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Extent of Poverty in India: A Different Dimension

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Poverty line in India is usually associated with a calorie threshold. This calorie threshold approach suffers from many problems. An alternative revealed preference based approach has been provided by Jensen and Miller (2010). In Jensen and Miller approach, the staple calorie share reveals whether a household is calorie deprived. We use this approach to estimate the extent of poverty in India. Though our poverty estimates are extremely close to the Tendulkar Committee estimates for the urban sector; for the rural sector our estimates are considerably less compared to the Tendulkar Committee figures. We also find remarkable rise in urban poverty between 2004-05 and 2007-08 by our method.

1 Introduction

Poverty line estimation has been a debatable issue in India and therefore, expert groups have been set up from time to time to review the methodology for estimation of poverty. The concept of poverty line was introduced by a working group of the Planning Commission in 1962 and subsequently expanded in 1979 by a task force (Sharma 2004). The latest of the expert committees in reviewing the methodology of poverty estimation is one chaired by Suresh D. Tendulkar, which submitted its report in 2009. All these approaches are based on a uniform calorie norm for all individuals, which make them susceptible to criticism from different quarters for different reasons — for example, Subramanian (2011), Swaminathan (2010). In spite of different problems embedded in having a uniform calorie norm for all families, there was no other alternative methodology available for calculation of poverty line.

In this paper we elaborate a new methodology, proposed by Jensen and Miller (2010), to estimate the extent of poverty without use of any uniform calorie threshold for all households. This methodology proposed by Jensen and Miller (henceforth JM methodology) is based on the theory of choice, particularly on the assumption that given a wider choice available to a rational individual, she chooses a better alternative. Therefore, the choice of a consumer with more income is preferable to the choice of a poorer consumer but not vice-versa. We quantify the desirability of a consumer's choice by her consumption of staple foods. A constrained consumer would consume more of staple food compared to an unconstrained consumer. Therefore, investigation into consumers' choices against income would enable us to

draw a line between constrained– and unconstrained– consumers. This line divides the poor from others, by JM methodology.

Estimation of poverty by JM methodology requires data on disposable income and actual food consumption for a household. For estimation of poverty in India using this method, we use the data from National Sample Survey Organization (NSSO) for the years of 2004–05 (61st Round) and 2007–08 (64th Round). Although the details of food consumption for a household can be found in these data-sets, incomes of households are not included in the NSSO data. As a remedy, we have considered expenditure of a household to substitute for the income of that household.

Head count ratio is a widely used measure of poverty. Our estimates of head count ratio for the year 2004–05 are contrasted with the benchmark of Tendulkar Committee estimates. For the urban sector, both estimates are similar—the JM estimate of 25.8% for all India is matched by the Tendulkar Committee figure of 25.7%. However, there is considerable divergence between JM estimates and Tendulkar Committee estimates for the rural sector. While the Tendulkar committee estimate for rural poverty is fixed at 41.8%, its JM counterpart is between 31.0 to 36.8% depending on the level of aggregation — India wise or state wise. We also estimate the extent of poverty with 2007–08 data and found a striking increase in urban poverty to 40.8% on the face of somewhat unchanging figure for the rural sector.

The plan of this article is described here. Section 2 discusses the problems with the uniform calorie threshold and how Jensen and Miller approach takes care of these problems. Section 3 elucidates the methodology and describes the data. Section 4 demonstrates results of our analysis. Section 5 concludes.

2. Jensen and Miller Methodology

2.1 Why Do We Require a New Approach?

Average per capita calorie intake has been extensively used to assess the extent of poverty in India. Approaches taken up by expert groups, which were set up by the Planning Commission in 1973 (Task force group) and in 1993 (Lakadawala Committee), constitute two examples. In those approaches, we should specify a

threshold daily calorie intake per capita—for example, 2400 and 2100 calories for rural- and urban- populations respectively—and then decide a poverty line basket—a consumption bundle—to ensure the specified threshold level of calorie for all members of a household. This basket, in general, depends on number of members in a household. The definition of poverty line, in nominal terms, is the per capita expenditure which enables a household to afford that specified poverty line basket. The households with a lesser income are categorized as calorie-deprived and hence, under the poverty line.

This approach has several limitations. Firstly, there, in general, is hardly any consensus on the subsistence calorie threshold itself (Dasgupta 1995; Svedberg 2000). Secondly, there is also evidence of change in calorie norms over time, which makes it even harder to press for a uniform calorie threshold. Deaton and Drèze (2009) demonstrated that per capita calorie consumption has been declining for the last 25 years despite an increase in the real wages over the years causing a downward shift in the calorie Engel curve. This apparent puzzle is only resolved if the calorie requirements change over time. Thirdly, absorption of calories from the food items depends on various characteristics of an individual, such as health status, metabolic rate and fitness level (Svedberg 2000:24). Most of these characteristics, being unobservable and difficult to measure, pose a severe limitation on the conversion of a calorie threshold into nominal terms. As an example, a person with some stomach disorder may have to consume a larger amount of food items compared to a healthy individual for obtaining a definite level of calories. If we use the same calorie threshold for a person suffering from stomach disorder and a healthy individual, we either underestimate the extent of poverty among the persons with stomach disorder or overestimate the degree of poverty among the healthy individuals. In the prevailing studies, none of these characteristics have been considered for estimating poverty in India. Fourthly, a threshold calorie approach does not consider the non-nutritional attributes – for example, taste – of food items. In practice, a household's selection of food items not only depends on the calorie content but also is contingent on these non-nutritional attributes. If we merely calculate whether the household's income is sufficient to buy the poverty line basket, it may not be sufficient. As these attributes have been completely ignored in the approaches based on calorie threshold, estimation of poverty based on a calorie threshold approach may give rise to

unreliable figures. There has also been strong indication that there is no tight link between income of a household and calories consumed by members of this household (Deaton and Drèze, 2009). The poverty estimates, therefore, could be arbitrary if we consider poverty line basket and per capita calorie consumption.

2.2 Jensen and Miller (2010) Approach

The various shortcomings of prevailing approaches underline the requirement to switch to a methodology, which does not specify any particular calorie threshold level for estimating poverty. Jensen and Miller (2010) have proposed a novel approach based on revealed preference of a household in choosing her consumption basket. A rational consumer is expected not to maximize the calorie consumption but to maximize her utility. Nevertheless, when an individual is below her subsistence level of calorie intake, she suffers from various physical inabilities like headache, dizziness and lack of concentration. These sufferings constitute a form of disutility on the part of this consumer. Since less than threshold level of consumption implies disutility for her, she minimizes these sufferings by augmenting consumption of food items having relatively higher calorie content per unit of expenditure. The food items, which provides relatively high amount of calorie per unit price, are collectively defined as "staple foods" in this context. A consumer near the "poverty line" has to invest heavily in staple foods to minimize the disutility associated with not meeting the required subsistence level of calorie intake. In other words, for a calorie deprived person, marginal utility of an additional calorie is quite high. Because of this high marginal utility of an additional calorie, a utility maximizing consumer, who cannot afford to meet the calorie requirement, is expected to consume greater amount of staple foods, the cheapest available sources of calories.

