Food and Prices in India:
Impact of Rising Food Prices on Welfare

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Abstract

THE paper presents the impact of a simulated increase in food prices on the household's welfare in India from the NSS Survey "Consumer Expenditure" (Round 61^{st}). It attempts to understand which households are the most vulnerable to rising food prices. Demand reactions and elasticities are computed from the Almost Ideal Demand System. Only demand is taking into account. The effect is computed assuming that the other influential parameters have not changed.

This study shows that there are differential impacts on different categories of households. Rural households are more vulnerable than urban households. In addition, the poorest households of both sectors are more penalized by rising food price than the richest households. The impact depends also on the commodity which price has increased. Indeed, an increase in cereal prices affects more the households than the same increase in fruit price.

Keywords — Elasticity, Welfare, Inflation, AIDS, Compensating Variation, Unit Value, NSS Data.

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1. INTRODUCTION

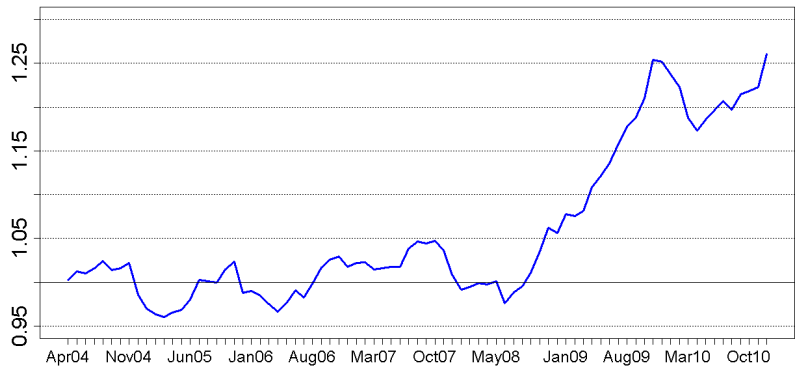
1.1. Context

Last years are characterized in India by growth at historically unprecedented rates. Real per capita income has also grown rapidly; poverty has declined. However, inequalities have increased.

Poor households don't benefit from the positive effects of growth. Health and education related indicators have improved, but this progress has been unsatisfactory, even when compared to other developing countries. Huge inter-state disparities in health and education related indicators remain. Growth picked out, but the level of rural poverty remains high (because of stagnation in the agricultural real wage and low access to public goods). For the poor households, in India, health indicators are particularly dire. The private health sector as currently organized is unlikely to improve the health and nutritional status of the poor household substantially. For education, the direct cost, even for public schools and even ignoring the opportunity cost, is nearly prohibitive for a poor family[1]. Furthermore, Himanshu [14] noticed that from 1993 to 2004, the poor households didn't really benefit from a period of very low food price inflation to improve their welfare.

However,after two decades of relative decrease in food prices across the globe, since 2008, food items have become more expensive than non food items. By mid-2008, international food price had skyrocketed to their highest level in 30 years, leading to hunger riots around the world. At the beginning of 2011, FAO food price index rose above its 2008 peak. India is also concerned by inflation, particularly food inflation[2]. In India, food prices have increased more rapidly than non food prices (Figure 1). Indeed, the ratio of food price on non-food price was around 1 until April 2008 to reach 1.25 in October 2009. Since the end of 2009, the ratio has been around 1.20.

Figure 1: Ratio of the Food Price Index on the Non-Food Price Index (April 2004-December 2010)



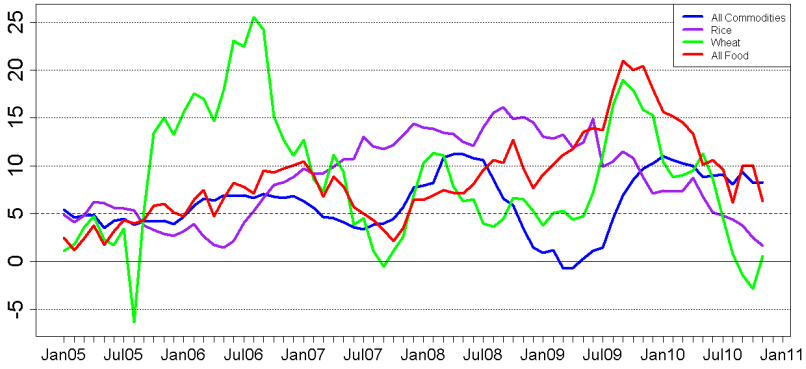
Source: Ministry of Commerce and Industry, WPI base year 2004-2005

The increase in food prices is not homogeneous. The commodities which explain inflation change over time. Figure 2 shows that cereal prices (rice and wheat particularly) have increased quickly since 2006: monthly inflation rate (YoY) is higher than 5% for wheat and rice (except for few months). The increase in cereal prices was higher than the increase in food prices before the beginning of 2009; after food prices have risen more quickly. We can notice that, in last quarter (from November 2010 to January 2011), wheat price decreased but this decrease didn't offset the past increase.

[1] See World Bank Report [23]

[2] Government has tried to fight rising prices by stopping exports of cereals, for instance, but it has not been enough to cut inflation.

Figure 2: Monthly Inflation Rate (YoY)



Source: Ministry of Commerce and Industry, WPI base year 2004-2005

It is well-known that people are adversely affected by rising food prices which limit their purchasing power. In order to develop efficient policies to fight the negative impact of rising food prices, it is necessary to know which households are the most vulnerable, how food inflation affects them and the magnitude of the impact on welfare.

1.2. Review of the Literature

A number of papers examines the effect of food price change on the household's welfare, in developing countries. Many works are based on the compensating variation, which corresponds to the difference between two values of the expenditure function. A first-order approximation of relative welfare variation is given by the sum, across commodities, of the product of price change by the household's net purchases of each good. Some authors, such as Deaton, use non-parametric variant of this concept. However, the first-order approximation neglects the substitution effects. A second-order Taylor expansion of the expenditure function attempts to estimate the effects of substitution on welfare variation. This work can be found, for example, in Minot and Goletti [17] or Ulimwengu and Ramadam [20]. Both papers focus on just one change price.

Minot and Goletti [17] investigated the potential effect of a liberalization of rice market in Viet Nam. One chapter of their paper was about the link between poverty and rice prices. In this chapter, both authors simulated a uniform increase in rice price by 10% and compute the effect on welfare and poverty derived from the compensating variation. They didn't estimate themselves price elasticities: they used elasticities computed by other authors from time-series data. They find that overall welfare impacts are generally large but differ considerably not only between urban and rural areas, but also across different regions. Surprisingly, there is no effect on poverty because a lot of households are net sellers. Moreover, they underline that "the welfare effects of a price change are more positive when consumer and producer responses are incorporated. However, the differences between short- and long-term effects are small, around 0.1 percentage points, as a result of the relatively inelastic demand and supply." (Minot and Goletti, p. 64).

Ulimwengu and Ramadam [20] investigated the effect of a change in cereal price on Ugandan households' welfare. They insisted on the importance of including the supply side on the analysis in order to obtain non-pessimistic results. They underlined also the importance of agricultural services and market access. They warned against policy response focusing on the demand because it would tend to favor consumers at the expense of producers.

More recent papers focus on the impact of the food price crisis in 2008 in order to estimate the

effect but also to characterize the most vulnerable households.

Zezza and al. [21] made an effort at differentiating the impact of an increase in food prices across population subgroups. Their work was based on 11 Living Standard Measurement Surveys (LSMS). They computed a first-order approximation of welfare variation following an increase in the three main tradable staple food prices of the country. Their aim was to understand the determinants of price vulnerability. Expenditure level is certainly important, but limiting the focus to that misses a large part of the determinant of vulnerability. Agricultural assets and livelihood strategy have to be looked. The gaps between poor and non-poor households, rural and urban households are highlighted. Their paper underlines also the differential effect of some variables across the countries. Indeed, the share of irrigated land has sometimes a negative impact, and sometimes a positive, depending on the country.

Ferreira and al. [24] examined this impact of food price crisis in Brazil. Indeed, while general inflation rate is around 5.3% in 2007-2008, food price inflation peaked at over 18% in mid-2008. Their approach was based on a three market approach: expenditure (demand), income (supply) and wage (labor). However, they neglected substitution effects. The overall effect of the price increases was to raise both extreme and moderate poverty. The poor either gain or lose less from higher prices than the middle groups. The rich lose little, since they spend a small proportion of their incomes on food to begin with. The combined effect is a U-shaped. The analysis of the vulnerable households is focused on expenditure level and doesn't include social characteristics. They also evaluate the efficiency of social programs, such as Bolsa Família and Benefício de Prestação Continuada. These programs are well-targeted but they are insufficient to fully protect the households. Disparities are found among rural and urban areas.

In this paper, I develop such analysis on the case of India, but focusing only on the demand side. The effect on the supply side and the labor market are not included. However, the NSS data and the WPI (Wholesale Price Index) allow working on 13 food categories and 1 non food categories. The analysis of the impact of rising food prices is, therefore, more precise and allows studying the importance of the structure of inflation and the substitution effects. This is also underlined by the four scenarios of inflation tested. Indeed, this paper doesn't focus only on food price crisis in 2008. It attempts to analyze the impact of inflation on welfare in other situations (with other structure of inflation), for instance the current inflation. Inflation hurts every day the households, not only on 2008.

This paper contributes also on the characterization of the vulnerable households in India. Indeed, it attempts to determine the factors of price vulnerability, especially food prices. Expenditure level is obviously the main determinant factor but social and demographical characteristics are also relevant. Policies may not focus only on income groups but should target also specific groups. Moreover, this paper presents price elasticities for 14 groups of commodities in India; these elasticities have been necessary to compute the welfare variation.

The rest of the paper unfolds in the following manner. Section 2 explains the analytical framework and the empirical approach. Section 3 describes the data. Section 4 presents the results concerning the demand. Section 5 focuses on the welfare variation and the most vulnerable households. Section 6 concludes the paper.

2. ANALYTICAL FRAMEWORK AND EMPIRICAL APPROACH

2.1. Compensating Variation

The impact on consumers of an increase in prices is often calculated using consumer surplus. However, there is a similar but more theoretically consistent approach based on the concept of compensating variation, i.e. the amount of money needed to compensate a consumer for the price change and restore the original utility level. It, therefore, corresponds to the difference between two values of the expenditure function:

$$CV = e(p_1, u_0) - e(p_0, u_0) \tag{1}$$

This can be approximated using a second-order Taylor-series expansion:

$$CV \cong \sum_{i=1}^{n} \frac{\partial e(p_0, u_0)}{\partial p_i}(p_{1i} - p_{0i}) + \frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n} \frac{\partial^2 e(p_0, u_0)}{\partial p_i \partial p_j}(p_{1i} - p_{0i})(p_{1j} - p_{0j}) \tag{2}$$

Using Shephard's lemma, replacing the Hicksian demand by the Marshallian demand at the optimum:

$$CV \cong \sum_{i=1}^{n} q_i(p_0, x_0)\Delta p_i + \frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n} \epsilon_{ij}\frac{q_i(p_0, x_0)}{p_{0j}}\Delta p_i \Delta p_j \tag{3}$$

Compensating variation divided by the initial total expenditure amount is defined by:

$$\frac{CV}{x_0} \cong \sum_{i=1}^{n} w_i \frac{\Delta p_i}{p_{i0}} + \frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n} \epsilon_{ij} w_i \frac{\Delta p_i}{p_{0i}}\frac{\Delta p_j}{p_{0j}} \tag{4}$$

Where w_k is the budgetary share allocated to the commodity k, ϵ_{ij} is the price elasticity of the Hicksian demand, p_{0k} is the initial price of the commodity k and Δp_k is the price variation of the commodity k.

