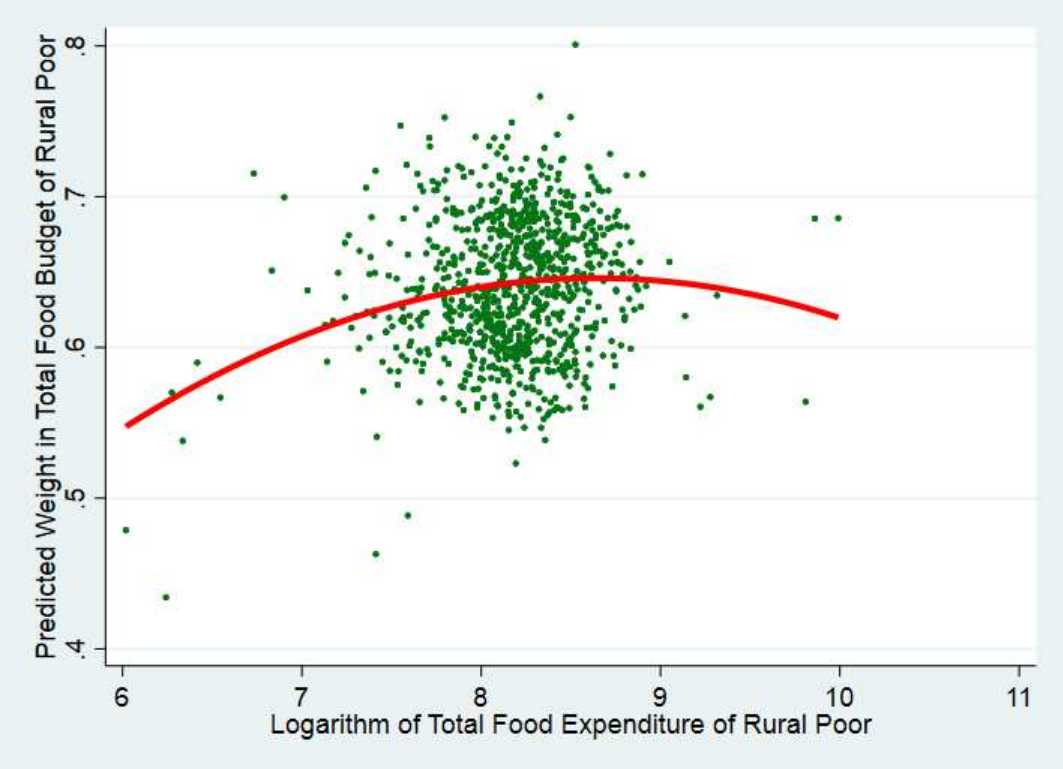
**APPENDIX VII**

## 3 Rural Poor: Quadratic Almost Ideal Demand System (QUAIDS) Analysis on Food Expenditure

### 3.1 Food demand elasticities: first budgeting stage

| Food demand elasticities: first budgeting stage | | |
|---|---|---|
| **Income elasticity of total expenditure** | | |
| | 0.923 | |
| | | |
| **Uncompensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.881** | | -0.954 |
| | | |
| **Compensated price elasticity of total expenditure** | | |
| **Food** | | Non Food |
| **-0.292** | | -0.543 |