As the income of a consumer increases beyond the "poverty line" — when she can afford to consume without being constrained by the calorific requirement — her preferences lend gradually more and more weight toward the non-nutritional attributes of food items. As she no longer look for the cheapest available source of calories, the marginal utility of an additional calorie declines and the consumer substitutes toward food items which are more expensive sources of calories. In fact, Deaton and Drèze (2009) find empirical evidence that a richer consumer, in general, allocates her food expenditure differently compared to a relatively poorer consumer, switching from cereal to fattier and sweeter foods like meat, edible oil and

sugars. The notion, whether an individual has passed the subsistence level, is unobservable from the calories threshold perspective, but her choice to switch away from staple food to expensive food items reveals that she is beyond the subsistence level of calorific requirement. Because of this revealed preference in the choices made by a consumer, we do not need to identify any general calorie threshold for all consumers or even a particular calorie threshold for each consumer. Instead the share of staple calorie in the total calorie consumption will determine whether the consumer is beyond the subsistence level, also called "poverty line" in this context.

It may well happen that the staple calorie share (henceforth SCS) may not reach the maximum value of 100% even for the poorest conceivable consumer. This is because of the fact that the cooking technology may require use of non-staple ingredients like oil. In that case, the choices of a consumer will be constrained by technology and her SCS has to depart from its maximum conceivable value. Moreover, it might also happen that cooking technology mandates use of a certain minimum amount of non-staple ingredients and therefore, the actual share of staple food (SCS) may actually fall when income plummets on the left side of the subsistence level. Therefore, a plot of SCS against income will reveal a constant or mildly increasing part for lower values of income, subsequently followed by rapidly declining part for comparatively higher values of income (See Figure 1). The point, past which SCS starts declining rather rapidly, discloses the position of subsistence level or "poverty line" under JM methodology.

The JM approach takes care of limitations of prevailing approaches cited before. Firstly, different individuals have different calorific requirements and it is usually not considered in the threshold calorie approach. Since the JM approach is based on revealed preference of a consumer, it is not required to look into particularities of different consumers. Secondly, the limitation regarding the imperfect absorption of calories is also taken care of in the JM approach. It has also been surmised that since the efficiency for absorption of calories varies across individuals, calories consumed is a poor measure for calories absorbed. Under the JM approach, we look into the consumption choices made by an individual, not into the calories consumed. If an individual's efficiency of absorption of calories is low then his consumption choices will remain inclined more toward staple foods, resulting in a consumption pattern different from that of a healthy individual's. So the problem of

distinguishing between absorption of calories and consumption of calories is dealt with. Thirdly, there is a recurring controversy related to the price indices being used to update the poverty line using the methodology suggested by Lakdawala Committee in 1993. Deaton and Drèze (2009) reckons that use of Consumer Price Index for Agricultural Labourers (CPIAL) to revise the rural poverty line results in underestimation of poverty. This problem is automatically taken care of in the JM approach, since we directly look into the consumer choice, which automatically imbibes income and prices in it, irrespective of any pricing index.

3. Data and Methodology

We use the NSSO survey data from the 61st Round, conducted in 2004–05, to compare the extent of poverty estimated using the JM method and other estimates, namely, Tendulkar Committee estimates and Planning Commission estimates based on Lakadwala approach. We also present the JM estimates of poverty using NSSO data from 64th Round conducted in 2007–08. In the data, we have information about food items consumed by a household in the last 30 days preceding the date of survey along with demographic details of the household. We calculate the total amount of calories consumed by a household through different categories of food items, such as cereals, milk, oil-spice-sugar, pulse-vegetables, fruit-meat etc.[3] We consider cereals along with cereal substitutes (Jackfruit and Tapioca) as the staple food to calculate SCS for a household, which is the ratio of calories obtained from consumption of staple food and total calories consumed. Similarly, we can also calculate milk calorie share, oil-spice-sugar calorie share, pulse-vegetable calorie share and fruit-meat calorie share.

In the JM methodology, we need to plot the SCS of a household against its income or wealth to determine the point of subsistence as illustrated in figure 1. NSSO surveys do not record the data on the income or wealth of a household. Therefore we use household expenditure as a proxy for income.[4] We examine the

[3] The calorific contents of food items are mostly taken from Gopalan et al. (1971). We have also consulted the United state department of agriculture data base accessed at http://www.nal.usda.gov/fnic/foodcomp/search/ (last accessed July 15, 2011).

[4] We have also appealed to per capita expenditure and adult equivalent adjusted per capita expenditure as alternative proxies for income, but the poverty estimates are unrealistically low. For rural and urban sectors in 2004–05, the poverty cut-off values of MPCE are found to be Rs 203 and 232, respectively. This is equivalent to 2.0% and 1.0% of poverty in head count terms, which is surely

pattern in a plot of SCS against household expenditure. In this plot, the point past which SCS starts falling sharply indicates the point consumers substitute expensive calorie sources for staple food. This point can be seen as a partition between the poor and the non-poor. The household expenditure corresponding to this point is called the cut-off household expenditure. This cut-off value is the basis of poverty estimation under JM methodology. Once this point is identified, members of a household with a household expenditure below this point are categorized as poor.

Since there are many households in and around a particular expenditure level with different values of SCS, we require estimating the average value of SCS for any particular expenditure level. We appeal to the kernel method in calculating a local average of SCS against expenditure of a household. More particularly, we use the Gaussian kernel function with appropriate bandwidth (Pagan and Ullah, 1999: 78-157) as the underlying kernel function.[5] The range of this plot can vary between the minimum value of household expenditure and the maximum value. In the both ends, the noise element of the plot dominates over the deterministic component for paucity of observations. We make suitable adjustments in the range to contain the noise component.

If the cooking technology and prices did not vary much across regions of India, a single nationwide estimate would have been adequate. Otherwise, a separate estimation for each state is preferable. We have carried out both for the 61st round. However, the 64th round is not a quinquennial round of NSSO and therefore due to inadequacy of data points, state wise estimates are not as reliable as of the 61st round. We have done our analysis separately for rural and urban sector. Along with this we have further segregated the rural and urban sector into two subgroups, namely — rural refined and urban refined. The refined classes consists of households, whose

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unacceptable. We have worked with an adult equivalent scale giving a weight of 0.7 to each adult member except the first, to whom we assign the full weight of 1, and 0.5 to each person under the age of 18. We use household expenditure per adult using this equivalence scale. We end up with head count ratio of 2.0% and 4.5% for rural and urban households, respectively.

[5] The formula for the kernel average is given by: $E(SCS| \text{ Expenditure}) = \Sigma_{i=1}^{n} K((\text{Expenditure}_i - \text{Expenditure})/h) \times SCS_i/\Sigma_{i=1}^{n} K((\text{Expenditure}_i - \text{Expenditure})/h)$, where $K(\cdot)$ is a kernel function (Gaussian), h is the bandwidth, n is the number of data points and Expenditure_i and SCS_i are the values for the i^{th} observation. Another popular kernel function, namely, Epanechnikov kernel, yields similar plots and similar estimates. For the sake of brevity, we desist from publishing them in the paper.

informant is capable and co-operative as identified by the investigator. Because of the nature of the informant, data provided by these households should be more reliable. The original estimates has been cross-checked with estimates obtained from this refined sample with better quality data.