It is possible to compute the compensating variation for each commodity (distinctly by supposing other prices don't change) or for all the system. I can compute short term response (before demand adjustment assuming that elasticities are equal to 0) or long term response (integrating demand adjustments). As the supply side is not included, relative welfare variation is equal to the opposite of compensating variation divided by the initial amount of total expenditure.

2.2. Demand System

We need to compute the price elasticities to calculate the compensating variation after demand adjustments. These elasticities are derived from the AIDS, based on expenditure function (Deaton and Muellbauer [7]), including social variables (see Heien and Wessells [13]). So budgetary share devoted to the commodity k depends on price logarithms, the monthly per capita expenditure, a price index[3] (to correct geographical and temporal variation), household's structure, religion...

[3]The price index P is defined as $P = \sum_k w_k ln(p_k)$

However, some goods are not consumed by all the households. The choice of consuming some commodities is not independent of the household's characteristics and can bias the estimators of the parameters needed to compute price and expenditure elasticities. For each commodity, consumption choice was modeled by a probit to correct this bias (see Heien [13]). The inverse Mills ratio[4] is introduced into the AIDS as an instrumental variable.

Implicitly, I assume that taste preferences are independent (consuming or non consuming) whereas I assume that consumed quantities for one good depend on consumed quantities of other goods[5] because of relative prices. So the demand system is defined by:

$$w_{ih} = \theta_{i0} + \sum_{k=1}^{s} \theta_{ik} d_{ik} + \sum_{k} \gamma_{ik} ln(p_{kh}) + \beta_i ln(\frac{M_h}{P_h}) + \delta_i R_{ih} \tag{5}$$

Where p_{kh} is the price of the commodity k of the household h, d_h the demographic and social characteristics of the household h, M_h the global expenditure of the household h, R_{ih} is the inverse Mills ratio and P_h the linear approximation of Stone's price index[6]. Following constraints are necessary:

- Additivity: $\sum_i \gamma_{ik} = 0,\ \sum_i \alpha_i = 1,\ \sum_i \beta_i = 0$ where $\alpha_i = \theta_{i0} + \sum_{k=1}^{s} \theta_{ik} d_{ik}$
- Homogeneity of degree 0 regarding price: $\sum_k \gamma_{ik} = 0,\ \forall i$
- Symmetry: $\gamma_{ik} = \gamma_{ki}$

Furthermore, there is a risk of correlation between demands that impede the estimation by OLS. Indeed, if correlations are neglected, the estimators of standard errors may be too large. The way to estimate must take into account the correlation between errors[7]; that's why the demand system is estimated by the SUR (Seemingly Unrelated Regression).

2.3. Estimation

The estimates are obtained with unit value data instead of price data. The unit value is defined as the ratio of the expenditure on the consumed quantities. Indeed, price data are not available for all commodities and all states in 2005. Using a price index clears some disparities which are captured by the unit value since unit values are available for each household and each commodity. Each household declares his expenditure and consumed quantity. The unit can be considered a "subjective price" and the highest price acceptable for a purchase. This "price" reflects also an increase in price if a part of the purchase is not edible (moisture, bad quality).

Indeed, if a household bought two kilograms of rice for 10 rupees (market price is 5 rupees per kilograms) but if one kilogram was not edible, the household would consider that he bought his rice at 10 rupees per kilogram and declare a unit value equal to 10. That's why unit values and prices can differ.

[4] $R_{ih} = \frac{\varphi}{\Phi}(ln(p_h), d_h, ln(m_h))$ for consumer household, $R_{ih} = \frac{\varphi}{1-\Phi}(ln(p_h), d_h, ln(_h))$ for non consumer households

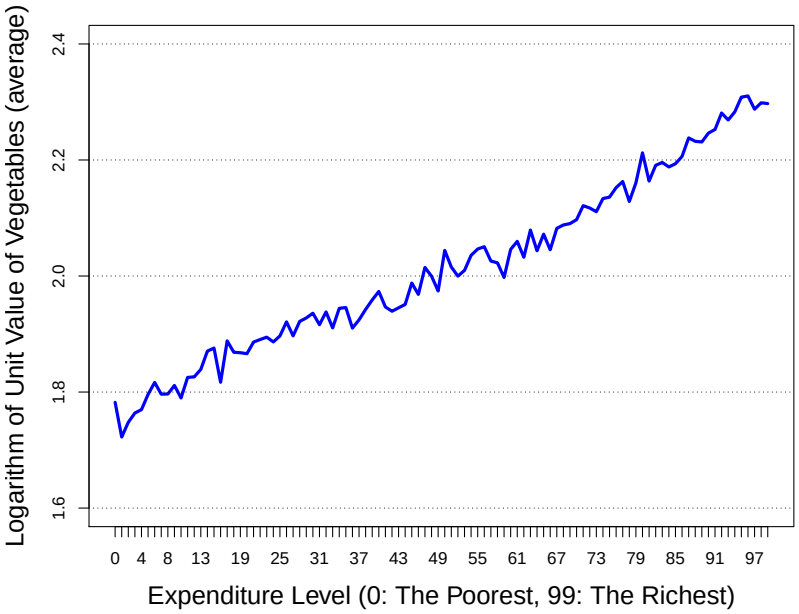
[5] Probit equations are estimated separately whereas demand equations are estimated as a system.

[6] Approximation makes easy estimation step.

[7] A storm which hits a lot of households would affect the consumption of all items not only one item. This exogenous shock leads to correlated errors between equations. For instance, the survey was conducted just after the tsunami so Nicobar and Andaman Islands were not surveyed but if the households had been surveyed, it would be possible that their consumption would be influenced by tsunami.

Moreover, the unit value is just a proxy of price, but it is not a price: commodities cannot be homogenous. It is possible to define a unit value for meat, but there is no price for meat because meat is not homogenous (it is made of chicken, goat, buffalo...; all these goods have their price).

Figure 3: Unit Value of Vegetables



Source: NSS Data Round 61^{st}.

Moreover, the unit value depends on quality: rich households may have a higher unit value because they have bought higher quality goods (more expensive, see Figure 3).

If households make a mistake on consumed quantities and/or expenditures, the unit value will be measured with errors that will bring a bias on the estimation. Siladitya Choudhury and S. Mukherjee [22] have tested the validity of derived price (unit values) against similar commodities of the Rural Retail Price data collected through an independent survey. Some items have failed: the NSS prices and the RPC prices don't mismatch. Value and quantities of some items tend to be improperly reported irrespective of the individual investigator or any specific region. However, gathering commodities in more general items can solve a part of this problem. Unfortunately, main failed items are vegetables which are an item in this study.

Deaton [3] put forward a method to estimate demand elasticities with unit values and to correct the quality effect (and measurement errors). He assumed that, on one cluster, prices don't change (they are unobserved) but they change among clusters (spatial variation). He demonstrated that, asymptotically, both problems (quality effect and measurement errors) are solved.

2.4. Inflation Scenario

I have estimated the compensating variation of four different scenarios of price changes. Each scenario refers to one specific event that has occurred in India since 2005. Table 1 shows the inflation rate for each commodity and each case. There are:

- **Long Term**: average of yearly inflation rate since 2005. It is characterized by a high food inflation (9.86%). The increases in vegetable and spice price are especially important. Except for both commodities, the increase in food prices is all around 7-11%. Non food inflation rate

is 5%, less than food inflation but it's a high yearly rate. The scenario is based on a high rate of price increase for all the commodities.

- **Short Term**: inflation rate observed last year (between February 2011 and February 2010). It is composed by a high non food inflation (9.12%) and a less food inflation (6.28%).

- **2008**: annual rate measured between June 2007 and June 2009. It is characterized by a very high food inflation rate and a relative low non food inflation rate. However,even if the increase in cereal prices is important (15-20%), cereals became relatively cheaper than the other food commodities.

- **December 2010**: monthly rate measured on December 2010. It looks like the structure of the Long-Term scenario. However, the increase in vegetable price is stubborn: in one month the inflation rate is equal to the annual inflation rate of the other scenarios. Food inflation is also important; but the increase is limited over the time while in 2008, food inflation was important for months.

	Long Term	Short Term	2008	December 2010[8]
Vegetables	20,72	16,11	21,17	27,11*
Rice	8,52	1,66	13,78	0,38*
Wheat	8,29	0,56	11,47	0,27*
Corn	8,67	13,32	10,40	0,44
Others Cereals	12,49	7,69	19,27	2,95*
Pulse	9,38	-4,11	19,33	1,49*
Starchy	11,86	-15,13	24,39	10,01*
Spices	21,52	23,25	19,30	17,97*
Meat and dairy products	10,13	12,16	15,78	1,03
Beverages and Other	6,47	2,35	13,61	-0,56
Sugar	7,49	-15,68	41,18	2,84*
Oil	4,01	11,44	-0,13	1,16*
Fruits	8,93	15,07	11,09	-1,42
Non Food	5,06	9,12	3,70	0,71
WPI	6,32	8,31	6,76	1,61*
Food	9,86	6,28	15,52	3,85*

Table 1: Inflation Data

3. DATA

3.1. NSS Survey

The NSS survey on expenditure is a national five-year investigation. The last but one survey took place between July 2004 and June 2005. The survey asks households their expenditure (food, durable goods, housing, ceremony, education...) but also the characteristics of the household (size, education level, relationship among the household's members, type of employment, feeling of

[8] Asterisk means that inflation between November 2010 and December 2010 was higher than monthly average inflation for the year 2010 (between December 2009 and December 2010), for others it was lower.

under-nutrition, type of dwelling, energy...). In 2004-2005, 124 644 households were surveyed, i.e. 609 736 persons.

Data of last round are not available but Moreover, are clearly unsuitable for the purpose of estimating the compensating variation of the price change since 2005.

3.2. Treatment of Outliers and Missing Values

It is necessary to deal with outliers and missing values. Thus, sometimes, consumed quantities were missing while a consumption value was filled in. Then, it was not possible to calculate the unit value. In this case, the assigned unit value is the median of the unit values of households by crossing state and area. The corresponding amount is, then, computed in order to confirm that the award is not an unrealistic amount (the amount is considered unrealistic if it is in the first or the last percentile). In this case, the assigned amount is the median and the unit value is computed. The same process is used when the expenditure value is missing (while a quantity is filled in).

For some commodities, the quantity unit can be ambiguous: the NSS survey interviews on the number of bought eggs but, usually, households buy six or twelve eggs. Two modes in the unit value distribution may appear: one corresponding to the price of one egg and the other corresponding to the price of six eggs. But the work is based on thirteen aggregated groups, the problem does not occur, except for beverage and other food because this group was made up of all food items which were not in the other groups.