#### 3.1.1 Fitted Engel Curve for Food



**APPENDIX VIII**

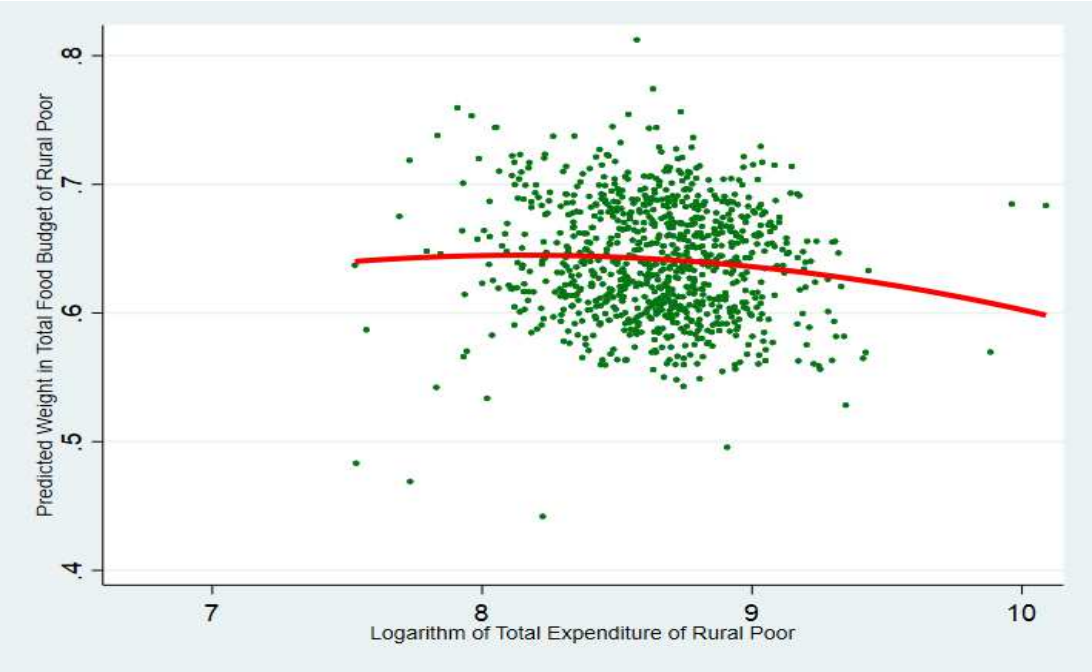
# RURAL POOR IN KERALA

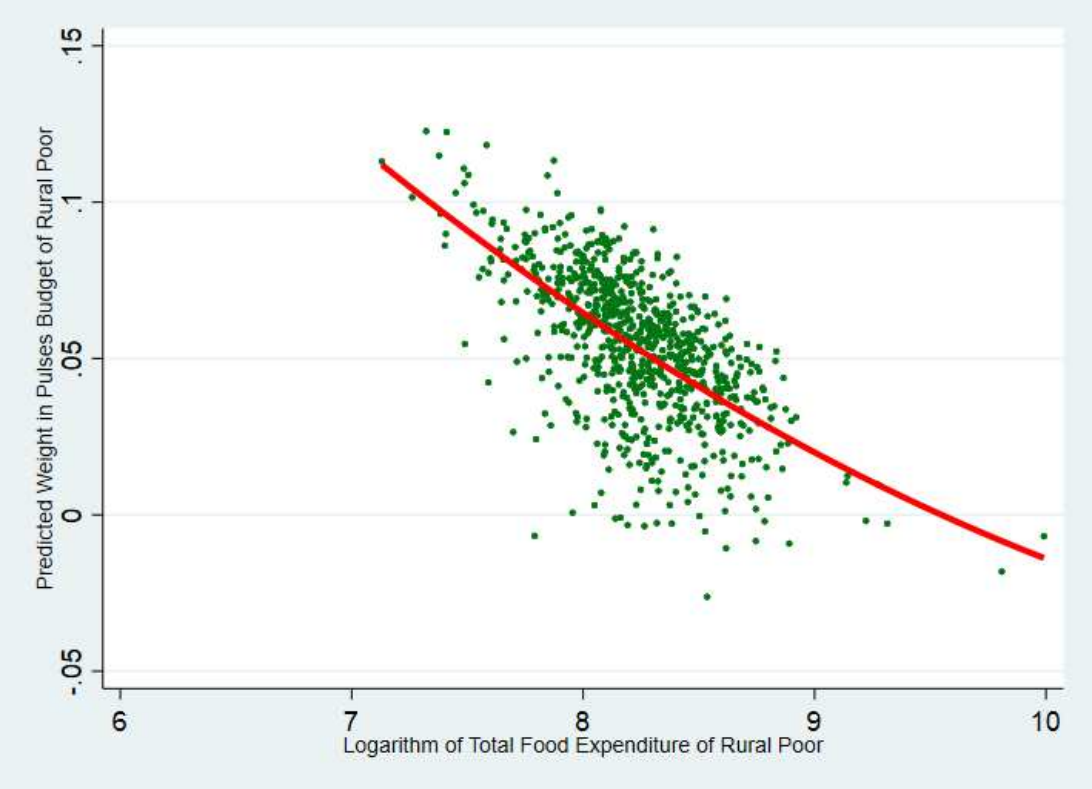
| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| alpha | | | | | | |
| alpha_1 | .2537342 | .0258403 | 9.82 | 0.000 | .2030882 | .3043801 |
| alpha_2 | .0499747 | .0124992 | 4.00 | 0.000 | .0254767 | .0744727 |
| alpha_3 | .1417057 | .0240242 | 5.90 | 0.000 | .0946192 | .1887922 |
| alpha_4 | .2199391 | .0295856 | 7.43 | 0.000 | .1619524 | .2779259 |
| alpha_5 | .1387581 | .0282231 | 4.92 | 0.000 | .0834419 | .1940743 |
| alpha_6 | .1958882 | .030404 | 6.44 | 0.000 | .1362975 | .2554789 |
| beta | | | | | | |
| beta_1 | -.0513905 | .0299055 | -1.72 | 0.086 | -.1100042 | .0072231 |
| beta_2 | -.0316267 | .0122428 | -2.58 | 0.010 | -.0556222 | -.0076311 |
| beta_3 | .0291302 | .0274105 | 1.06 | 0.288 | -.0245935 | .0828538 |
| beta_4 | -.019924 | .0356515 | -0.56 | 0.576 | -.0897998 | .0499517 |
| beta_5 | .0560997 | .0281977 | 1.99 | 0.047 | .0008332 | .1113662 |
| beta_6 | .0177114 | .0360276 | 0.49 | 0.623 | -.0529014 | .0883242 |
| gamma | | | | | | |
| gamma_1_1 | .0539461 | .005331 | 10.12 | 0.000 | .0434976 | .0643946 |
| gamma_2_1 | -.007192 | .0020908 | -3.44 | 0.001 | -.0112899 | -.0030941 |
| gamma_3_1 | -.0039639 | .0027644 | -1.43 | 0.152 | -.009382 | .0014542 |