4. Results and Discussion

4.1 Consistency of JM Approach

The core idea involved in JM approach is substitution towards expensive sources of calories with the augment in income. This behavior should be revealed in the consumption choices made by the individuals. One way to verify the veracity of JM approach is to look into the graph plotting calorie shares of expensive food items (such as milk, fruit-meat) against household expenditure. Figure 2 displays increasing milk calorie share against log of household expenditure, which underlines the fact that milk is consumed proportionately more by the rich compared to the poor. The calorie share from fruit and meat also reveals somewhat similar trend. A lot of Indians do not consume meat out of their food habit and therefore, the increasing trend of meat calorie share is somewhat mitigated by this factor. One interesting observation is that the calorie share of oil-spices-sugar is almost constant or mildly increasing for all levels of household expenditure. This points out to the technological constraint in cooking, which forces people to use some expensive food items like oil and spices, irrespective of their household expenditure. This is very well reflected in almost flat or very mildly increasing oil-spice-sugar calorie share. From figure 2, it is evident that there has been increase of 1.78% in oil-spice-sugar calorie share on moving from point A to point B, whereas for the corresponding movement—from point C to point D—on milk calorie share curve, the increase is of a magnitude of 5.25%.

4.2 JM Estimates of Poverty

We plot the local (kernel) average of SCS against the household expenditure for the rural and urban sectors respectively for the years of 2004–05 (figures 3 and 4) and 2007–08 (figures 5 and 6). Along with SCS, we also plot the share of other categories of food items: fruit-meat, milk, oil-spice-sugar, and pulse-vegetable. We calculate the poverty estimates using three different procedures. First, an all India study: we plot SCS against household expenditure for all households in our sample,

sector wise. We need to identify the point in the local average of SCS curve past which the rapid decline in SCS begins. In our procedure, we calculate the household expenditure at which the local average of SCS attains the maximum. We define this as the cut-off expenditure. Cut-off household expenditure for rural sample in the year of 2004–05 is found to be Rs 1650. We calculate the extent of poverty in rural India through head count ratio by considering proportion of the population with a lower household expenditure compared to the critical value. The figure stands at 31.0% in 2004–05. Cut-off household expenditure for urban sample in 2004–05 comes out to be Rs 2288 and it leads us to a figure of 25.8 % as the extent of poverty in urban India. Poverty estimates for year 2007–08 stands at 31.3 % and 40.8 % in rural and urban sector with cut-off household expenditures of Rs 2380 and Rs 4315 respectively.

In second procedure, an all India study[6] is done with sample households restricted to the refined samples (with capable and cooperative informants) sector wise – rural refined and urban refined respectively. Poverty estimates using this procedure stands at 33.3 % and 28.5 % with Rs 1759 and Rs 2433 as cut-offs for household expenditures in rural-refined and urban-refined sample respectively for year 2004–05. For year 2007–08, the poverty estimates stand at 28.9% and 36.8% with Rs 2334 and 4047 as cut-off household expenditures for rural-refined and urban-refined samples respectively. In the third procedure, we restrict our sample of households to a particular state, sector wise. We estimate the extent of poverty, statewise[7], through the head count ratio following the same methodology of plotting SCS against household expenditure and spotting the cut-off household expenditure. Subsequently, we aggregate state wise estimates with appropriate weights to obtain the all India poverty estimate. For the year of 2004–05, this aggregated poverty estimate for India stands at 36.8% and 26.3% for rural and urban sectors respectively.

4.3 Comparison of the JM Figures with the Tendulkar Committee Estimates

[6] The plots of rural refined and urban refined samples are quite similar to the plots obtained for rural- and urban- sectors. These plots are available from the authors on request.

[7] The plots of SCS against household expenditure, statewise and sector wise, are available from the authors on request.

We compare the poverty estimates of our study with estimates of the Planning Commission and the Tendulkar Committee. For the rural and urban sectors in 2004–05, the results have been presented in tables 1 and 2 respectively. For the year of 2007–08, head count ratios for estimating poverty is tabulated in Table 3. Regardless of methodology, we always find that extent of poverty is higher in the rural sector compared to the urban sector in 2004–05. Moreover, the variation between different estimates on the extent of poverty in the urban sector is rather low with various estimates ranging approximately between 25 to 28%.

However, the extent of poverty in the rural sector is more controversial. In the lower side, the Planning Commission reported the head count ratio of rural poverty at 28.3%. This estimate of rural poverty seemed unrealistic, and because of this perception, the Planning Commission formed the expert group headed by Suresh D. Tendulkar to look into the methodology for poverty estimation. The Tendulkar committee (Planning Commission 2009) elaborated various issues which led to the underestimation of the poverty in the rural sector, such as outdated poverty line basket constituted in 1973-74, Consumer Price Index for Agricultural Labourers (CPI-AL) underestimating the inflation and no expenditure being attributed to consumption of health and educational services. Tendulakar Committee rectified these issues working with NSS data and with their revised methodology, they estimated the rural poverty figures at 41.8% — an upper bound for the extent of rural poverty. JM estimates of rural poverty are in between the values projected by the Tendulkar Committee and the Planning commission.

A comparison of the poverty limits using two approaches is a pertinent question. For 2004–05, Tendulakar Committee decided Rs 447 and Rs 579 as poverty lines for rural and urban sectors, respectively. We find out the local averages for the household expenditure (and household size) around the cut-off expenditure—Rs 1650 and Rs 2288, respectively—defined by the JM approach. Thereby, we estimate the monthly per capita expenditure around the cut-off expenditure stands at Rs 401 and Rs. 530 respectively. We have tabulated JM poverty estimates, state-wise, vis-à-vis their Tendulkar Committee counterparts in Table 4. Apart from some small states like Goa, Mizoram, Nagland etc., both estimates do not differ too widely. In some states, head count ratio is larger by the Tendulkar Committee methodology, whereas the reverse is also observed in many states.

4.4 Movement of Poverty Estimates between 2004–05 and 2007–08

As far as rural poverty is concerned, there is virtually no change in 2007–08 over 2004–05. In the all India study, we have calculated the head count ratio in 2007–08 as 31.3% (Table 3), which is quite similar to the estimate of 31.0% (Table 1) in 2004–05. Nevertheless, there is a massive jump in the extent of urban poverty in 2007–08 when compared to the corresponding figures in 2004–05. Going by the all India study, urban poverty has augmented by a whopping 15%—from 25.8% (Table 2) to 40.8% (Table 3).

Even if 2007–08 is not a quinquennial round, this magnitude of augment in urban poverty is so striking, it demands an explanation. It could also be noted that there is no such increase in the corresponding estimate of rural poverty. The obvious suspect is high episodes of inflation during 2008 especially in food items. There is evidence that the "food products" categorized under the "manufactured products"—which are definitely more prevalent in the urban sector compared to the rural—are primarily responsible for the inflation in food prices (Sthanumoorthy, 2008). By the effect of the economic slowdown in 2008, there has been a sharp fall in employment in the export oriented sectors, like textiles, garments and Jewelry (Ghosh, 2009). A good number of poor workers, often migrants, became unemployed; so laying-off of these workers may result in higher poverty in the urban sector.