Some outliers are well-identified and correctable. For instance, the informed quantities or values are thousandfold higher than those observed on average. In this case, this may be a misinterpretation of units (grams against kilograms) or a misreporting (comma)...

Other values are not easily correctable, but it is not possible to delete data. Indeed, one cannot assign a zero-consumption of the commodity to one person who, on the contrary, had an atypical consumption of this good (large consumption or high prices...).

With 14 posts, if the outliers are defined as the values outside the interval defined by the mean, in logarithm, more or less 2.5 times the standard deviation[9], too many households should be deleted (about 17% in all-India for the unit values). I decided to maintain the values to keep the consumption's structure. On the other hand, the unit values have been replaced by the median (obtained in the presence of these values).

For non food goods, it is not possible to calculate a unit value. Indeed, only consumed value is filled in, quantity is not filled in. How could you fill in purchased quantity of health? But in order to use the AIDS with non food goods, price data are necessary. Following Chern [1], prices are replaced by the WPI (Wholesale Price Index). The WPI is preferred to the CPI (Consumer Price Index) to capture the evolution of non food prices in India. For each surveyed household, the date of survey is indicated so the corresponding monthly WPI is imputed. Thus, two households, surveyed in January, have the same non food price index but one household, surveyed in March, has another non food price index. Some states produce their own WPI but not all; moreover, the year base is sometimes really dated (1957), that is a problem and that's why the "non food price" is not distinguished by state.

3.3. Consumption Pattern

Consumption was gathered on 14 distinct budgetary posts: vegetables, spices, starchy, meat and dairy products, pulse, oil, corn, wheat, rice, other cereals and substitutes, sugar, fruits,

[9]Interval defined by Deaton and Tarozzi [9]

beverage and other food and non food commodities.

Table 2 illustrates the budgetary share (national average) allocated for each commodity. Rural and urban patterns are quite different. For instance, cereal consumption is around 26% of food consumption in the urban areas against 35% in the rural areas; that's why both sectors are studied separately to capture these differences.

Table 2: Budgetary Share in India

	Rural	Urban
Other Cereal	1.46	0.64
Wheat	6.10	5.07
Beverage	5.05	8.19
Starchy	1.71	0.83
Fruits	1.74	2.30
Vegetables	4.15	3.43
Corn	0.38	0.03
Oil	5.31	4.13
Pulse	3.66	2.83
Rice	12.99	7.00
Spice	4.28	3.09
Sugar	2.51	1.83
Meat	11.03	10.44
Non food	39.63	50.19

Source: NSS Survey Round 61^{st}.

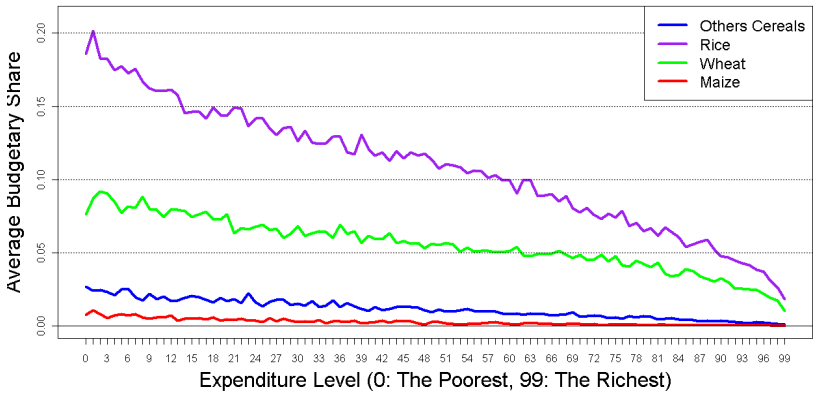
In contrast of the increase in per capita expenditure, there has been no real increase in per capita food expenditure after 1987-1988; households have purchased more non food items whereas the relative price of food was lower in 2004-05 than in 1993.

Moreover, the food basket's composition has changed. The consumption of non cereal commodities is increasing, except for consumption of pulse. Indeed, Kumar, Mruthyunja and Dey [16] have reported that since 1983 cereal consumption has declined for all income groups because of consumption diversification and pure income effect.

Consumption pattern and its evolution differ according to expenditure level. For instance, rich households purchase more non food goods than poor households (relatively and absolutely). They also consume fewer cereals (see Figure 4).

Moreover, there are always differences between the rural and urban food basket (see Table 2) but "the dietary pattern is converging slowly and becoming similar in nature" (Kumar [16]). Rural households consume more cereals; less beverage than urban households but differences are lower than in the past. Indeed, in 1994, the budgetary share of cereals in rural areas was 28.21 against 16.97 in urban areas, while in 2004 the share was 20.93 in the rural sector (decrease by 26%) and 12.74 in the urban sector (decrease by 24%). However, the decrease in cereal consumption does not seem to be correlated with prices. Indeed, until 2005, cereals (especially coarse cereal as millet) have become cheaper than the other food. Normally, cereal consumption would have to increase because of price effect (price elasticity).

Figure 4: Cereals' budgetary share according to the MPCE, all India



Source: NSS Survey Round 61^{st}.

This decrease in cereal consumption has sharply consequences: per capita calorie intake decline (Deaton and Drèze [5]). Indeed, cereals are (and were) the main source of calories but the decrease in calories from cereals is not compensated by the increase in calories from other food items. Currently, about three quarters of the population live in households where per capita calorie intake is below minimum requirements - 2400 (2100) per day in the rural (urban) areas - they are so treated as malnourished. An increase in food price could accentuate the loss of calorie intake and other nutrients by reducing food purchasing power, but it is not the focus of this paper.

4. DEMAND RESULTS

RESULTS obtained without and with Deaton's corrections are really similar: or the quality effect is low and there are no measurement errors or else Deaton's method doesn't enable to correct bias (see Gibson and Rozelle [12] or Niimi [18]). Next results are derived from estimates obtained without Deaton's correction (except concerning quality elasticities).

Even if it is not the main purpose of this paper, it is interesting to analyze the results of the estimation of demand system.

4.1. Taste and Demand Parameters

ESTIMATION of the AIDS parameters is satisfying. Residuals are important but can be considered negligible. Indeed, R^2 is between 0.20 and 0.50 for all commodities; that is similar to those obtained by other authors carrying out similar works (see Heien [13]). Moreover, the root mean square error is relatively low except maybe for beverage.

Moreover, it was necessary to take into account the problem of censorship. The inverse Mills ratio is always significant at 5% except for one commodity (vegetables). For vegetables, the coefficient of the inverse Mills ratio is different to 0 at 10% level.

For each commodity, demand depends principally on the MPCE and the price but social variables are also relevant. The influence of social and demographic variables is different from one good to another. Thus, the household size has a positive influence on the demand of meat and dairy products, corn, wheat and non food and a negative influence on other goods. The positive effect on consumption of meat and dairy products may come from the fact that if the household is large, the probability that there are young children is higher. Similarly, the share of non-food expenditure may grow significantly more than food share because it is less easy to make scale economies (expenditure in education and health).

4.2. Elasticities

Elasticities are easily obtained from the AIDS (the formulas given by Ramadam and Ulimwengu [20] are adapted because the inverse Mills ratio depends also on prices and on the total expenditure). Price elasticities are really small; a majority is between -0.05 and 0.05. Elasticities are reported on Table 7 and Table 8 of the Appendix. Moreover, demand is not yet stable; the changes in elasticities between 1993 and 2004 underline that[10].

Indeed, consumption pattern is changing quickly (see past Section) that explains why the elasticities have changed since 1993. Elasticities reflect demand so if demand changes, the values of elasticities must change. For instance, the own-price elasticity of vegetables was equal to -1.12 in 1993 and decreased to -0.59 in 2005 in the urban sector. In parallel, the own-price elasticity of coarse cereals (other cereals and maize) decreased between 1993 and 2004. There is also an income effect: the expenditure elasticity of cereal became negative and this of vegetables and fruits are positive and relatively high. That can explain the substitution observed between cereals and vegetables. This finding underscores the changes occurred on consumption pattern.

Table 3: Expenditure Elasticity

	Vegetables	Spices	Starchy	Beverage
Rural	0.72 (0.02)	0.67 (0.01)	0.05 (0.03)	1.73 (0.09)
Urban	0.57 (0.02)	0.48 (0.02)	0.22 (0.04)	1.24 (0.10)
	Corn	Wheat	Rice	Oil
Rural	0.59 (0.05)	−0.55 (0.04)	−0.42 (0.06)	0.62 (0.01)
Urban	0.93 (0.01)	−0.63 (0.06)	−0.14 (00.06)	0.48 (0.02)
	Pulse	Meat	Other Cereal	
Rural	0.66 (0.01)	1.88 (0.03)	0.18 (0.04)	
Urban	0.54 (0.02)	1.07 (0.01)	−0.13 (0.08)	
	Sugar	Fruits	Non Food	
Rural	0.83 (0.02)	1.66 (0.05)	1.23 (0.01)	
Urban	0.46 (0.02)	1.33 (0.03)	1.25 (0.01)	

Source: Author's calculations based on the NSS Data Round 61^{st}. The figures in brackets are obtained from 1,000 replications of the bootstrap using the cluster-level data and are defined as half the length of the interval around the bootstrapped mean that contains 0.638 (the fraction of a normal random variable within two standard deviations of the mean) of the bootstrap replication.

Expenditure elasticities (Table 3) confirm that cereals became an inferior good, at least for rice and wheat. The expenditure elasticities of corn and other cereals (in the rural areas) are positive, but the estimation is not good because a lot of households don't consume these commodities. The expenditure elasticities were always positive in 1993 for all the cereals. It was in last decade that cereals became an inferior good. It cannot explain why cereal consumption declined between 1983 and 1993, but it could, in part, explain why, since 1993, cereal consumption has declined.

Naturally, non food items, beverage, meat and fruits are luxury goods. For meat and non food items, consumption patterns consolidate this finding; indeed, the main part of the increase in real per capita expenditure is followed by an increase in non food expenditure. Kumar [16] noticed also an important increase in meat expenditure between 1983 and 2000 (+65-70% of the budgetary share). The other commodities are normal goods.

[10]Expenditure elasticities derived frome the 50^{th} Round of the NSS Survey are given in Appendix, Table 9

While meat is a product whose demand is very elastic to a variation in expenditure (and therefore income) in the rural areas (1.88), it is much less in the urban areas (1.07). Except for starchy, corn, rice and non-food goods, demand for necessary or luxury goods is less elastic in the urban sector than in the rural areas and more elastic concerning inferior goods. Urban households may prefer maintaining a diversified consumption that's why demand is less elastic in case of a change price.

Except the own-price elasticity of corn demand in the rural areas all own-price elasticities are negative (Table 4). Demands in spices, wheat and other cereals are elastic (elasticity greater than one in absolute value) in both rural and urban areas; demand for other goods is not elastic. The less elastic demands in the urban areas are sugar (-0.20) and non-food goods (-0.34); in the rural areas starchy (-0.32) and sugar (-0.31) are the less elastic.