| gamma_4_1 | -.0136357 | .002758 | -4.94 | 0.000 | -.0190414 | -.0082301 |
| gamma_5_1 | -.004199 | .0040239 | -1.04 | 0.297 | -.0120856 | .0036877 |
| gamma_6_1 | -.0249555 | .0034168 | -7.30 | 0.000 | -.0316522 | -.0182588 |
| gamma_2_2 | .0505345 | .0030836 | 16.39 | 0.000 | .0444908 | .0565783 |
| gamma_3_2 | -.0082042 | .0014837 | -5.53 | 0.000 | -.0111123 | -.0052961 |
| gamma_4_2 | -.0103566 | .0016074 | -6.44 | 0.000 | -.013507 | -.0072063 |
| gamma_5_2 | -.007442 | .0024122 | -3.09 | 0.002 | -.0121699 | -.0027142 |
| gamma_6_2 | -.0173397 | .0018688 | -9.28 | 0.000 | -.0210024 | -.013677 |
| gamma_3_3 | .0034735 | .0025648 | 1.35 | 0.176 | -.0015534 | .0085004 |
| gamma_4_3 | .0042104 | .001934 | 2.18 | 0.029 | .0004198 | .0080011 |
| gamma_5_3 | .0009881 | .002703 | 0.37 | 0.715 | -.0043097 | .006286 |
| gamma_6_3 | .003496 | .0021107 | 1.66 | 0.098 | -.0006408 | .0076329 |
| gamma_4_4 | .0277129 | .0025348 | 10.93 | 0.000 | .0227449 | .032681 |
| gamma_5_4 | -.0067384 | .0027059 | -2.49 | 0.013 | -.012042 | -.0014349 |
| gamma_6_4 | -.0011926 | .002263 | -0.53 | 0.598 | -.005628 | .0032428 |
| gamma_5_5 | .0302456 | .0051253 | 5.90 | 0.000 | .0202003 | .040291 |
| gamma_6_5 | -.0128543 | .0031816 | -4.04 | 0.000 | -.0190901 | -.0066185 |
| gamma_6_6 | .0528461 | .0034204 | 15.45 | 0.000 | .0461423 | .0595498 |