4.5 Movement of SCS and Calorie Per Capita Consumption over the Years

We note the differences between two groups: one below the cut-off expenditure (poor) and the other lying above (non-poor). We compare the staple calorie share (SCS), per capita calorie intake, household expenditure and monthly per capita expenditure for both groups, tabulated in Tables 5 and 6, for the years of 2004–05 and 2007–08 respectively. It is interesting to note that the mean SCS for poor people is less than the cut-off SCS value, which may be interpreted as a piece of evidence regarding the presence of an increasing part in the beginning of SCS curve. As mentioned before, this increasing part is because of the cooking technology constraint which forces people to use some expensive food items like oil, spices, irrespective of their household expenditure.

We plot kernel density function—a non-parametric way to plot the frequency distribution—for SCS. Figure 7 shows the distribution of SCS for rural households for the years of 2004–05 and 2007–08, respectively. For a point in the x-axis, area beneath the curve and to the left of a point gives us the proportion of people who are below that particular value of SCS. Figure 8 presents the same for urban households. Though the distribution of SCS for rural households stays roughly the same in both years, for the urban households there has been a leftward shift in the curve which shows that over the years people are substituting away from the staple food over time. This is interesting considering that urban poverty has gone up in this time. Definitely, it implies a change in food habit altogether so that even after consumption of less cereal, overall, there is an increase in poverty as measured by the pattern of SCS. This is also confirmed by much lower cut-off value for SCS in 2007-08 compared to 2004-05.

Our plots depict the kernel density distribution of daily per capita calorie intake for rural and urban sectors—figures 9 and 10, respectively. There has also been a leftward shift over the years in per capita daily calorie consumption. This decline in the calorie intake is, indeed, consistent with the findings of Deaton and Dreze (2009). However, when this is accompanied by an increase in poverty estimates for the urban sector, it poses a concern of inadequate calorie intake for a large population.

5 Concluding Remarks

What makes this study interesting is comparability of head count ratio estimates using the JM approach to the Tendulkar Committee figures. By no count, this is a coincidence because of the remarkable comparability between two sets of figures for all major provinces. The less populated provinces suffer from lack of data and that could be one of the reasons of divergence between two sets of estimates encountered. In this context, we highlight the fact that calorie norm estimation often gives rise to absurd results (Dev 2005) and exaggeration of poverty figures is no solution either. By these two counts, JM methodology provides a useful alternative way to meaningfully estimate the extent of poverty in India.

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References:

Dasgupta, Partha (1995): *An Inquiry into Well-Being and Destitution* (London: Oxford University Press).

Deaton, Angus and Jean Drèze (2009): "Food and Nutrition in India: Facts and Interpretations", *Economic & Political Weekly*, 44(7):42–65.

Dev, Mahendra S. (2005): "Calorie Norms and Poverty", *Economic and Political Weekly*, 40(8): 789-792.

Ghosh, Jayati (2009): "Global Crisis and the Indian Economy" in *Global Financial Crisis: Impact on India's Poor, Some Initial Perspectives*, United Nations Development Programme India, viewed on 26 December 2011 (http://data.undp.org.in/FinancialCrisis/FinalFCP.pdf).

Gopalan, C., B. V. Rama Sastri, and S.C. Balasubramanian (1971): *Nutritive Value of Indian Foods* (Hyderabad: National Institute of Nutrition, Indian Council of Medical Research).

Jensen, Robert and Nolan Miller (2010): "A Revealed Preference Approach to Measuring Hunger and Undernutrition", *NBER Working Paper No. 16555*.

Pagan, Adrian and Aman Ullah (1999): *Nonparametric Econometrics* (Cambridge: Cambridge University Press).

Planning Commission (2009): *Report of the Expert Group to Review the Methodology for Estimation of Poverty*, Government of India, New Delhi.

Sharma, Savita (2004): "Poverty Estimates in India: Some Key Issues", ERD Working Paper No. 51, Asian Development Bank, Manila.

Svedberg, Peter (2000): *Poverty and Undernutrition* (London: Oxford University Press).

Sthanumoorthy, R (2008): "Nature of Current Inflation in Food Prices", in *Economic and Political Weekly*, 43 (40): 17–21.

Subramanian, S (2011): "The Poverty Line: Getting It Wrong Again," in *Economic and Political Weekly,* 46 (48): 37–42.

Swaminathan, Madhura (2010): "The New Poverty Line: A Methodology Deeply Flawed", *Indian Journal of Human Development*, 4(1).i

Table 1. Poverty estimates for the rural households in 2004–05

	Head Count Ratio (in %)	Average daily intake of calorie	Average MPCE	Average SCS	Cut-off household expenditure	Cut-off SCS
Jensen & Miller All India Study (rural sector)	31.0	2050	575	0.70	1650	0.73
Jensen & Miller All India Study (rural-refined sample)	33.3	2054	634	0.68	1759	0.71
Jensen & Miller all India figure after aggregation of state-wise figures	36.8	—	—	—	—	—
Planning Commission estimates	28.3	2047	559	----------	----------	----------
Tendulkar Committee estimates	41.8	—	—	—	—	—

Table 2. Poverty Estimates for the Urban Households in 2004–05

	Head Count Ratio (in %)	Average daily intake of calorie	Average MPCE	Average SCS	Cut-off household expenditure	Cut-off SCS
Jensen & Miller All India Study (urban sample)	25.8	1966	1120	0.59	2288	0.65
Jensen & Miller All India Study (urban-refined sample)	28.5	1999	1259	0.56	2433	0.64
Jensen & Miller all India figure after aggregation of statewise figures	26.3	—	—	—	—	—
Planning Commission estimates	25.7	—	—	—	—	—
Tendulkar Committee estimates	25.7	—	—	—	—	—

Table 3. Poverty Estimates for the year 2007–08: Rural and Urban

	Head Count Ratio (in %)	Average daily intake of calorie	Average MPCE	Average SCS	Cut-off household expenditure	Cut-off SCS
Jensen & Miller All India Study (**rural** sample)	31.3	2012	798	0.68	2380	0.70
Jensen & Miller All India Study (**rural-refined** sample)	28.9	2052	904	0.66	2334	0.70
Jensen & Miller all India figure for **rural** sample after aggregation of state-wise figures	32.3	----------	----------	----------	----------	----------
Jensen & Miller All India Study (**urban** sample)	40.8	1953	1558	0.57	4315	0.58
Jensen & Miller All India Study(**urban-refined** sample)	36.8	1979	1778	0.54	4048	0.58
Jensen & Miller all India figure for **urban** after aggregation of state-wise figures	36.5	----------	----------	----------	----------	----------

Table 4. State-wise Poverty estimates (Head Count Ratio) for 2004–05

States	**Urban (JM Method)**	**Urban (Tendulkar Committee)**	**Rural (JM Method)**	**Rural (Tendulkar Committee)**
Andhra Pradesh	27.5	23.4	34.7	32.3
Arunachal Pradesh	34.1	23.5	50.3	33.6
Assam	29.4	21.8	22.7	36.4
Bihar	36.8	43.7	43.8	55.7
Chhatisgarh	39.0	28.4	46.9	55.1
Delhi	13.7	12.9	8.8	15.6
Goa	10.3	22.2	15.4	28.1
Gujarat	15.6	20.1	35.9	39.1
Haryana	21.1	22.4	19.9	24.8
Himachal Pradesh	35.9	4.6	26.7	25.0
Jammu & Kashmir	29.7	10.4	4.3	14.1
Jharkhand	37.5	23.8	43.4	51.6
Karnataka	24.2	25.9	35.0	37.5
Kerala	15.4	18.4	25.5	20.2
Madhya Pradesh	22.9	35.1	41.0	53.6
Maharashtra	25.7	25.6	45.7	47.9