Table 4: Own-Price Elasticity

	Vegetables	Spices	Starchy	Beverage
Rural	−0.65	−1.01	−0.32	−0.56
	(0.03)	(0.01)	(0.03)	(0.02)
Urban	−0.59	−1.00	0.15	−0.49
	(0.06)	(0.03)	(0.20)	(0.03)
	Corn	Wheat	Rice	Oil
Rural	3.14	−0.90	−0.42	−0.85
	(3.93)	(0.04)	(0.04)	(0.04)
Urban	−57.22	−1.10	−0.76	−0.84
	(45.83)	(0.06)	(0.09)	(0.09)
	Pulse	Meat	Other Cereal	
Rural	−0.43	−0.45	−2.68	
	(0.03)	(0.01)	(0.27)	
Urban	−0.48	−0.79	−4.28	
	(0.07)	(0.03)	(2.08)	
	Sugar	Fruits	Non Food	
Rural	−0.31	−0.76	−0.52	
	(0.05)	(0.01)	(0.02)	
Urban	−0.20	−0.84	−0.36	
	(0.09)	(0.02)	(0.02)	

Source: Author's calculations from NSS Data Round 61^{st}.

Cereal demand is more elastic in the urban area. Urban consumption depends less on cereal; urban households have already diversified their consumption and are less dependent to cereal to feed them. So they can substitute more easily cereals to other food if the price of cereal increases. Households seem to prefer rice rather wheat. Indeed, wheat demand is more elastic than rice demand and Moreover, the expenditure elasticity is higher for rice (rice demand decreases more slowly if total expenditure increases than wheat demand). Main substitutes of cereals are other cereals (Table 5). This finding is quite normal. Substitution is priority done among similar commodities. That can explain in part why price elasticities are so small, especially own-price elasticities. Indeed, the substitution may take place first among the group. For instance, the main substitute of cucumber may be another vegetables and so substitution among groups is less important than within a group.

Table 5: Price Elasticity of Cereal in Rural Area

	Others	Corn	Wheat	Rice
Others	−2.68	−0.48	0.67	0.43
	(0.27)	(0.17)	(0.14)	(0.21)
Corn	−1.83	3.14	0.42	−0.80
	(0.64)	(3.93)	(0.52)	(0.98)
Wheat	0.15	0.03	−0.90	0.40
	(0.03)	(0.03)	(0.04)	(0.04)
Rice	0.04	−0.02	0.18	−0.42
	(0.02)	(0.03)	(0.02)	(0.04)

Source: Author's calculations from NSS Data Round 61^{st}.

Quality elasticities are very low; lower in the rural areas than in the urban areas that can come from a less wide selection of varieties in villages than in towns. Except for corn, all the quality elasticities are significantly different from zero. The highest elasticity is for beverage that can be understood because it is a heterogeneous group where quality is an important differentiation factor. The estimation didn't allow obtaining quality elasticity for non food items, but quality elasticity for non food items may be higher than the quality elasticity for food commodities.

5. ESTIMATED IMPACT OF RISING FOOD PRICES ON WELFARE

For each scenario (see Section Inflation Scenario), I computed the effects before the demand's adjustment (before) and after the adjustment (after).

5.1. Magnitude of the Impact and Demand Adjustment

The adjustments of demand limit weakly the negative impact of rising prices. This effect depends also on goods. Indeed for meat and dairy products, for an increase by 10% in price - case long-term - the gap between both variations is 0.1 point while for a same level of rising - case 2008 – for corn the gap is void (See Appendix, Table 10 and Table 11). This naturally depends also on the value of the own-price elasticities of the Hicksian demand. The more elastic demand is, the more important the gap between before and after adjustment will be. This effect is especially high if the budgetary share is important. Thus, as shown in the formula of the variation of well-being, the variation will be more important if the factor $\left(-w_i \frac{\Delta p_i}{p_0 i}\right)$ is important but will be more compensated by taking into account the adjustments of demand if the demand is elastic ($-\frac{1}{2}\epsilon_{ii} w_i (\frac{\Delta p_i}{p_0 i})^2$) because this term is positive if the own-price elasticity is negative.

Focusing on the evolution of the general price index is not advised. Indeed, if I assume that all commodities have experienced the same price variation - equal to the general price index evolution - results will be different. They do not take into account the fact that some particularly important commodities in the Indian consumption have seen their price increased more quickly. In all configurations except for Short-Term, this overestimates the negative impact of an increase in prices (food and non-food goods). Moreover, summing the individual effects (without taking into account the effects of the cross-elasticities) underestimates the negative impact of inflation. Indeed, taking into account the cross-elasticities also helps to limit the negative impact: the impact is less important if the increases are simulated jointly than if the impacts of one change are summed (See Appendix, Table 12).

Global inflation rate is quite similar between Long Term scenario (6.32) and 2008 scenario (6.76) but the overall effect is different: the 2008 scenario is more penalizing for the households. In order to understand the effect of rising price, it's necessary to know which item prices increase. The structure of inflation is really determining, especially the gap between non food inflation rate and

food inflation rate, and after among the food commodities. The structure of inflation implies also higher or lower differences between rural and urban sector. Rural households are more vulnerable if food inflation is important. The differences may be lower if the increase in beverage price is important because the urban household will be more penalized than the rural households.

Table 6: Average of Welfare Variation after Including Demand Reactions

	Long Term	Short Term	Year 2008	December 2010
Rural	−8.13	−6.74	−10.57	−2.60
	(0.72)	(1.20)	(1.50)	(0.83)
Urban	−7.43	−7.49	−9.31	−2.08
	(0.75)	(1.03)	(1.52)	(0.85)

Source: Author's calculations from NSS Data Round 61^{st}. The figures in brackets are standards errors.

In the rural areas, the increases in price of rice, wheat, meat, vegetables and non-food goods penalize more the households. An increase by 10% in the price of these four goods decreases the welfare by more than 1%, on average. On the contrary, a very important increase in the price of starchy, corn or other cereals has a void impact on the welfare. Thus, an increase by 12.5% in the price of starchy decreases the well-being by 0.17% while an increase by 8% in the price of wheat decreases the household's welfare by 0.44% and an increase by 5% in non-food price decreases the welfare by 2%.

The impacts are somewhat different in the urban environment. Indeed, the differences in the consumption pattern and the values of price-elasticities lead to different effects. Thus, urban households are more vulnerable to an increase in the price of rice, beverage, fruit and non-food goods than in the rural areas. However, the impact is lower in the urban areas than in the rural areas except for the Short-Term case (which is characterized by a very high increase in non-food prices). Thus, rural populations are the most vulnerable by inflation, particularly food inflation.

Next section tries to determine which households are the most vulnerable to rising food prices. It focuses on which variables have a significant (positive or negative) impact on the magnitude of welfare variation. Moreover, it attempts to determine at-risk populations for each scenario and explain why.

5.2. Who Are the Most Vulnerable?

5.2.1. Poor vs. Rich

The MPCE explains the main part of the magnitude of the impact on welfare (See Tables 13 and 14 of the Appendix). The effect is generally positive: the higher the MPCE is, the lower the negative impact on welfare is. Four goods, in fact luxury goods, can be distinguished: meat, beverage, fruit and non food items. For instance if the MPCE increases by 10%, the negative impact due to rising non food price is increased by 0.01282 and the negative impact due to rising rice price is reduced by 0.00243. Non food budgetary share is also important to characterize the impact of rising price. Indeed, for a same increase in price (10%) the effect of non food share on the magnitude of the impact of inflation varies from one to ten. For instance if non food share is reduced by one point, the negative impact of rising rice price is increased by 2.116 until the negative impact of rising fruit price is increased by 0.161.

Both findings confirm that the poor households have not benefited from the growth on last years to improve their well-being because of the high inflation. They are penalized because they have low MPCE and because they consume more food that negatively increases the magnitude of the

impact. Moreover, at a same non food share, they consume more cereals that also adversely affect them.

The inflation of last five years penalized the poor household whereas in last year (2010) the rich households were more negatively affected. The reversal on last year didn't offset the impact of past inflation characterized by high food price inflation. However, if, in the next years, the non food inflation is higher than food inflation, the poor households will be less negatively affected by the inflation and will be able to improve their conditions. On the other hand, if food price inflation is higher, their vulnerability will increase whereas the rich households will not be so much affected by the inflation that will increase the disparities.

Moreover, having a regular income allows limiting the negative impact of an increase in price on welfare for the main commodities, particularly cereals. This reinforces the vulnerability of poor households[11] which are 86% declaring no regular income vs. 52% for the other households. Thus it is important to provide regular income to fight against vulnerability because households are less vulnerable; they can plan their consumption, they no longer live from hand to mouth and are so less dependent to market price evolution.

Food inflation disadvantaged more strongly poor households whereas a higher increase in price of luxury goods (whose expenditure elasticity is greater than 1) penalizes more rich households (decreasing relation with the logarithm of the MPCE).

5.2.2. Rural vs. Urban

Except for beverage and non food, rural households are, on average, as much or more adversely affected by rising food price, all things being equal (for instance at a same level of MPCE). An explanation can be found on the values of price elasticities. Indeed, rural demand is less elastic than urban demand and so the households don't adjust enough their consumption to limit the negative impact on welfare. Moreover, even if the self-employed in rural non agriculture (they are on average richer than the other rural households) are more negatively affected by rising cereal prices than casual laborers on the urban areas (they are on average poorer than the other urban households). For the other items, casual laborers are more adversely affected.

Thus, rising cereal price affected more negatively all the rural households, whereas for the other commodities the at-risk populations are defined priority by expenditure level. However,this study doesn't take into account the effect on farmer income. Indeed, a majority of rural households work on the agricultural sector and so can benefit from an increase in food prices. The effect on income will be important if the increase in food price results of an increase in product price. On the other hand, if the increase results of an increase in retail price, the winners may be the middlemen and not the farmer.

In any case, if rural inflation is enough lower than urban inflation, rural households will be less affected by inflation and so the welfare level may converge to urban area; on the other hand if rural inflation is higher the gap is accentuated and disparities may increase. But since 2006, inflation rate (YoY) is higher for agricultural laborers (CPI-AL) than for industrial worker (CPI-IW), so disparities may increase between both sectors: rural households have been more negatively affected. That can reinforce existing disparities such as on poverty HCR gap (41.8% against 28.3% with the new poverty lines defined recently, see Himanshu [15]).

Thus, the increase in price of four commodities affects particularly rural households with a low level of expenditure - rice, spices, sugar and starchy - while three goods affect urban poor households: wheat, beverage and other food, other cereals and substitutes. The impact of an increase in rice

[11] For next figures, poor households are defined as the households whose the MPCE is less than 150% of the poverty line.

is naturally more important in the rural sector. Indeed, in the rural sector at the national level, rice represents 55% of cereal consumption against 49% in the urban areas; wheat represents 47% of the urban household's cereal consumption against 30% for rural households, that's why urban households suffer most from an increase in wheat price.

5.2.3. SC/ST and Religion

Religious status is relevant to explain the magnitude of the impact of rising food even if the effect on the magnitude of welfare variation is lower than that of the expenditure level. Indeed, for most of the items, the religious belonging can accentuate the vulnerability. This study focuses on three groups: Hindus, Muslims and others (including Sikhs, Jain, Christian, Buddhist and other religious minorities).