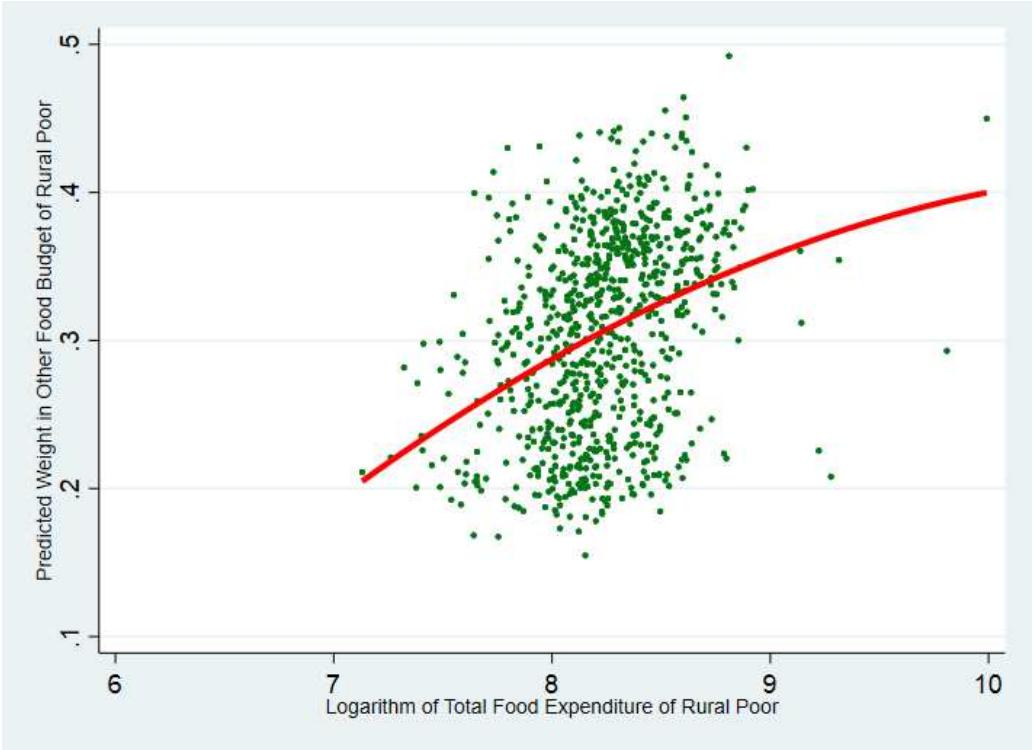
| | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| lambda | | | | | | |
| lambda_1 | -.004047 | .0091169 | -0.44 | 0.657 | -.0219158 | .0138219 |
| lambda_2 | .0042071 | .0035422 | 1.19 | 0.235 | -.0027354 | .0111497 |
| lambda_3 | .0034481 | .0079829 | 0.43 | 0.666 | -.0121982 | .0190944 |
| lambda_4 | -.0210967 | .0109811 | -1.92 | 0.055 | -.0426193 | .000426 |
| lambda_5 | .0203367 | .0095385 | 2.13 | 0.033 | .0016416 | .0390319 |
| lambda_6 | -.0028483 | .0105702 | -0.27 | 0.788 | -.0235656 | .0178689 |

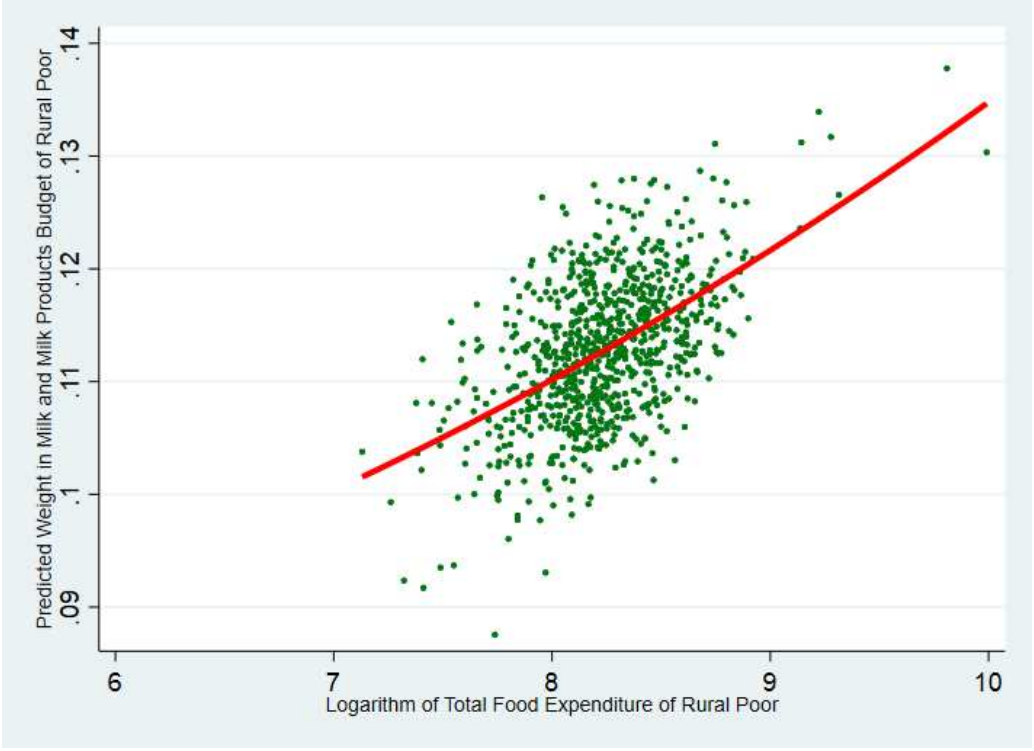
**APPENDIX IX**

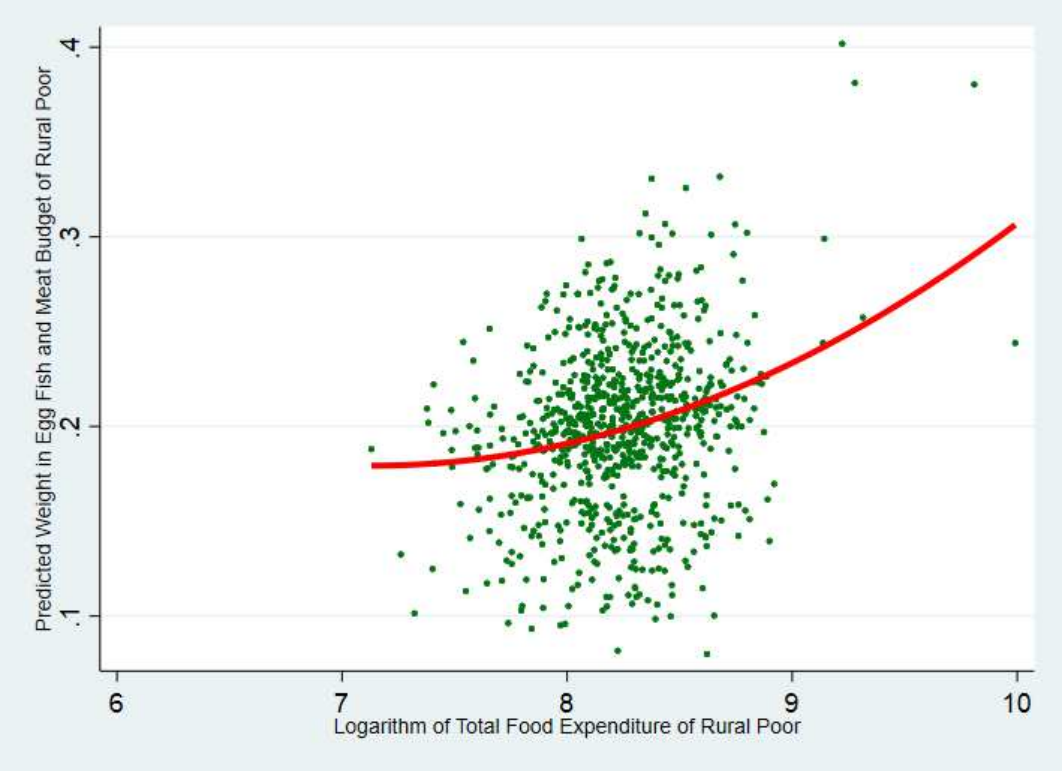
## ENGEL CURVES- RURAL POOR KERALA

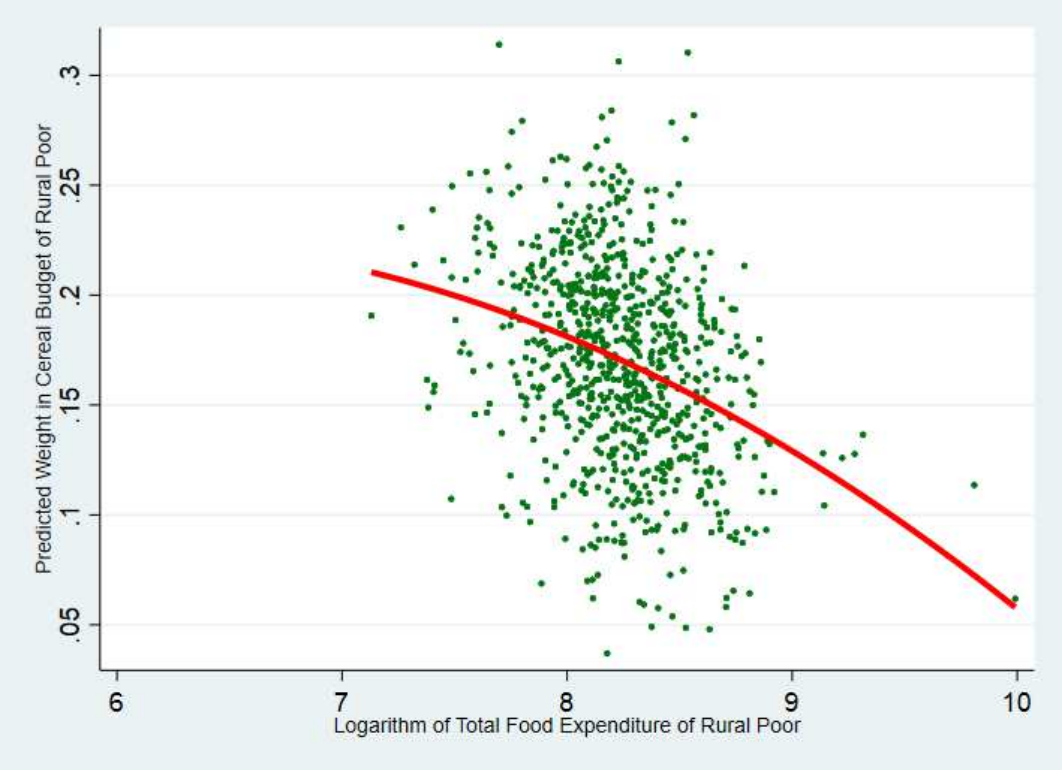


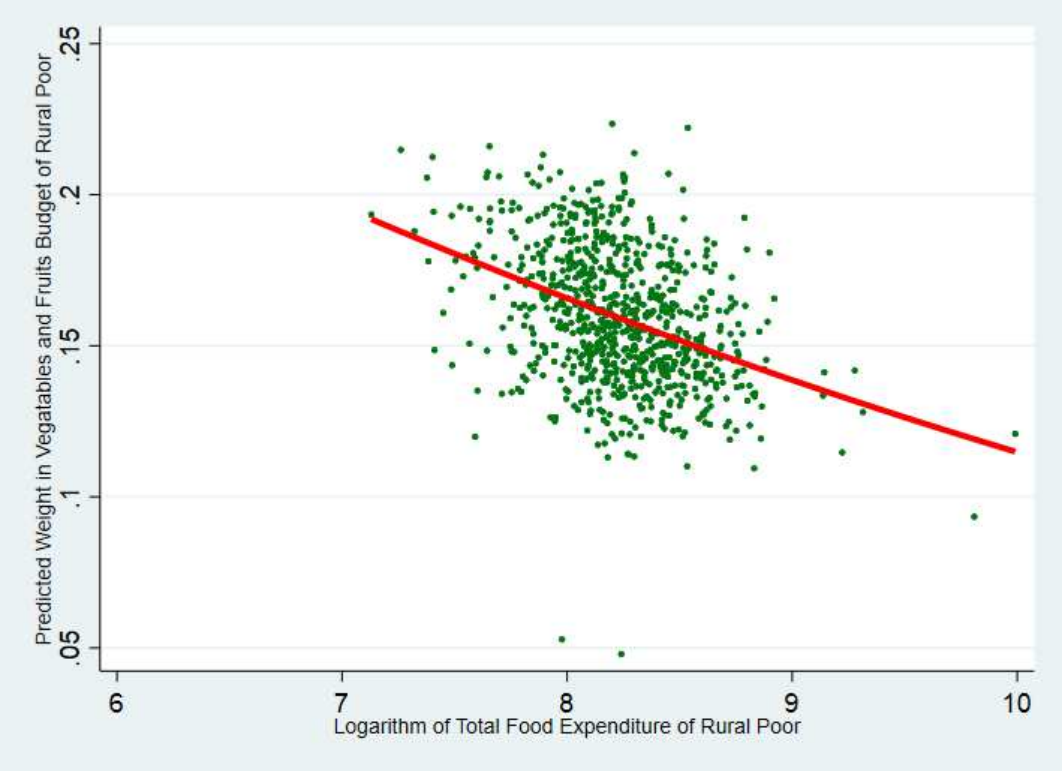




Predicted Weight in Other Food Budget of Rural Poor
.1
.2
.3
.4
.5
6
7
8
9
10
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Milk and Milk Products Budget of Rural Poor
.09
.1
.11
.12
.13
.14
6
7
8
9
10
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Egg Fish and Meat Budget of Rural Poor
.1
.2
.3
.4
6
7
8
9
10
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Cereal Budget of Rural Poor
.05
.1
.15
.2
.25
.3
6
7
8
9
10
Logarithm of Total Food Expenditure of Rural Poor


Predicted Weight in Vegatables and Fruits Budget of Rural Poor
.05
.1
.15
.2
.25
6
7
8
9
10
Logarithm of Total Food Expenditure of Rural Poor

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