Manipur	19.9	34.5	78.0	39.3
Meghalaya	11.6	24.7	10.5	14.0
Mizoram	36.2	7.9	22.9	23.0
Nagaland	34.5	4.3	34.0	10.0
Orissa	43.0	37.6	56.5	60.8
Pondicherry	8.6	9.9	20.8	22.9
Punjab	19.7	18.7	20.8	22.1
Rajasthan	21.1	29.7	42.8	35.8
Sikkim	22.5	25.9	18.4	31.8
Tamilnadu	28.8	19.7	33.6	37.5
Tripura	31.1	22.5	32.5	44.5
Uttar Pradesh	32.6	34.1	35.5	42.7
Uttaranchal	24.0	26.2	44.7	35.1
West Bengal	34.0	24.4	27.7	38.2
All India	26.3	25.7	36.8	41.8

Table 5. Averages of Select Statistics for Poor and Non-poor (2004–05)

	Urban poor	Rural poor	Urban non poor	Rural non poor
SCS	0.56	0.71	0.59	0.70
Per capita daily calorie intake	1786	1864	1972	2029
Monthly per capita expenditure	749	427	1134	582
Household expenditure	1558	1143	5647	3441

Table 6. Averages of Select Statistics for Poor and non-poor (2007–08)

	Urban poor	Rural poor	Urban non poor	Rural non poor
Average SCS	0.56	0.69	0.57	0.68
Average Per-capita calorie intake per day	1832	1933	1962	2016
Mean MPCE	1120	629	1589	807
Average household expenditure	2818	1674	8550	4559

Figure 1. Trend Exhibited by Staple Calorie Share (SCS)

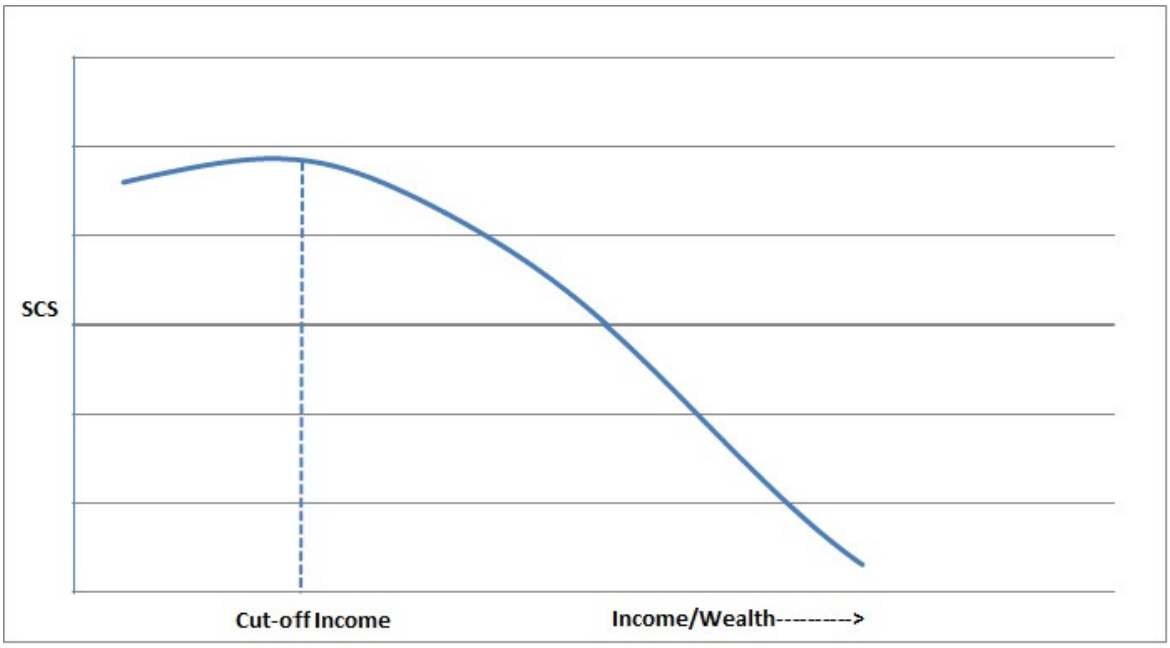


Figure 2. Plot of Milk, Oil-Spice-Sugar, Fruit-Meat Calorie Share against Household Expenditure

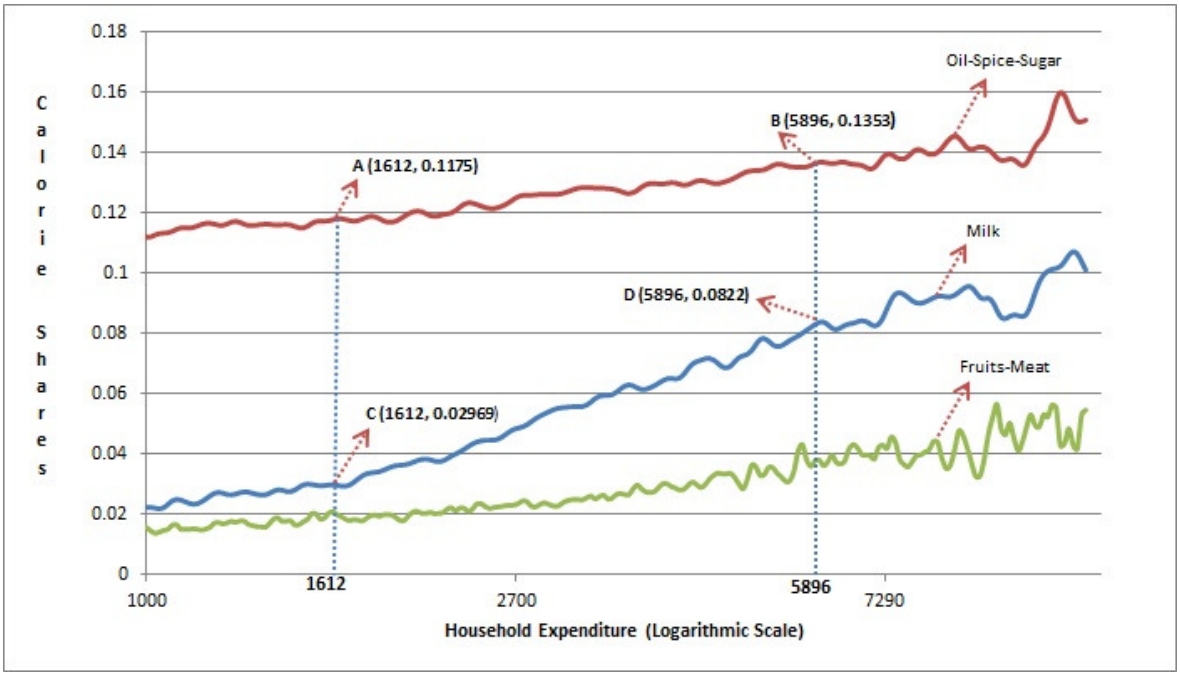


Figure 3. Calorie Shares against Household Expenditure for All India Rural Sample (2004–05)