The main finding is an increase in the negative impact of rising meat price if the household is Muslim. Muslims are also more negatively affected by an increase in rice or starchy prices. Moreover, the own-price elasticity of meat demand is higher for Muslims (-0.84) than for the other religious groups (-0.86 for both groups).The share of Muslim who consumes meat is higher than the share of Hindu. Both facts explain why Muslims are more negatively affected by an increase in meat price. The households which are not Hindu are also more negatively affected by an increase in meat prices.

For the six main budgetary shares (rice, wheat, vegetables, meat, beverage and non food items), the Scheduled Caste and the Scheduled Tribes are more negatively affected by an increase in price than the non SC/ST except for meat. The disparity among both groups is huge for rice, meat and non food items. The positive effect of being SC/ST regarding the impact of a rising meat price on welfare can be due to the less part of SC/ST consuming meat and among the meat consumers, the less important budgetary share. For the other 8 goods the effect of being SC/ST is positive but weak. Furthermore, the SC/ST are more negatively affected by an increase in price of the main commodities.

5.2.4. Household composition

Woman vulnerability is confirmed. Indeed, if the householder is a woman, the impact on the household's welfare is as much or more negative than if the householder is a man (except for non food items). On average, the households whose householder is a woman devote a higher budgetary share to food good (59% vs. 57%). Thus, mechanically, food inflation affects them more negatively. On the other hand, marital status is not a relevant factor of vulnerability. Being never married, widowed or divorced are not systematically more penalizing than being married. Their consumption pattern and elasticities are not enough sufficiently different to bring significantly different impacts on the magnitude of welfare variation.

The household size is, in many cases, a factor of vulnerability for the households. Indeed, for most of the commodities, the negative effect increases with the household size to reach its maximum when the household is composed of around ten people; after this threshold, the effect is still negative but less important (it concerns few households, around 3% of the population). However, for beverage, pulse and starchy the household size increases always the loss of well-being.

There are economy scales in consumption. So, at a same level of MPCE, a large household may live in best comfort than a small household. The large household may save more per capita (saving rate increases with living standards). In case of an increase in prices, the large household may be so less negatively affected than the small household. However, the empirical results underscore an opposite effect. The divergence with the theoretical analysis can come from the weak development of saving access in India.

The proportion of children under 15 years in the household is always a variable which has a significant effect on the impact of inflation on the household's welfare. Having relatively many children in the household conducts to a decrease in the households' well-being for meat and dairy products (which can be understood especially if the children are very young and should drink milk), wheat, beverage and other food, non-food goods, fruit and starchy. We can think that it is more difficult to make economy scale on non food items (health, education are included) than in food commodities. The opposite effect on an increase in rice price and on an increase in wheat price is something strange.

5.2.5. Governmental Program

Households which self-report hunger are more negatively affected by an increase in price except for rice and non food items. Moreover, the households which don't receive a governmental program[12] are less vulnerable. These findings confirm the extreme vulnerability of the poorest households to the inflation. Indeed, the households reporting hunger are on average poorer than the other households. Moreover, in order to benefit from one of these programs the household must be declare disadvantageous households.

Current governmental programs don't allow protecting this at-risk population in case of inflation. However,it is more difficult to insert into the analysis meals taken outside the household. This study simulates the impact of rising price of specific goods (vegetables, rice...) whereas those programs offer prepared meals or food as wage. The negative impact of inflation on the households can be overestimated because, for instance, the effect of having free meals at midday instead of making own meal is underestimated.

On the other hand, having a ration card[13] can limit the negative impact of inflation on the household's welfare. Indeed, households with a ration card are less negatively affected by an increase in cereal prices. Households are protected by restricted prices (Antodaya and BLP cards allow its owner to buy rice and wheat at very low prices which are fixed).

This last finding mitigates the critics on the PDS and its failures. Indeed The PDS program is critiqued because it fails to target the poorest households. Indeed "identifying the poor in a country like India is a formi-dable task"[14]. Moreover, Himanshu[15] said "Historically, limiting food security to BPL families has severely impaired the effective access to food for poor families. In particular, (i) large numbers of poor families did not have BPL cards, (ii) even when they had cards, access to PDS was not automatic and, (iii) even if they had access to Public Distribution System (PDS), they did not receive the full entitlement of food." I don't question these problems but this work underlines the positive effect for the households which have a ration card and which purchase food on PDS shop. These programs of food security allow the households to mitigate the negative impact of inflation on welfare. However, I don't distinguish cards and the positive effect can come from the other cards but the existence of a positive effect is set for the programs.

[12]Four governmental programs are effective: Food for Work, Annapoorna, ICDS and Midday Meal.

[13]There are three types of food ration card: BLP, the Antodaya and others. The BLP (Below Poverty Line) card is issued to households by the Government. The condition is, of course, to live below poverty line (threshold depending on the sector and the State). This card allows buying on PDS (Public Distribution System) shops where prices are normally lower at market prices (but is not always the case, a large existing traffic) Antodaya card is reserved to the "very poor", it concerns the poorest households among those living below the poverty line. The beneficiaries of this card can purchase 25 kg of cereals at 2 INR/kg for wheat and 3 for rice. Other cards also allow accessing to limited price commodities but they are not described.

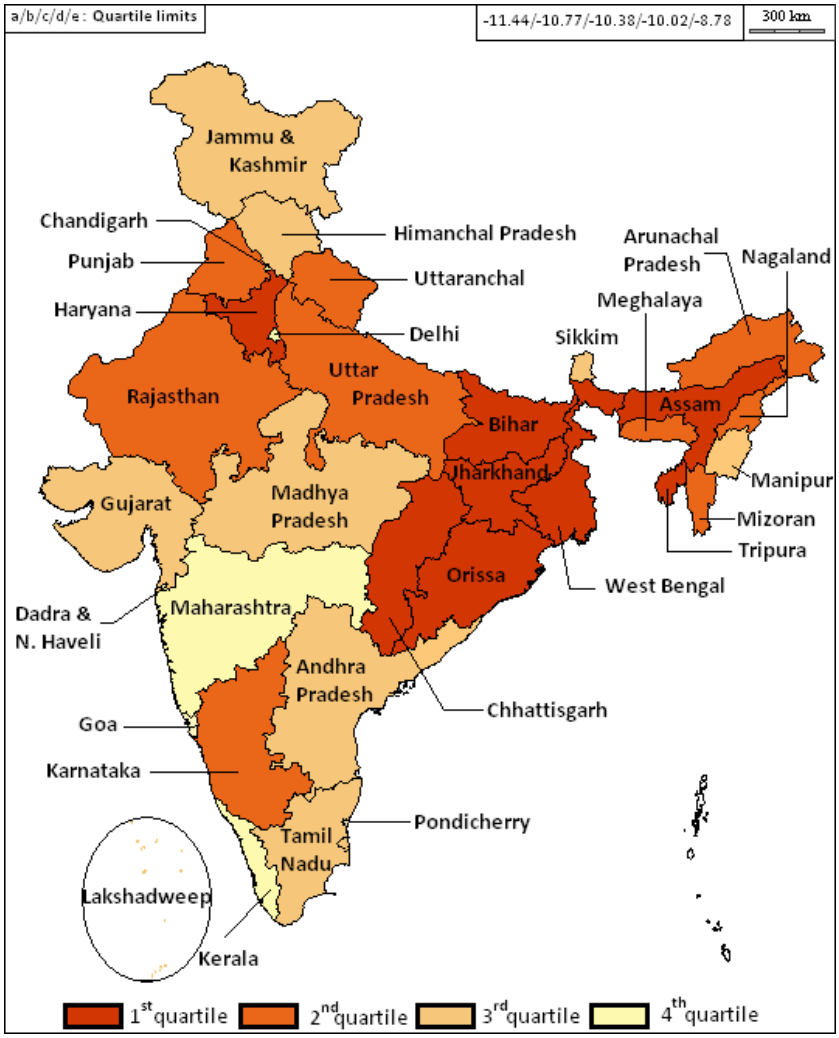
[14]PDS Forever? By Ashok Kotwal, Milind Murugkar, Bharat Ramaswami, published on EPW Vol xlvi no 21

[15]http://www.india-seminar.com/2011/617/617_himanshu.htm

5.2.6. State Disparities

There are also disparities between states. Indeed, national average clears variations between states. Differences on the magnitude of the impact depend on commodity whose price increases. The impact of an increase in non food prices is quite homogenous among state whereas there are huge differences between states for wheat and rice. Indeed, Rajasthan, Bihar, Uttar Pradesh and Madhya Pradesh are strongly affected by an increase in wheat price: in average welfare decrease by 1% for an increase by 10% in prices. At the opposite, nineteen states are weakly affected (the welfare decrease is lower than 0.2%).

Figure 5: Welfare Variation by State for 2008



Source: Author's calculations from NSS Data Round 61^{st}.

An increase in rice prices affects strongly the states on the East coast, specifically Manipur, Assam, Tripura, West Bengal, Chhattisgarh and Jharkhand. The decrease in welfare is higher than 2%. States on North-West are more protected (the welfare decrease is lower than 0.5%).

For the "2008" case, the variations are enough significant. The following map (Figure 5) shows these disparities. Four groups (i.e. quartiles) are made. The limits of each quartile are given to be compared with the national average (-10.31%).

5.3. The Four Inflation Scenarios

In long term perspective (i.e. according to the Long Term scenario), the most vulnerable households are the poorest rural households (low monthly expenditure per capita). These households dedicated a small share of their budget to non-food goods. The households, less educated, is composed by few children and many women; the householder is old enough (about 50 years). Muslims are protected but the non-Hindu and non-Muslim are more adversely affected by the inflation because the increase in meat price was relatively lower than the increase in other food prices. Agricultural laborers without lands and households without a regular source of income are also particularly affected by inflation. Households self-reporting hunger are at risk populations.

A bout of inflation such as that of December 2010 (see Table 14 of the Appendix) affects negatively the poorest households because of very high food price inflation. However,that must be checked by other studies. Indeed, this work is not based on data of December 2011; it's just a simulation of the potential effect of the inflation on the household's welfare. The result of the simulation based on inflation of December 2011 is pessimistic by the magnitude of the impact (a third of the impact of Long Term scenario but just for one month and not one quarter) and by the most affected households which are yet disadvantaged.

The food price crisis in 2008 had affected hardest rural households. However,affluent and educated households whose householder is a 60 year-old woman are the most vulnerable. Apart from this, at-risk populations have the same characteristics as those of the "Long term" case.

Thus in India the most disadvantaged households are not the most affected by global food prices episode in 2008 because cereals have experienced the highest increase in prices - the Government took drastic measures to limit the increase in the price of cereals such as the stop of exports - but food goods such as meat and dairy products consumed by richer households. Remember However,that these positive effects of the increase in prices on producers are not taken into account.

On the other hand, on short term perspective (Short Term scenario) the most affected populations by "Short term" inflation are so different. Indeed, the richest urban households, devoting a high share of their spending on non-food goods are the most negatively affected by the rise in price. The fact of not having children under 15 years in the household and a high proportion of women reinforces the effects as well as a low level of education. Households working on their own account, but with no regular source of income are among the most vulnerable households. Again having a food ration card increases the vulnerability of households.