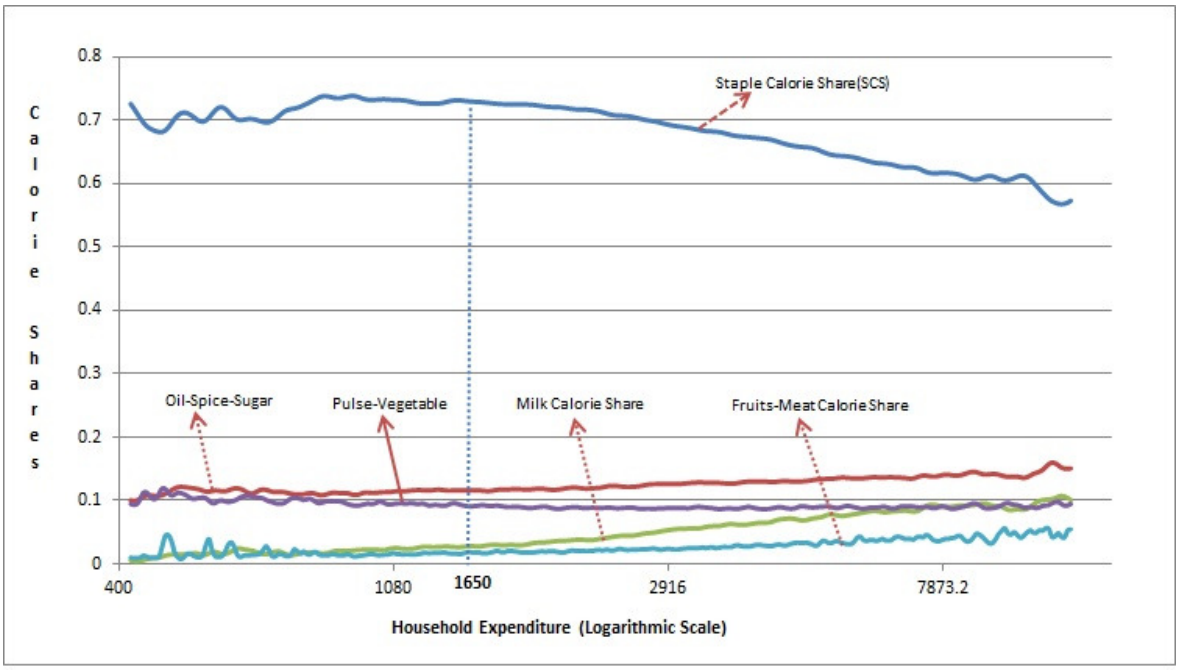


Figure 4. Calorie Shares against Household Expenditure for All India Urban Sample (2004-05)

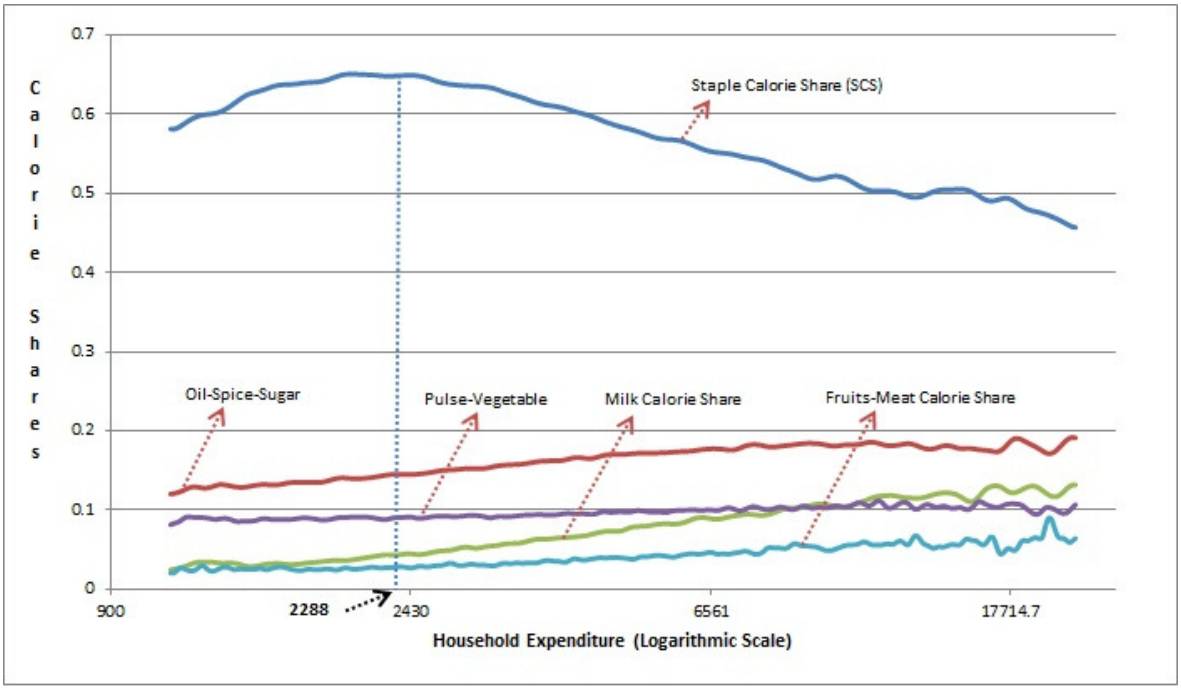


Figure 5. Calorie Shares against Household Expenditure for All India Rural Sample (2007–08)

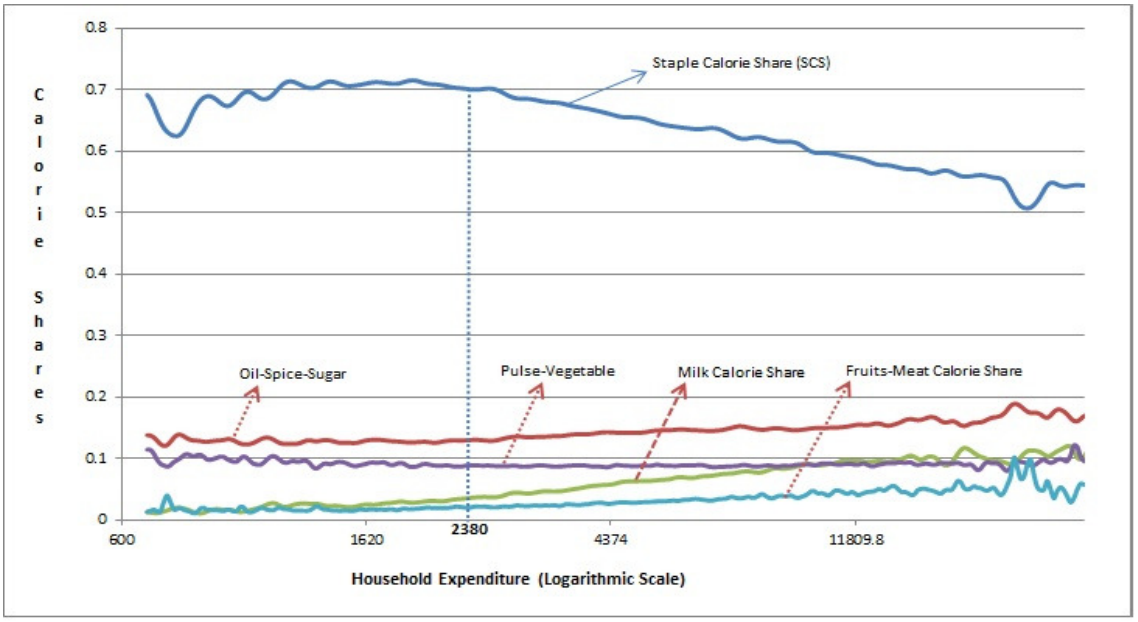


Figure 6. Calorie shares against Household Expenditure for All India Urban Sample (2007–08)