6. CONCLUDING REMARKS

This paper examined the impact of food inflation on the household's welfare. The main findings are as follows.

First, consumption pattern has changed since 1993. Non food expenditure has increased whereas households have diversified food consumption. Cereal, particularly coarse cereal, consumption has declined. Many authors characterized these changes and tried to explain it. It is not the focus of the article but it is important to understand why elasticities between 1993 and 2004 changed. Consumption pattern is not yet stable in an emergent country like India. These evolutions impact the demand reactions and so the values of price and expenditure elasticities; the effect on welfare.

Secondly, expenditure elasticities allow classifying commodities on three groups: inferior goods

(cereals), normal goods and luxury goods (fruit, non food, beverage and meat). Elasticities on the rural areas are not the same than in the urban areas. Indeed, urban demand is less elastic except for inferior goods. Moreover, price elasticities are small but in majority significantly different to zero. Demand is not elastic so inflation will impact severely the households because their consumption pattern would not change a lot. However,some goods are substitutable, for instance cereals. If wheat price increases, rice demand will increase to substitute wheat in order to limit the negative impact.

Then, the household's welfare has increased in India since 1993. Improvements in health's access, electricity, less physical work, increase of real income per capita explain this improvement but some factors have limited the improvement of well-being as inflation. Indeed, food inflation affects negatively the welfare of households. The average of decrease is around 8-10% for each scenario (except December 2010 but we can't compare directly this scenario with the other three). Variations are computed from the elasticities obtained with the NSS data (Round 61^{st}) and assuming that elasticities have been constant since 2005. The most penalizing increases in price concern cereals and non-food goods, on the contrary an increase in fruit price is not really penalizing for the households. Indeed, the structure of inflation is important to compute the decrease in the household's welfare.

Next, different structures of inflation affect negatively different households. Indeed, if the price of food, especially cereals, increases rapidly, the most vulnerable households are the rural households with a low level of expenditure. If the highest increase in price concerns non-food items, the most negatively affected households are the rich household living in the urban areas. The household size, the age and the sex of the householder are characteristics which impact the value of the decrease in well-being but differently according to the structure of inflation. Food inflation increases inequalities (by impacting more the poorest) whereas non-food inflation seems to reduce (by impacting the richest).

These results on the impact of inflation on the household's welfare are far from conclusive. Same studies with recent data, with price data, including the supply side and the effects on others markets (labor market for instance) must be carried on such as a study which doesn't focus on price to explain welfare's variation.

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A. APPENDIX

Key lecture for the two following tables: The figures in brackets are obtained from 1,000 replications of the bootstrap using the cluster-level data and are defined as half the length of the interval around the bootstrap mean that contains 0.638 (the fraction of a normal random variable within two standard deviations of the mean) of the bootstrap replication.

Urban		Vege tables	Spices	Starchy	Oil	Pulse	Meat	Others Cereals	Corn	Wheat	Rice	Beverages and Other	Sugar	Fruit	Non food
Expenditure Elasticity		0.72	0.67	0.05	0.62	0.66	1.88	0.18	0.59	-0.55	-0.42	1.73	0.83	1.66	1.23
		(0.02)	(0.01)	(0.03)	(0.01)	(0.01)	(0.03)	(0.04)	(0.05)	(0.04)	(0.06)	(0.09)	(0.02)	(0.05)	(0.01)
Price Elasticity	Vegetables	-0.32	0.13	-0.75	0.11	0.20	0.10	0.96	-2.06	0.04	-0.41	0.03	0.23	3.49	0.04
		(0.02)	(0.01)	(0.03)	(0.01)	(0.01)	(0.00)	(0.06)	(0.11)	(0.02)	(0.01)	(0.03)	(0.02)	(0.14)	(0.07)
	Spice	0.24	-0.95	0.40	0.06	0.15	0.03	-0.30	-0.49	0.18	-0.32	0.05	0.05	0.39	0.13
		(0.02)	(0.01)	(0.02)	(0.00)	(0.01)	(0.00)	(0.03)	(0.03)	(0.02)	(0.02)	(0.00)	(0.02)	(0.05)	(0.08)
	Starchy	-0.21	0.01	-1.51	0.09	0.02	0.07	1.08	-0.08	-0.40	-0.11	0.09	-0.21	0.05	-0.03
		(0.01)	(0.01)	(0.12)	(0.01)	(0.02)	(0.00)	(0.08)	(0.04)	(0.03)	(0.01)	(0.01)	(0.02)	(0.20)	(0.08)
	Meat	0.18	0.11	0.73	-0.21	0.02	0.06	-0.25	4.26	-0.26	-0.02	0.01	-0.01	-6.48	0.32
		(0.01)	(0.01)	(0.04)	(0.04)	(0.02)	(0.01)	(0.05)	(0.21)	(0.02)	(0.03)	(0.03)	(0.03)	(0.26)	(0.39)
	Pulse	0.15	0.19	-0.01	0.11	-0.76	0.02	-0.33	-3.20	-0.15	-0.24	0.01	-0.06	4.20	0.07
		(0.02)	(0.01)	(0.06)	(0.01)	(0.03)	(0.01)	(0.02)	(0.15)	(0.02)	(0.01)	(0.02)	(0.03)	(0.22)	(0.01)
	Oil	0.23	0.09	0.61	0.10	0.04	-0.86	-0.28	0.57	-0.12	1.01	-0.30	-0.06	-0.55	0.11
		(0.00)	(0.00)	(0.02)	(0.00)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.03)	(0.05)
	Others	0.11	0.01	0.49	0.20	-0.18	-0.05	-1.14	0.03	-0.19	0.49	-0.15	-0.18	-0.20	0.19
	Cereals	(0.08)	(0.00)	(0.06)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)	(0.08)	(0.21)
	Corn	0.05	-0.05	0.01	-0.18	-0.09	0.02	-0.44	-1.33	-0.43	0.22	-0.03	0.11	0.57	-0.15
		(0.01)	(0.01)	(0.06)	(0.02)	(0.01)	(0.00)	(0.03)	(0.23)	(0.02)	(0.01)	(0.02)	(0.02)	(0.14)	(0.20)
	Wheat	0.07	0.22	-1.29	-0.07	-0.11	-0.03	-0.40	-5.06	-3.00	2.07	0.19	-0.62	6.49	0.16
		(0.02)	(0.01)	(0.06)	(0.01)	(0.01)	(0.01)	(0.03)	(0.18)	(0.11)	(0.04)	(0.01)	(0.03)	(0.28)	(0.07)
	Rice	-0.46	-0.17	-0.23	0.15	-0.20	0.65	1.29	4.18	3.29	-2.71	0.48	0.62	-5.06	-0.08
		(0.02)	(0.01)	(0.05)	(0.01)	(0.01)	(0.02)	(0.04)	(0.18)	(0.09)	(0.06)	(0.02)	(0.02)	(0.21)	(0.13)
	Beverages	0.05	0.00	0.29	-0.01	0.01	-0.12	-0.37	-0.12	0.18	0.28	-0.25	-0.23	0.15	0.00
	and Other	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.03)	(0.01)	(0.02)	(0.01)	(0.03)	(0.01)	(0.10)	(0.02)
	Sugar	0.13	0.03	-0.45	-0.05	-0.10	-0.01	0.04	-2.57	-0.38	0.24	-0.13	-0.19	4.20	-0.04
		(0.01)	(0.01)	(0.05)	(0.01)	(0.02)	(0.00)	(0.03)	(0.13)	(0.01)	(0.01)	(0.01)	(0.04)	(0.18)	(0.07)
	Fruit	-0.03	0.04	-0.10	0.05	0.03	-0.03	0.42	-0.07	-0.02	-0.29	0.06	0.12	-0.67	0.07
		(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.03)	(0.01)	(0.03)	(0.03)	(0.02)	(0.00)	(0.01)	(0.04)
	Non food	-0.40	0.80	1.85	-0.11	0.78	0.13	-1.95	7.73	0.90	-0.41	0.05	0.25	-8.67	0.32
		(0.03)	(0.04)	(0.11)	(0.03)	(0.01)	(0.46)	(0.18)	(0.35)	(0.08)	(0.06)	(0.12)	(0.05)	(0.83)	(0.83)

Elasticities are presented so that the columns are the goods whose prices are changing and the rows the goods whose quantities are being affected

Source: Author's calculations from NSS Data Round 61st.

Table 7: Price Elasticity of Compensated Demand in Rural Area, Estimated by the AIDS with Demographic Translation and Selection Bias Correctionl

Urban		Vege tables	Spices	Starchy	Oil	Pulse	Meat	Others Cereals	Corn	Wheat	Rice	Beverages and Other	Sugar	Fruit	Non food
Expenditure Elaasticity		0.57	0.48	0.22	0.48	0.54	1.07	-0.13	0.93	-0.63	-0.14	1.24	0.46	1.33	1.25
		(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.01)	(0.08)	(0.01)	(0.06)	(0.06)	(0.10)	(0.02)	(0.03)	(0.01)
Price Elasticity	Vegetables	-0.26	0.14	-0.17	0.32	0.01	0.05	-0.01	-0.04	-0.15	-0.43	0.00	0.07	0.03	0.30
		(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.00)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.05)
	Spice	0.08	-0.99	0.06	0.10	0.11	0.02	-0.04	-0.03	0.11	-0.42	-0.04	-0.09	0.06	1.50
		(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.00)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)	(0.06)
	Starchy	-1.01	0.75	-0.90	0.87	0.19	0.53	0.64	-0.12	-2.09	-0.16	0.08	-0.33	-0.10	2.39
		(0.07)	(0.06)	(0.08)	(0.10)	(0.11)	(0.05)	(0.03)	(0.05)	(0.07)	(0.06)	(0.02)	(0.08)	(0.02)	(0.17)
	Meat	0.24	0.05	0.07	-0.35	-0.14	-0.03	0.05	0.06	-0.27	0.04	-0.08	-0.06	0.07	0.55
		(0.02)	(0.01)	(0.01)	(0.04)	(0.03)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.06)
	Pulse	0.01	0.06	0.05	-0.31	-0.28	-0.06	0.09	-0.10	-0.12	-0.33	-0.02	-0.07	0.06	0.96
		(0.02)	(0.02)	(0.02)	(0.04)	(0.06)	(0.01)	(0.01)	(0.01)	(0.02)	(0.03)	(0.01)	(0.03)	(0.01)	(0.07)
	Oil	0.02	0.00	0.03	-0.03	0.01	-0.69	-0.06	0.01	0.09	0.11	-0.12	0.00	0.02	0.60
		(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)	(0.02)
	Others	1.69	-0.97	2.54	-1.62	0.45	-1.33	-2.14	-0.81	0.75	-0.25	-0.80	0.63	0.77	-3.06
	Cereals	(0.12)	(0.06)	(0.13)	(0.14)	(0.06)	(0.09)	(0.06)	(0.05)	(0.11)	(0.11)	(0.05)	(0.06)	(0.05)	(0.34)
	Corn	-8.04	-1.53	-0.36	17.41	-11.21	1.37	0.63	-2.60	-15.33	12.57	-0.45	-10.33	-0.03	24.15
		(0.99)	(0.19)	(0.08)	(2.08)	(1.34)	(0.15)	(0.08)	(0.19)	(1.86)	(1.53)	(0.06)	(1.26)	(0.01)	(2.87)
	Wheat	-0.24	0.02	-0.37	-0.53	-0.17	0.26	0.26	-0.09	-3.45	2.76	-0.16	-0.32	0.08	1.72
		(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.02)	(0.03)	(0.01)	(0.07)	(0.07)	(0.03)	(0.01)	(0.02)	(0.13)
	Rice	-0.35	-0.50	-0.08	-0.22	-0.30	0.18	-0.13	0.08	1.88	-1.94	0.14	0.08	-0.16	1.10
		(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.04)	(0.02)	(0.01)	(0.06)	(0.08)	(0.02)	(0.01)	(0.02)	(0.12)
	Beverages	0.01	0.00	0.01	-0.09	0.00	-0.26	-0.06	0.01	-0.08	0.15	0.37	-0.06	-0.01	0.11
	and Other	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)	(0.10)	(0.01)	(0.06)	(0.11)
	Sugar	0.15	-0.11	-0.15	0.04	0.00	-0.07	0.03	-0.19	-0.68	0.27	-0.25	0.00	0.10	0.75
		(0.02)	(0.03)	(0.02)	(0.04)	(0.05)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.05)	(0.01)	(0.07)
	Fruit	2.25	0.24	-0.17	-4.08	2.66	-0.15	-0.18	0.43	4.32	-3.12	0.11	2.56	-0.68	-5.84
		(0.16)	(0.03)	(0.02)	(0.35)	(0.23)	(0.04)	(0.02)	(0.04)	(0.32)	(0.26)	(0.02)	(0.21)	(0.01)	(0.51)
	Non food	0.03	0.08	0.02	0.07	0.05	0.13	0.04	-0.01	0.11	0.09	0.04	0.02	0.02	-0.57
		(0.01)	(0.01)	(0.02)	(0.07)	(0.01)	(0.01)	(0.04)	(0.04)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.15)

Elasticities are presented so that the columns are the goods whose prices are changing and the rows the goods whose quantities are being affected

Source: Author's calculations from NSS Data Round 61st.

Table 8: Price Elasticity of Compensated Demand in Urban Area, Estimated by the AIDS with Demographic Translation and Selection Bias Correction

	Wheat	Rice	Other Cereals	Starchy	Oil	Spice	Pulse	Vegetables	Maize	Sugar	Meat	Fruits	Beverage	Non Food
Rural	0.05	-0.02	0.24	0.47	0.63	0.69	0.66	0.76	0.86	0.88	2.01	1.52	3.52	1.05
Urban	0.01	-0.34	-1.24	0.23	0.71	0.65	0.68	0.82	0.38	0.86	1.79	1.45	2.39	1.00

Table 9: Expenditure Elasticities derived from the 50^{th} Round of the NSS Survey

Urban: After/Before	Long Term	Short Term	2008	December 2010
Vegetables	-0.69/-0.71	-0.54/-0.55	-0.72/-0.75	-0.90/-0.93
	(0.41)/(0.42)	(0.32)/(0.33)	(0.43)/(0.44)	(0.53)/(0.55)
Rice	-0.55/-0.60	-0.11/-0.12	-0.84/-0.96	-0.03/-0.03
	(0.50)/(0.55)	(0.10)/(0.11)	(0.77)/(0.89)	(0.02)/(0.02)
Wheat	-0.36/-0.42	-0.03/-0.03	-0.47/-0.58	-0.01/-0.01
	(0.37)/(0.43)	(0.03)/(0.03)	(0.43)/(0.48)	(0.01)/(0.01)
Corn	0.00/0.00	0.00/0.00	0.00/0.00	0.00/0.00
	(0.03)/(0.03)	(0.04)/(0.05)	(0.03)/(0.04)	(0.00)/(0.00)
Others Cereals	-0.07/-0.08	-0.05/-0.05	-0.10/-0.12	-0.02/-0.02
	(0.21)/(0.24)	(0.14)/(0.15)	(0.30)/(0.38)	(0.05)/(0.06)
Pulse	-0.26/-0.27	0.12/0.12	-0.53/-0.55	-0.04/-0.04
	(0.16)/(0.16)	(0.07)/(0.07)	(0.31)/(0.32)	(0.03)/(0.03)
Starchy	-0.09/-0.10	0.13/0.13	-0.18/-0.20	-0.08/-0.08
	(0.11)/(0.12)	(0.16)/(0.15)	(0.21)/(0.23)	(0.09)/(0.10)
Spices	-0.59/-0.67	-0.64/-0.72	-0.54/-0.60	-0.51/-0.56
	(0.32)/(0.36)	(0.34)/(0.38)	(0.29)/(0.32)	(0.27)/(0.30)
Meat and	-1.02/-1.06	-1.22/-1.27	-1.56/-1.65	-0.11/-0.11
dairy products	(0.58)/(0.60)	(0.69)/(0.72)	(0.89)/(0.94)	(0.06)/(0.06)
Beverages and	-0.54/-0.53	-0.19/-0.19	-1.14/-1.12	0.05/0.05
other	(0.83)/(0.82)	(0.30)/(0.29)	(1.77)/(1.73)	(0.07)/(0.07)
Sugar	-0.14/-0.14	0.29/0.29	-0.76/-0.76	-0.05/-0.05
	(0.09)/(0.09)	(0.20)/(0.20)	(0.52)/(0.52)	(0.04)/(0.04)
Oil	-0.16/-0.17	-0.46/-0.47	0.01/0.01	-0.05/-0.05
	(0.09)/(0.09)	(0.22)/(0.25)	(0.00)/(0.00)	(0.03)/(0.03)
Fruits	-0.20/-0.21	-0.33/-0.35	-0.25/-0.25	0.03/0.03
	(0.16)/(0.17)	(0.27)/(0.29)	(0.20)/(0.21)	(0.03)/(0.03)
Non Food	-2.50/-2.54	-4.45/-4.57	-1.84/-1.86	-0.36/-0.36
	(0.68)/(0.69)	(1.21)/(1.24)	(0.50)/(0.51)	(0.09)/(0.09)

Table 10: Average of Welfare Variation (%) in Rural Area for the Increase in Each Price Independently, Estimated by the AIDS

Rural: After/Before	Long Term	Short Term	2008	December 2010
Vegetables	-0.83/-0.86	-0.65/-0.67	-0.87/-0.90	-1.07/-1.12
	(0.46)/(0.47)	(0.36)/(0.37)	(0.48)/(0.50)	(0.59)/(0.62)
Rice	-0.98/-1.11	-0.21/-0.22	-1.45/-1.79	-0.05/-0.05
	(0.83)/(0.94)	(0.18)/(0.18)	(1.24)/(1.53)	(0.04)/(0.04)
Wheat	-0.44/-0.51	-0.03/-0.03	-0.58/-0.70	-0.02/-0.02
	(0.47)/(0.54)	(0.03)/(0.04)	(0.62)/(0.75)	(0.01)/(0.01)
Corn	-0.03/-0.03	-0.05/-0.05	-0.04/-0.04	0.00/0.00
	(0.17)/(0.18)	(0.25)/(0.28)	(0.20)/(0.22)	(0.01)/(0.01)
Other Cereal	-0.17/-0.18	-0.11/-0.11	-0.25/-0.28	-0.04/-0.04
	(0.43)/(0.47)	(0.28)/(0.29)	(0.64)/(072)	(0.10)/(0.11)
Pulse	-0.33/-0.34	0.15/0.15	-0.66/-0.71	-0.05/-0.05
	(0.18)/(0.19)	(0.08)/(0.08)	(0.36)/(0.39)	(0.03)/(0.03)
Starchy	-0.18/-0.20	0.29/0.26	-0.34/-0.42	-0.16/-0.17
	(0.18)/(0.20)	(0.30)/(0.26)	(0.34)/(0.42)	(0.16)/(0.18)
Spice	-0.83/-0.92	-0.88/-0.99	-0.75/-0.83	-0.70/-0.77
	(0.35)/(0.39)	(0.38)/(0.43)	(0.32)/(0.35)	(0.30)/(0.32)

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Rural: After/Before	Long Term	Short Term	2008	December 2010
Meat and	-1.07/-1.12	-1.27/-1.34	-1..62/-1.74	-0.11/-0.11
dairy products	(0.78)/(0.81)	(0.93)/(0.99)	(1.18)/(1.27)	(0.08)/(0.08)
Beverages	-0.32/-0.33	-0.12/-0.12	-0.68/-0.69	0.03/0.03
and Others	(0.48)/(0.48)	(0.18)/(0.18)	(1.00)/(1.01)	(0.04)/(0.04)
Sugar	-0.18/-0.19	0.42/0.39	-0.82/-1.03	-0.07/-0.07
	(0.13)/(0.13)	(0.27)/(0.26)	(0.67)/(0.69)	(0.05)/(0.05)
Oil	-0.21/-0.21	-0.60/-0.61	0.01/0.01	-0.06/-0.06
	(0.10)/(0.10)	(0.28)/(0.28)	(0.00)/(0.00)	(0.08)/(0.08)
Fruits	-0.15/-0.16	-0.25/-0.26	-0.19/-0.19	0.02/0.02
	(0.17)/(0.18)	(0.28)/(0.29)	(0.21)/(0.22)	(0.02)/(0.02)
Non Food	-1.99/-2.00	-3.56/-3.61	-1.46/-1.47	-0.28/-0.28
	(0.62)/(0.62)	(1.10)/(1.12)	(0.45)/(0.45)	(0.09)/(0.09)

Table 11: Average of Welfare Variation (%) in Urban Area for the Increase in Each Price Independently, Estimated by the AIDS

	Long Term	Short Term	Year 2008	December 2010
Rural	-8.13	-6.74	-10.57	-2.60
	-9.09	-5.99	-13.68	-2.99
Urban	-7.43	-7.49	-9.31	-2.08
	-8.05	-7.98	-10.11	-2.2

Table 12: Welfare Varation: jointly (fisrt row) or sum of changes (second row)

VARIABLES	Long Term	Short Term	2008	December 2010
Non Food	4.086***	-3.375***	10.94***	1.621***
Budgetary Share	(0.0339)	(0.0556)	(0.0378)	(0.0469)
Logarithm of the MPCE	0.155***	-0.418***	-0.152***	0.501***
	(0.00838)	(0.0147)	(0.0111)	(0.0125)
Urban	0.195***	-0.141***	0.375***	0.112***
	(0.0283)	(0.0369)	(0.0214)	(0.0378)
Female	0.00898	0.0877***	-0.0492***	0.0423***
	(0.0110)	(0.0233)	(0.0157)	(0.0162)
Proportion of the household	0.206***	0.264***	0.179***	0.327***
Below 15 years-old	(0.0192)	(0.0290)	(0.0214)	(0.0261)
Proportion of woman	-0.223***	-0.310***	-0.108***	-0.320***
in the household	(0.0168)	(0.0281)	(0.0197)	(0.0238)
Education level	-0.000885	0.00780***	-0.0101***	0.00451***
(household average)	(0.000975)	(0.00208)	(0.00145)	(0.00148)
Age of householder	-0.0103***	0.00366	0.00204	-0.0169***
	(0.00130)	(0.00225)	(0.00158)	(0.00191)
Age square of	0.000103***	-1.10e-05	-3.73e-05**	0.000176***
householder	(1.29e-05)	(2.18e-05)	(1.55e-05)	(1.91e-05)
Household Size	0.0373***	0.0291***	0.00184	0.119***
	(0.00289)	(0.00595)	(0.00410)	(0.00448)
Household Size Square	-0.000609***	0.000587	0.000544**	-0.00369***
	(0.000157)	(0.000360)	(0.000234)	(0.000243)

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VARIABLES	Long Term	Short Term	2008	December 2010
Mulsim	0.0216***	0.0317**	0.0767***	0.0338***
	(0.00637)	(0.0134)	(0.00909)	(0.00992)
Others	-0.0345***	-0.0801***	-0.243***	0.0185
religions	(0.00926)	(0.0146)	(0.0124)	(0.0140)
Never married	0.551***	0.748***	0.249***	0.719***
	(0.0283)	(0.0365)	(0.0242)	(0.0382)
Widowed or divorced	-0.0406***	-0.0577***	-0.0183	-0.101***
	(0.0101)	(0.0218)	(0.0153)	(0.0152)
Self-employed in	0.0711***	0.103***	0.0882***	0.110***
rural non-agriculture	(0.00675)	(0.0166)	(0.0126)	(0.0107)
Other labour	0.0676***	0.0286	0.0536***	0.118***
in the rural area	(0.00846)	(0.0205)	(0.0151)	(0.0133)
Self-employed in l	0.0422***	-0.0659***	0.0272**	0.120***
agriculture	(0.00644)	(0.0160)	(0.0126)	(0.0102)
Self-employed	-0.0554*	-0.166***	-0.00219	-0.0677*
Urban	(0.0290)	(0.0403)	(0.0250)	(0.0396)
Regulary wage	0.0338	0.0189	0.0837***	0.0139
Urban	(0.0324)	(0.0464)	(0.0291)	(0.0448)
Casual labour	-0.0417	-0.123***	-0.0991***	-0.0290
Urban	(0.0310)	(0.0443)	(0.0282)	(0.0425)
Others	0.170***	0.138***	0.145***	0.245***
(both sectorl)	(0.0133)	(0.0235)	(0.0170)	(0.0199)
No regular	-0.0395***	-0.119***	-0.0363***	-0.0397***
income	(0.00879)	(0.0161)	(0.0112)	(0.0128)
Loan his dwelling	-0.00157	0.00892	0.0266*	-0.0133
	(0.0118)	(0.0209)	(0.0146)	(0.0179)
No dwelling	0.229	0.362	-0.00929	0.226
	(0.202)	(0.228)	(0.185)	(0.270)
Others but not owner	0.188***	0.0650*	-0.0434*	0.309***
	(0.0243)	(0.0343)	(0.0239)	(0.0343)
Have a ration card	-0.0897***	-0.289***	-0.0715***	-0.0987***
	(0.00533)	(0.0118)	(0.00865)	(0.00845)
Own lands	0.0739***	0.0340	0.0331**	0.0941***
	(0.0123)	(0.0217)	(0.0154)	(0.0185)
Enough food in past	0.0940***	0.404***	0.252***	0.0685***
12 months	(0.0154)	(0.0382)	(0.0266)	(0.0249)
Not to benefit from	0.0604***	0.150***	0.153***	0.0521***
a govermental program	(0.00424)	(0.0102)	(0.00790)	(0.00642)
SC/ST	0.0421***	0.0294**	0.162***	-0.0199**
	(0.00561)	(0.0119)	(0.00871)	(0.00842)
Constant	-10.68***	-3.681***	-14.40***	-6.584***
	(0.0623)	(0.110)	(0.0800)	(0.0923)
R-squared	0.703	0.352	0.817	0.389

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Results of Vulnerability Regression (NSS Data) for each inflation cases

VARIABLES	Rice	Meat	Wheat	Beverage	Non alimentaire	Vegetables
Non Food	2.116***	2.862***	0.128***	2.479***		0.497***
Budgetary Share	(0.0349)	(0.0451)	(0.0231)	(0.0778)		(0.0101)
Logarithm of the MPCE	0.243***	-0.625***	0.200***	-0.415***	-1.282***	0.0678***
	(0.00920)	(0.0124)	(0.00650)	(0.0185)	(0.0194)	(0.00271)
Urban	0.0244	0.106***	-0.0240	-0.260***	-0.150**	0.00820
	(0.0226)	(0.0293)	(0.0149)	(0.0693)	(0.0624)	(0.00782)
Female	0.0264*	0.0282**	0.0123	-0.0538***	0.117***	0.0132***
	(0.0154)	(0.0142)	(0.0110)	(0.0208)	(0.0243)	(0.00436)
Proportion of the household	0.263***	-0.122***	-0.211***	-0.281***	-0.289***	0.0676***
Below 15 years-old	(0.0216)	(0.0209)	(0.0147)	(0.0441)	(0.0457)	(0.00592)
Proportion of woman	-0.227***	-0.0249	0.121***	0.375***	-0.206***	-0.0650***
in the household	(0.0197)	(0.0181)	(0.0136)	(0.0353)	(0.0357)	(0.00587)
Education level	-0.000890	0.00180	0.00446***	-0.000560	-0.00771***	-0.00141***
(household average)	(0.00158)	(0.00144)	(0.00105)	(0.00187)	(0.00266)	(0.000407)
Age of householder	-0.0276***	0.0120***	0.00166	0.0311***	0.0139***	-0.00273***
	(0.00173)	(0.00151)	(0.00115)	(0.00271)	(0.00273)	(0.000502)
Age square of	0.000253***	-0.000102***	-5.18e-06	-0.000314***	-0.000152***	2.73e-05***
householder	(1.71e-05)	(1.48e-05)	(1.13e-05)	(2.69e-05)	(2.74e-05)	(5.03e-06)
Household Size	-0.0202***	-0.0870***	-0.0444***	0.0964***	-0.0723***	0.0283***
	(0.00474)	(0.00411)	(0.00291)	(0.00653)	(0.00737)	(0.00119)
Household Size Square	0.00263***	0.00374***	0.000627***	-0.00555***	0.00304***	-0.000891***
	(0.000300)	(0.000249)	(0.000171)	(0.000397)	(0.000394)	(6.63e-05)
Mulsim	-0.191***	-0.0281***	0.0408***	0.0571***	0.209***	0.0145***
	(0.0109)	(0.00844)	(0.00706)	(0.0120)	(0.0148)	(0.00279)
Others	0.0643***	-0.153***	0.0497***	-0.0429**	0.0278	-0.0105***
religions	(0.0137)	(0.0108)	(0.00743)	(0.0170)	(0.0177)	(0.00363)
Never married	0.200***	0.399***	0.0135	-1.223***	0.295***	0.130***
	(0.0231)	(0.0267)	(0.0176)	(0.0678)	(0.0538)	(0.00794)
Widowed or divorced	0.0598***	0.0322**	-0.0134	-0.00968	-0.0414*	-0.0250***
	(0.0148)	(0.0132)	(0.0109)	(0.0182)	(0.0224)	(0.00421)
Self-employed in	0.0691***	-0.124***	-0.117***	-0.0205**	0.143***	0.0189***
rural non-agriculture	(0.0139)	(0.00952)	(0.00902)	(0.00912)	(0.0170)	(0.00328)

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VARIABLES	Rice	Meat	Wheat	Beverage	Non alimentaire	Vegetables
Other labour	0.152***	-0.109***	-0.115***	-0.0880***	-0.00703	0.0225***
in the rural area	(0.0161)	(0.0107)	(0.0114)	(0.0132)	(0.0189)	(0.00392)
Self-employed in rural	0.180***	-0.303***	-0.106***	0.0910***	0.237***	0.0292***
agriculture	(0.0131)	(0.00916)	(0.00816)	(0.00800)	(0.0155)	(0.00315)
Self-employed	0.246***	-0.289***	-0.136***	0.151**	0.0507	-0.0264***
Urban	(0.0258)	(0.0309)	(0.0174)	(0.0699)	(0.0667)	(0.00854)
Regulary wage	0.194***	-0.156***	-0.132***	0.00251	0.0626	-0.00826
Urban	(0.0297)	(0.0340)	(0.0196)	(0.0759)	(0.0734)	(0.00990)
Casual labour	0.237***	-0.254***	-0.0986***	0.0841	0.103	-0.00866
Urban	(0.0297)	(0.0328)	(0.0216)	(0.0735)	(0.0684)	(0.00943)
Others	0.196***	-0.143***	-0.129***	-0.227***	0.0184	0.0396***
(both sectorl)	(0.0165)	(0.0144)	(0.0113)	(0.0271)	(0.0306)	(0.00497)
No regular	-0.0171	0.0529***	-0.0303***	-0.0420**	-0.0296	0.0129***
income	(0.0118)	(0.0103)	(0.00871)	(0.0181)	(0.0191)	(0.00335)
Loan his dwelling	-0.0723***	0.0646***	0.0260**	-0.0380	-0.383***	-0.00467
	(0.0167)	(0.0135)	(0.0122)	(0.0249)	(0.0283)	(0.00469)
No dwelling	0.437***	0.132	0.00940	-0.841*	0.178	0.0282
	(0.157)	(0.206)	(0.0910)	(0.461)	(0.334)	(0.0672)
Others but not owner	0.164***	0.0393*	0.142***	-0.651***	0.0389	0.0384***
	(0.0247)	(0.0232)	(0.0206)	(0.0582)	(0.0516)	(0.00761)
Have a ration card	0.150***	-0.184***	0.00694	0.0849***	-0.00828	-0.0184***
	(0.00938)	(0.00694)	(0.00632)	(0.00877)	(0.0126)	(0.00251)
Own lands	-0.0409**	0.0321**	0.0750***	-0.200***	0.00420	0.00998**
	(0.0178)	(0.0134)	(0.0132)	(0.0266)	(0.0271)	(0.00486)
Enough food in past	-0.701***	0.173***	0.0954***	0.129***	-0.121***	0.0192**
12 months	(0.0358)	(0.0171)	(0.0216)	(0.0200)	(0.0375)	(0.00786)
Not to benefit from	0.102***	-0.0474***	-0.189***	0.0562***	0.000887	0.0179***
a govermental program	(0.00889)	(0.00582)	(0.00521)	(0.00626)	(0.0105)	(0.00195)
SC/ST	-0.0827***	0.0856***	-0.0113*	-0.0255**	-0.0855***	-0.0109***
	(0.00929)	(0.00691)	(0.00619)	(0.0101)	(0.0128)	(0.00238)
Constant	-3.267***	2.244***	-0.926***	-0.419***	4.051***	-1.138***

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VARIABLES	Rice	Meat	Wheat	Beverage	Non alimentaire	Vegetables
(0.0825)	(0.0814)	(0.0526)	(0.132)	(0.152)	(0.0225)	
R-squared	0.263	0.309	0.160	0.397	0.380	0.212

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Results of Vulnerability Regression (NSS Data) for some commodities (inflation rate:10%)