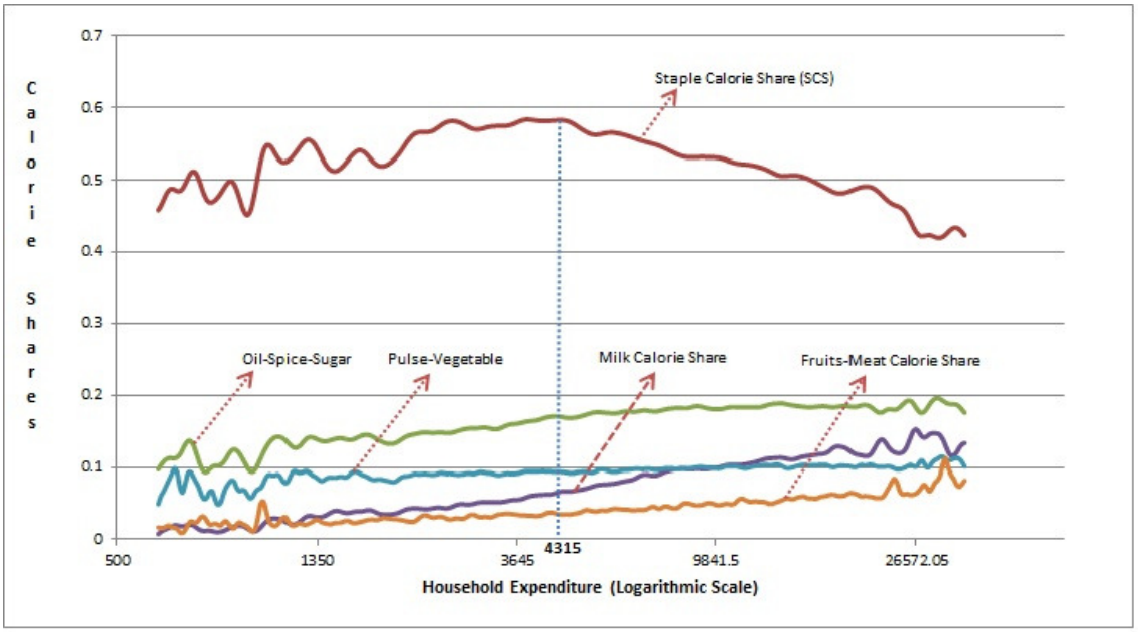


Figure 7. Distribution of Rural Households by SCS

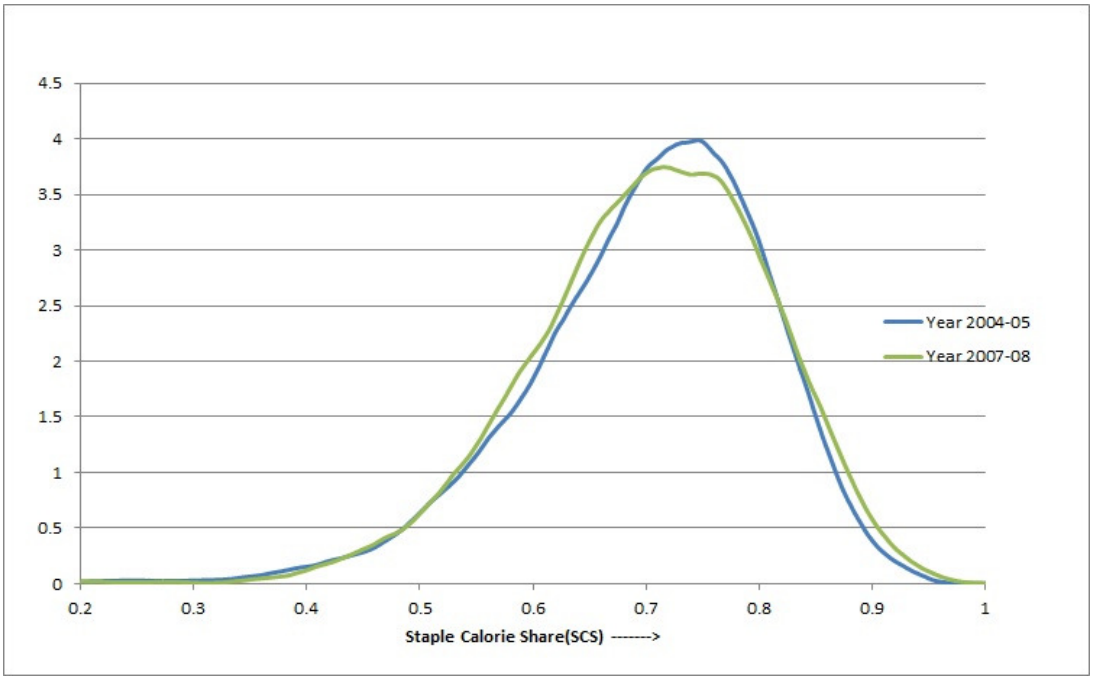


Figure 8. Distribution of Urban Households by SCS

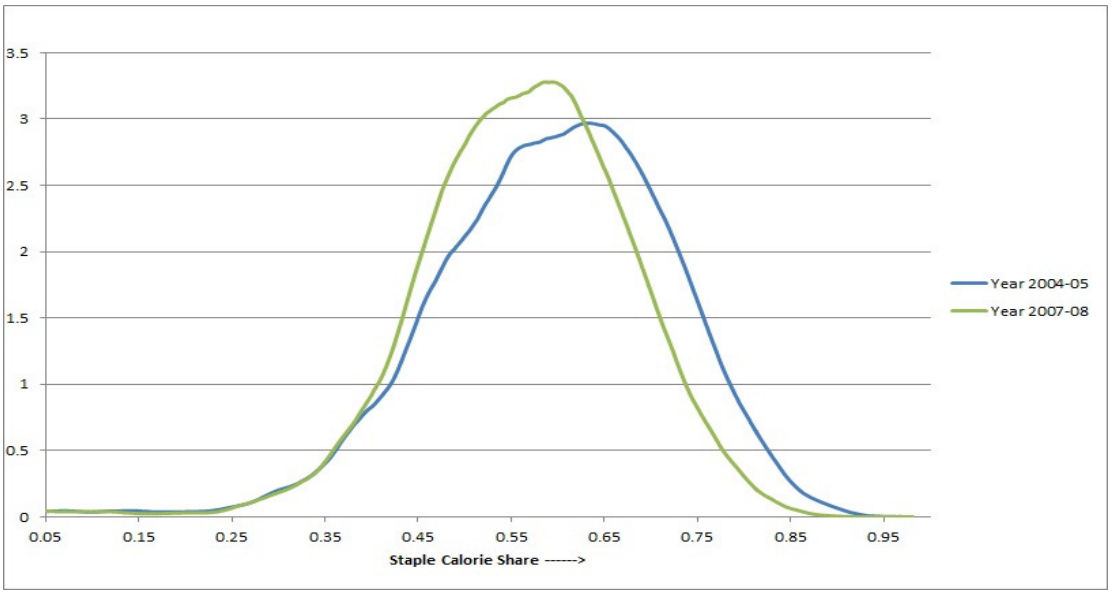


Figure 9. Distribution of Rural Households by Their Daily per Capita Calorie Intake

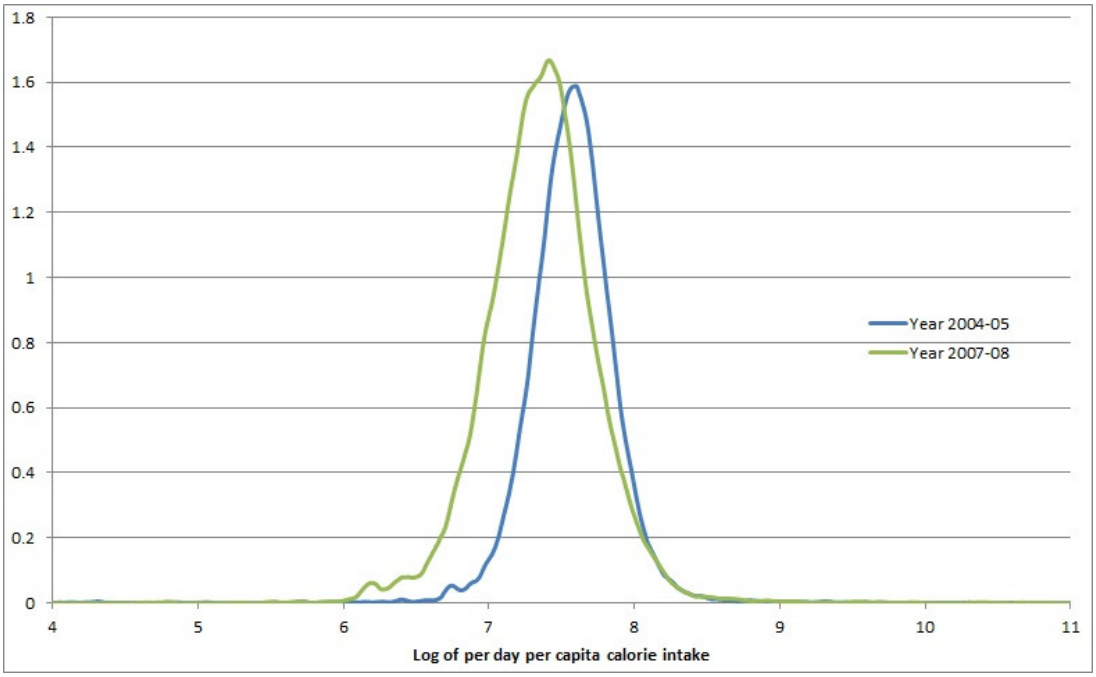
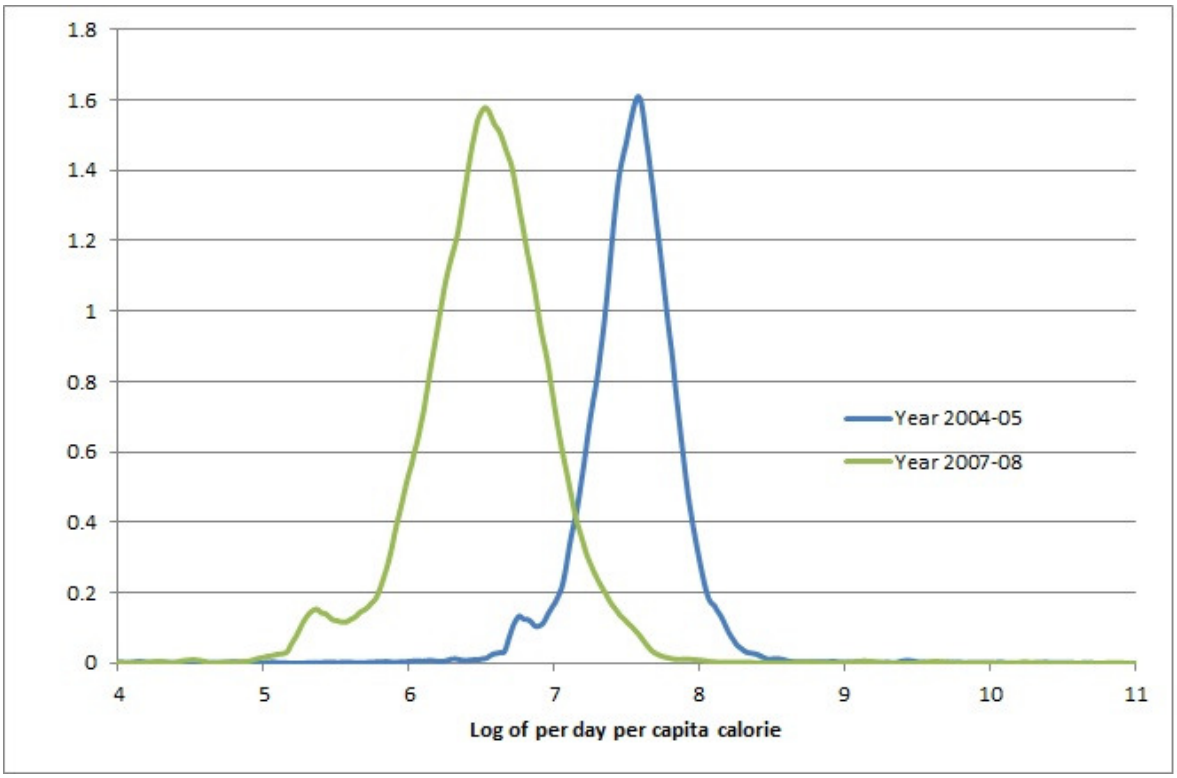


Figure 10. Distribution of Urban Households by Their Daily per Capita Calorie Intake



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Abstract:

Poverty line in India is usually associated with a calorie threshold. This calorie threshold approach suffers from many problems. An alternative revealed preference based approach has been provided by Jensen and Miller (2010). In Jensen and Miller approach, the staple calorie share reveals whether a household is calorie deprived. We use this approach to estimate the extent of poverty in India. Though our poverty estimates are extremely close to the Tendulkar Committee estimates for the urban sector; for the rural sector our estimates are considerably less compared to the Tendulkar Committee figures. We also find remarkable rise in urban poverty between 2004-05 and 2007-08 by our method.

Key Words/Phrases:

Referencing Style Followed: