**Estimating Purchasing Power Parities from Household Expenditure Data Using Complete Demand Systems with Application to Living Standards Comparison: India and Vietnam1**

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**Abstract**

This study departs from the previous literature on purchasing power parity (PPP) by proposing a demand system based methodology for calculating the PPP that takes account of consumer preferences and allows for the substitution effect of price changes. The methodology is used to calculate the PPP between the Indian Rupee and the Vietnamese Dong. The study allows for regional variation in preferences and price changes both inside the country and between countries. It proposes and applies a methodology for constructing prices from unit values after adjusting them for quality and demographic effects. The adjusted unit values are used as prices in the demand estimations, and the demand parameter estimates are used to calculate both spatial prices within each country and the PPP between the two countries within a consistent framework. The study illustrates the usefulness of preference consistent methods to calculate the PPP by applying the PPPs to compare living standards between India and Vietnam. The significance of the results follows from the fact that the levels of living comparisons are quite sensitive to the PPP used in converting the Rupee expenditures into Vietnamese Dong. The present results on food PPPs question the relevance of the PPPs from the ICP project in cross-country welfare comparisons especially in a period of high food inflation.

Key Words: Purchasing Power Parity, QAIDS, CPD method, Spatial Prices, TCLI.

JEL Classification: C18, D11, E31, O53.

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1. **Introduction**

Conversion rates of one currency into another are required for a variety of reasons such as international comparison of living standards, ranking of countries by their per capita GDP and in cross country inequality and poverty comparisons[[1]](#footnote-1). Market exchange rates are inappropriate for such comparisons because they are based on tradeable items only. The purchasing power parity (PPP) provides the adjustments required to market exchange rates such that the price of an item in two countries is identical if expressed in a common currency. The PPP rates are based on a much wider selection of items than market exchange rates including both tradeable and non-tradeable items. Asian countries such as China and India rank much higher on per capita GDP if PPP rates are used instead of market exchange rates. The United Nations International Comparison Project (ICP) carries out detailed price comparisons across countries to arrive at the PPP values required for a variety of cross country comparisons such as the ones mentioned above[[2]](#footnote-2). Given the crucial role that PPPs play in international comparisons, there has been considerable controversy on the PPP values that should be used as deflators[[3]](#footnote-3). While Clements, Wu and Zhang (2006) provide a method of comparison of consumption patterns between countries that is free of currency units, the requirement of PPP is, in general, unavoidable in most cross-country comparisons.

PPP rates are also required in intra national comparisons since a country’s currency unit does not have the same purchasing power in all regions in that country. The issue of intra national PPP takes the form of spatial prices. The role that PPPs perform in converting an internationally denominated poverty line, for example, 1 US $ a day, into that of different countries expressed in their own currencies is analogous to the role that spatial prices play inside a country in converting the national poverty line into regional poverty lines taking into account regional prices and preferences. While considerable resources have been spent by the statistical agencies on calculating PPP rates between countries, as is evident from the scale of the ICP project, the issue of intra national PPPs has received much less attention. In large heterogeneous countries such as Brazil and India, the requirement of intra national PPP rates, i.e. spatial prices, is as important as that of the international PPP rates in the cross-country context. This is evident from the recent attempts of Aten and Menzies (2002) on Brazil and Coondoo, Majumder and Ray (2004), Coondoo, Majumder and Chattopadhyay (2011), Majumder, Ray and Sinha (forthcoming) on India to calculate spatial prices. The evidence in these studies shows that cross-country PPP rates at the aggregate level that do not take into account the regional diversity in countries such as Brazil and India are likely to be seriously misleading. Setting aside the issue of regional diversity, the idea of a distribution invariant PPP that is supposed to hold for all the expenditure classes, rich and poor alike, is another important issue of interest. This is an assumption that has been criticised in the poverty context by Reddy and Pogge (2007). If untrue, as the present results suggest, this is yet another indictment of the all purpose, single value, country wide PPP s that come out of high profile projects such as the ICP.

In view of its importance, the methodologies adopted to calculate the PPP has received considerable critical scrutiny. For example, Hill (2000) and Almas (2011) analyse and quantify the PPP bias in the widely used Penn World Table incomes of various countries. One of the most prominent methods adopted in the PPP calculations has been the Country Product Dummy Method (CPD), due to Summers (1973), that is based on the idea of hedonic price regressions, and was originally proposed to deal with the problem of missing observations in international price comparisons. The CPD method has been analysed and extended by Diewert (2005) and Rao (2005). Coondoo, Majumder and Ray (2004) extend the CPD methodology by using it in conjunction with the idea of a “quality or price equation”, due to Prais and Houthakker (1955), to calculate spatial prices in the Indian context. The methodology proposed by Coondoo, Majumder and Ray (2004) has been used in modified form in the cross-country context by Deaton, Friedman and Alatas (2004) to calculate PPP rates between India and Indonesia. The latter study is not based on any preference consistent “complete” demand system. In contrast, Oulton (2012) takes an expenditure function based approach, but does not consider the spatial dimension within each country in the cross-country expenditure comparisons.

A key limitation of the CPD approach is that it does not take into account the preferences of the consumer as revealed by her estimated demand pattern. Notwithstanding the fact that the PPP is analogous to the concept of a True Cost of Living Index (TCLI), and the increasing availability of household survey data that provides the necessary information for a preference consistent, demand systems based approach to PPP calculations, such an approach is conspicuous by its absence. Recent studies that come closest to this spirit are O’Donnell and Rao (2007) who estimate demand systems to calculate PPP between Ethiopia and Uganda and Coondoo, Majumder and Chattopadhyay (2011) who use Engel curve analysis to estimate spatial prices in India. While O’Donnell and Rao’s (2007) study on PPP rates between Uganda and Ethiopia is based on estimated demand parameters, treating each country as a homogeneous entity, and does not concern itself with the spatial dimension inside each country, Coondoo, Majumder and Chattopdhyay’s (2011) study is entirely on spatial prices in India but is restricted to Engel curve analysis that ignores price induced substitution effect between commodities. Majumder, Ray and Sinha (forthcoming) propose a demand system based approach to the calculation of spatial prices in India. The present study extends this exercise to the cross-country context of India and Vietnam and to include welfare comparison between the two countries. This paper reports that in a period of high food inflation not only are the preference consistent food PPPs quite different from those from the ICP project, and those reported elsewhere, but the estimate of relative welfare based on the alternative PPPs varies sharply as well.

The principal motivation of this study is to propose a preference consistent and unified framework for the estimation of PPPs within and between countries. The paper proposes a three step methodology. In step 1, the study estimates prices from household level unit values after adjusting for quality, demographic and regional effects. In step 2, the quality adjusted unit values are used to estimate preference parameters from a “complete” demand system. In step 3, the estimated demand parameters are used to calculate spatial prices within a country, and PPP between countries, using the “exact” approach of a “true cost of living index” (TCLI). The usefulness of this three step methodology is illustrated by applying it to estimate PPPs both within and between India and Vietnam using a recent demand system. The paper contains a systematic comparison of the expenditure function based PPPs in the spirit of the “exact price indices” with those from using the CPD procedure and the Divisia price indices.

The usefulness of the proposed methodology is illustrated by using the spatial prices and the cross-country PPPs to compare of levels of living between India and Vietnam based on food expenditures. The exercise follows the methodology proposed in Oulton (2010) for calculating prices as true cost of living indices. The comparison of living standards between India and Vietnam extends the cross-country expenditure comparisons in Feenstra, Ma and Rao (2009), Oulton (2012) by using PPPs that vary across expenditure percentiles and a welfare measure that, following Sen (1976), is sensitive to inequality changes. The paper reports the sensitivity of the welfare comparisons to the PPPs used, namely, between the welfare rankings obtained using the “demand system” based methodology on food expenditures proposed here with those using PPPs that are currently available. The results underline the policy significance of our results by pointing to a picture of high sensitivity of the welfare comparisons to the PPPs used during a period that overlaps partly with the recent global financial crisis.

In view of the absence of studies that estimate inter country PPPs using a preference consistent framework this study fills a significant gap in the literature. In the spirit of combining the spatial dimension in each country with the cross country aspect, the study calculates the PPP rates between the two countries both in aggregate and separately for the rural and the urban areas, and provides evidence on their movement over time. A significant contribution of this study is that it tests for invariance of inter-country PPP across expenditure classes and hence departs from the practice of assuming that the PPPs between countries is the same for all households irrespective of their affluence, an assumption that has been criticised in the poverty context by Reddy and Pogge (2007), as mentioned earlier. To the best of our knowledge, this assumption has not been tested before. Another key distinguishing feature of this study is that it concentrates on food based PPPs and departs from the practice in the ICP and other studies of considering all items, both food and non- food, in the PPP calculations. Consistent with the point made by Reddy and Pogge (2007), PPPs based on food items alone are more relevant in welfare comparisons such as poverty calculations that require price indices that are more relevant for the poor. While the PPPs from the ICP are an improvement from the market exchange rates by considering a wider basket of goods, namely, tradeable and non-tradeable items, they go overboard by including a host of items which hardly figure in the consumption basket of the ultra poor. This is a serious limitation of the ICP PPPs, given that one of the main uses of PPPs is to convert poverty lines denominated in US dollar into that in local currencies. As we report later in the levels of living comparisons, the results from using the ICP PPP s are quite different from those using the distribution sensitive and preference consistent PPPs obtained in this study. Moreover, the present results provide significant evidence of rural urban heterogeneity in the PPPs and in the welfare comparisons between India and Vietnam.

Perhaps for the first time, the present study estimates the PPP exchange rates between two countries (India and Vietnam) taking account of their regional heterogeneity in preferences and prices. The heterogeneity in preferences between (and within) India and Vietnam is explicitly taken into account by estimating the rank three Quadratic Almost Ideal System (QAIDS), due to Banks, Blundell and Lewbel (1997), separately for (i) India and Vietnam, (ii) in each country, separately for its rural and urban areas and (iii) within each sector, separately for each of the constituent states and regions in India and Vietnam, respectively. QAIDS is estimated in its true, non-linear form rather than its linear approximate version, LQAIDS, that has been used in several recent applications [see, for example, O’Donnell and Rao (2007)].

Other distinguishing features of this study include the modification of the procedure due to Cox and Wohlgenant (1986) and Hoang (2009) to generate the quality adjusted prices of food items based on unit values from the household surveys that are subsequently used in the demand estimation, and the incorporation of demographic effects in the estimated quality equations[[4]](#footnote-4). The methodological contribution of this study has wider application than the immediate PPP context of this study since the quality adjusted food prices, obtained from the hedonic price regressions using the unit values from the household surveys, will help in constructing food poverty lines in both countries that can validate, or otherwise, the poverty lines currently in use.

The rest of the paper is organised as follows. Section 2, which presents the framework and describes the methodology, is subdivided into 3 subsections. Section 2.1 introduces the estimating equations, and describes the procedure for calculating the intra country and the cross-country PPP rates. Section 2.2 describes the procedure for constructing prices, required in the demand estimation and the PPP calculations, from the unit values contained in the Household Expenditure Surveys. Section 2.3 describes the procedure for comparing the levels of living between India and Vietnam using the spatial prices/PPPs obtained earlier. The data sets are briefly described in Section 3, along with the presentation and discussion of the estimates of the quality adjusted prices of the principal food items in each country. The results on the intra country PPP rates (i.e., spatial prices in each country) and the PPP rates between the two countries, along with the levels of living comparisons between India and Vietnam, have been presented and discussed in Section 4. Section 5 concludes the paper.

1. **Framework and Methodology**
   1. **Procedures for Estimating the PPPs**

The methodology views the PPP as a True Cost of Living Index as follows.

PPP (*A, B*) = (1)

denotes reference utility, the comparison country/region, *A*, and the base country/ region, *B*, respectively, and , denote the corresponding vector of prices in the two countries/regions. Equation (1) gives us spatial prices when *A*, *B* refer to regions inside a country, and PPP when *A*, *B* refer to different countries. Unless preferences are homothetic, a possibility that is rejected by the evidence presented in Oulton (2012), the spatial prices/PPP are dependent on reference utility, and, hence, on reference expenditure. This provides the background to the evidence presented later on the sensitivity of the PPP s between the two countries to reference expenditure.

The general cost function underlying Quadratic Logarithmic (QL) systems, (e.g., the Quadratic Almost Ideal Demand System (QAIDS) of Banks, Blundell and Lewbel (1997) and the Generalized Almost Ideal Demand System (GAIDS) of Lancaster and Ray (1998)), is of the form:

(2)

*p* is the price vector, is a homogeneous function of degree one in prices, and are homogeneous functions of degree zero in prices, and *u* denotes the level of utility. The budget share functions corresponding to the cost function (2) are of the form

(3)

denotes nominal per capita expenditure and *i* denotes item of expenditure.

Using equation (1), the corresponding True Cost of Living Index (TCLI) in logarithmic form comparing price situation with price situation is given by

= (4)

is the reference utility level. The first term of the R.H.S. of (4) is the logarithm of the basic index (measuring the cost of living index at some minimum benchmark utility level) and the second term is the logarithm of the marginal index. Note that for,, , so that the basic index takes a value and hence, may be interpreted as that component of TCLI that captures the effect of uniform or average inflation on the cost of living. On the other hand, for the marginal index takes a value of unity. Hence, the marginal index may be interpreted as the other component of TCLI that captures the effect of changes in the relative price structure.

The specific functional forms of and for QAIDS in (2) are as follows:

; = and

where is the price of item *i* in region *r*.

The resulting budget share equations are given by

= + log + log( /) + [log( /)]2  . (5)

Given a reference utility level, the regional PPPs can be calculated from equation (4) using the estimated parameters and information on prices.

Based on the level (country/region/sector) of data used, estimation of demand system [eq. (5)] yields the estimates of, *b*where superscript *r* denotes country/region/sector, as the case may be. Substitution in (4) and taking exponential yields the PPP between countries/regions/sectors, conditional on pre-specified reference utility,, in each situation. A comparison among regions yields spatial prices and that between countries measures the purchasing power parity between countries. In the empirical work, we have used the utility level corresponding to median expenditure in the base country, India, as the reference utility level[[5]](#footnote-5), , to calculate the PPPs and have compared them with those at other percentile points of the expenditure distribution.

* 1. **The procedure to generate quality adjusted unit values as prices (food items)**

The PPPs based on complete demand systems require price information for estimation of the price parameters. Such information is missing in most data sets. We use as proxies for prices[[6]](#footnote-6) the unit values for food items obtained by dividing expenditure values by quantities. However, the raw unit values need to be adjusted for quality and demographic effects. To do so, we adopt the following procedure.

The unit values, *vi*, are adjusted for quality and demographic factors following Cox and Wohlgenant (1986) and Hoang (2009), through the following regression equation:

(6)

is the unit value paid by household *h* for item *i* in state/province *j*, district *d* and sector *s*, is the median unit value for the district in which the household resides, is the household food expenditure per capita, is the proportion of times meals consumed outside by that household and, and are dummies for sector, state/province and district, respectively. While Huang estimates equation (6) using *mean* (in place of *median* being used here) unit prices and then adds the predicted residual ( to the district *mean* to get the quality adjusted price for each good, the present paper uses deviation of household level unit prices from *median* unit prices to represent quality effect. The quality adjusted unit prices are calculated by, first, estimating equation (6) which, for each commodity , regresses the deviation of household’s unit price from the median price in the district , of state/province in each sector *s* (rural or urban), , on household characteristics.

Next, the district wise quality adjusted price for each item is generated by adding the district median unit value for this item to the estimated residual from equation (6).

(7)

The district wise median of the prices calculated in equation (7) is used to represent the district wise quality adjusted price for each food item in state/province *j*. In other words, each household is assumed to face the vector of quality adjusted median value, using equations (6) and (7), of the item in the district where the household resides. The use of district level information on unit values allows us to consider price variation among districts and, hence, the present empirical exercise goes beyond previous studies that rarely went beyond state level variation in prices and preferences.

* 1. **Comparing Levels of Living between Countries**

The methodology proposed by Sen (1976) for real income comparisons between countries is used here to compare the levels of living between India and Vietnam as measured by their spending on food items. Following Sen (1976), we consider, as a welfare measure, the inequality corrected mean per capita food spending in the 2 countries: *=(1-)*, *=(1-)*, where μ, G denote the mean per capita food expenditure (over the principal food items) and Gini food expenditure inequality, respectively. The superscripts *I*, *V* refer to India and Vietnam, respectively. The ratio,, is a measure of the relative level of living in Vietnam vis a vis India. To calculate this ratio, we converted the Indian food expenditures (in Rupees) to Vietnamese Dong using the PPPs obtained in this study. Recognising the dependence of the calculated PPP on the reference expenditure and spatial differences in preferences and prices, we provide below the welfare ratios calculated separately for rural and urban areas using the corresponding PPPs. Besides the rural urban differences in the levels of living comparison, the paper also provides evidence on the sensitivity of the welfare comparisons to the PPPs used, namely, between those that allow them to vary across expenditure percentiles, and those which do not. Note that, while the Gini expenditure inequalities are unit free and consequently will be the same after conversion of the food expenditures from one currency into another, this will not be the case if the PPPs are allowed to vary with reference expenditure as is the case here. The temporal comparison of the welfare ratio allows us to incorporate the movements in PPPs over time. As we shall show later, the PPP produced by the ICP understates the depreciation of the Dong vis-a-vis the Rupee over the period, 2004-5 to 2008 and consequently overstates sharply the welfare level of the Vietnamese relative to the Indian consumer during the recent global financial crisis.

1. **Data and the Quality Adjusted Unit values**

The Indian data came from the 55th (July, 1999 - June, 2000), 61st (July, 2004 - June, 2005) and 66th (July, 2009- June, 2010) rounds of India’s National Sample Surveys (NSS) on consumer expenditure. All these rounds are “thick” rounds, being based on large samples. The exercise was performed over 15 major states of the Indian union, with each state subdivided into rural and urban sectors. The list of the states covered, along with the number of districts in each state, is provided in Table A1 in the Appendix. The data from the unit records (household level) were used in our analysis.

The Vietnamese data came from the Vietnamese Living Standard Survey (VLSS) in 1997/98, and the Vietnamese Household Living Standard Surveys (VHLSS) of 2004 and 2008. The 1997/98 Vietnam Living Standards Survey was the second VLSS survey conducted by the General Statistics Office (GSO) of Vietnam, with technical support from the World Bank and financial support from the UNDP (United Nations Development Program) and SIDA (Swedish International Development Cooperation Agency). The VHLSS 2004 and 2008 are parts of the Vietnam household living standard survey conducted every two years between 2002 and 2010. The VHLSS questionnaires are the same as those of the VLSS surveys except that some modules are simplified and some modules are not included. The household expenditure module used in the present analysis remains same across the VLSS and VHLSS surveys. For the purpose of this study, the eight major regions of Vietnam are grouped into three regions for rural and urban areas separately. North Vietnam consists of Red River Delta, Northeast and Northwest; Central Vietnam consists of North Central coast, South Central Coast and Central highlands; and South Vietnam consists of South East and Mekong Delta. The list of the regions, along with the number of communes in each region, is presented in Table A2 in the Appendix.

The empirical exercise was conducted on the following six Food items in each country[[7]](#footnote-7): Cereals & Cereal substitutes; Pulses; Milk & Milk Products; Edible Oil; Meat, Fish & Eggs and Vegetables. These are well defined food items whose meaning does not change much between India and Vietnam. Also, we have household level quantity and expenditure information that goes down to district level in both the countries.

The VLSS 1997-98, VHLSS 2004 and VHLSS 2008 collect detailed consumption information on market purchase and home production and consumption during the tet holiday period for 45 food items. The information on household consumption is computed for market purchase, home production and consumption during the tet holiday period. For a 12 month recall period information is collected on number of months (of the 12 months) each food item was purchased, usual frequency of purchase during those months, quantity purchased each time and value of each purchase. These pieces of information are combined to calculate the total expenditure on each food item over the past 12 months including the consumption during the tet holiday period. Besides market purchase, information is also collected for consumption from home production. Separate information is collected for food consumption during tet holiday period. The information on food consumption during tet holiday period and non-tet months is combined to get the quantity and value of food consumption during the last 12 months. This information is converted into monthly consumption and expenditure for comparability with NSS data, which consists of monthly figures. The quantity of food item purchased is reported in grams, kilograms, litres and numbers. For consistency, these quantities were converted to kilograms where possible. For food items reported in numbers such as eggs and bananas, the following conversion has been used: 1 egg (58 grams), 10 bananas (1 kg), 1 orange (150 grams), 1 pineapple (1.5 Kg). Lemons and ginger were not included.

Appendix Tables A3 (a, b) and A4 present the mean per capita quantity and per capita expenditure (in local currencies) of the six principal food items in India and Vietnam, respectively, obtained from NSS 61stround (India) and VHLSS 2004 (Vietnam). Notwithstanding differences in definition and in their composition, we have tried to ensure that these six food groups are as comparable as possible between the two countries. The Vietnamese consume more cereals than the Indians, and their consumption of Meat, egg and fish is a good deal higher. In contrast, the Vietnamese consumption of Milk and Vegetables is considerably lower than that of the Indians. In both countries, cereals and cereal products is, in quantity and expenditure terms, by far the single most important group of food items, with rural households consuming more than the urban ones.

The PPP rates between India and Vietnam were computed adopting the median household in the expenditure distribution of the NSS as the reference household. To examine the sensitivity of the PPPs to the reference expenditure, the calculations were repeated for NSS 61st round/VHLSS 2004 by using, as reference households, median values of various percentiles in the NSS round 61 expenditure distribution. The coefficient estimates of the quality adjustment regressions of the unit values, item by item, [equation (6)] are presented[[8]](#footnote-8) in the Appendix - Table A5 for NSS 61st round, and Table A6 for VHLSS, 2004. Several of the quality and demographic effects are highly significant, though much more in case of India than in Vietnam. In both countries and for several items, notably for Cereals and Cereal products, the more affluent households consume superior quality food items, as evident from the positive and significant coefficient estimate of the per capita expenditure variable on unit values. This is also true of the variable measuring the proportion of meals consumed outside the household in India since households that eat outside the home are the more affluent households. The fact that this variable is less significant in Vietnam may reflect the greater tendency to eat outside the home in Vietnam than in India.

The quality and demographically adjusted unit values of the six food items, mentioned above, at median in the three NSS/VLSS/VHLSS rounds have been presented in Tables 1, 2 and 3 for India and in Tables 4, 5 and 6 for Vietnam. These tables report the adjusted unit values, treated as proxies for prices, for each state/province, disaggregated by rural and urban, and at the all country level. The Indian estimates show that over the period between NSS rounds 55 and 66, much of the food inflation has been on account of Edible Oil and Meat, Egg & Fish. The prices of Cereals & Cereal substitutes were mostly static or, in some cases, even recorded a slight decline. The period between NSS rounds 61 and 66 saw a much greater increase in the quality adjusted unit values of all the principal food items in India than over the earlier period between NSS rounds 55 and 61. A comparison with the Vietnamese estimates of adjusted unit values presented in Tables 5 and 6 shows however that the Indian inflation in the second half of our chosen time period pales into insignificance when compared with that in Vietnam over the period, 2004-2008. For example, there was a doubling in the unit values of Cereals and Cereal substitutes and a six-fold increase in that of Meat, Fish and Egg in Vietnam over this period, 2004-2008. The sharp depreciation in the value of the Dong vis-a-vis the Rupee, that we report later, can be largely explained by the much higher food inflation in Vietnam than in India over this period. It also explains the sharp divergence between the PPPs obtained in our study and that from the ICP, since items such as Meat, Fish and Eggs figure much more prominently in the food basket of the poor in Vietnam than in India[[9]](#footnote-9). The reader will recall that the PPPs calculated in this study are food PPPs and, unlike the ICP PPPs, they incorporate the varying food preferences and varying price induced substitution between and within the two countries.

The evidence on high food inflation in Vietnam contained in Tables 5 and 6 is consistent with unpublished reports available in <http://www.vifap.org/wp-content/uploads/2011/09/Food-Crisis_18_December_2010.pdf> on inflation in Vietnamese food prices during this period. As the authors of the report say, "Vietnam, a major agricultural exporter, did not avoid the recent sharp food price increases. Even with export restrictions on rice applied in January 2008, Vietnamese food prices increased dramatically in concert with international food prices. The food price index increased about 70% and cereal prices more than doubled from January 2006 to August 2008. This increase in food prices is the major factor that pushed increases in the Consumer Price Index (CPI) to levels that had not been seen since 1990. The sharp price increase generated many concerns about its impacts on different household groups, on social stability, and on food security in Vietnam."

There are two other differences between the two countries that are apparent from the tables. The rural urban difference in the prices is generally much greater in Vietnam than in India. Also, the all Vietnam prices are much closer to the rural figures than the urban, which is not necessarily the case in India. This suggests that Vietnam is more rural than India[[10]](#footnote-10), and this is reflected in the result reported later that the intra country PPP in Vietnam and the Vietnam/India PPP is much closer to their rural counterpart than the urban.

Comparison of the item wise prices between India and Vietnam shows wide variation in the item specific PPPs, both between items and in their movement over time. It is, therefore, not possible to draw any inference on the overall PPP between the Indian Rupee and the Vietnamese Dong, both on its magnitude and its movement between the two surveys, by simply inspecting the item specific PPPs. Moreover, the sharp variation among the item specific PPPs, and the varying importance of the items in the expenditure pattern of households, both between regions and between varying affluent levels, suggest that the PPPs will vary across different population subgroups. We now turn to the evidence on these issues.

1. **Results**

**4.1 Intra country PPPs in India and Vietnam**

**Spatial Food Prices in India**

Table 7 presents the food PPPs (along with their standard errors) based on the QAIDS parameter estimates for each of the 15 major states in India (rural and urban), with All-India (for the respective sectors) as base, for the three NSS rounds - 55th, 61st and 66th. The QAIDS was estimated for each state separately and for each of the three rounds, along with that for All India which pooled the data over these 15 major states.

Several features are worth noting: First, the regional or spatial food PPPs are generally well determined; second, in several cases, though not always, the state PPPs are considerably different from the All India PPP normalised value of 1; prominent examples are the poorer states of Bihar, Orissa and Uttar Pradesh where 1 Rupee buys much more than what it buys elsewhere; third, there is rural urban agreement on the PPPs in all the three rounds with a reasonable degree of stability in the PPP values over this period; fourth, the idea that a Rupee buys the same everywhere in India, underlying the conventional between-country PPP calculations in ICP, is inconsistent with the picture portrayed in Table 7 which rejects, in case of several states, the hypothesis that the spatial price is one.

**Spatial Food Prices in Vietnam**

Table 8 presents the corresponding QAIDS food PPPs for the three regions of Vietnam (rural and urban), with All-Vietnam (for the respective sectors) as base, for 1998, 2004 and 2008 along with their standard errors. The PPPs are less well determined than in India, which largely reflects the much smaller sample size in VLSS/VHLSS compared to the NSS. The affluent Southern region[[11]](#footnote-11) is the most expensive region with the Dong buying less there than in the rest of the country. A comparison with the spatial prices in India in Table 7 shows that the spread in food prices between the most expensive (Southern) region and the least expensive (Central) region is much smaller than in India. However, as in India, the qualitative picture is robust between the rural and urban sectors and is stable over the period covered by the three Vietnamese surveys.

**4**.**2 Purchasing Power Parity between India and Vietnam**

Table 9 compares the QAIDS food based PPP rates between the Indian Rupee and the Vietnamese Dong with that from using the CPD method (Rao, 2005), and the conventional Divisia (DIV), Paasche (PA), Laspeyre (LA) and Fisher (FI) price indices.

The CPD index is obtained from the following regression equation:

+ (8)

where is the budget share of the *i*-th item in the *r*-th country, is the country dummy and are the product (item) dummies. If is the ordinary least square squares estimator of, then *exp*( yields the CPD index. The DIV, PA, LA and FI indices are given, respectively, by the following formulae:

DIV = ; PA = ; LA = ; and

FI = .

The following results are worth noting from Table 9.

1. The QAIDS based PPP estimates vary between rural and urban areas and reconfirm the picture of rural urban heterogeneity in each country that was evident from the spatial prices reported earlier.
2. There has been reasonable stability in the PPPs both between methods and over time in the first two periods. The picture changed dramatically in the third period, 2004/5- 2008/9 with the Dong slipping sharply against the Rupee. This is explained by the large increases in the prices of Cereals and Cereal substitutes, and Meat, Fish and Eggs in Vietnam, reported earlier, which dwarfed that in India over this period, along with the fact that the latter item features much more prominently in the Vietnamese diet than in the Indian diet. Large parts of India are vegetarians and do not consume this item at all.
3. There is reasonable agreement in the first two periods between the PPP rates from QAIDS and that from the CPD, Divisia and Fisher’s Index. However, the Paasche and Laspeyre’s PPPs vary considerably from one another and the rest, as one expects from the use of these fixed-basket based price indices. The Fisher index that averages out the large and reverse biases in Paasche and Laspeyre’s is much closer to the Divisia, CPD and QAIDS PPP rates, though differences still remain across the alternative procedures.
4. The picture of rough stability in the PPPs across procedures changes drastically in 2008-9 with the PPP rates varying widely. The Fisher’s and Divisia PPP rates are in line with one another, but the CPD PPP rates move to values that are much higher than the rest. The QAIDS based PPP rates are also much higher than the Fisher’s and Divisia PPP rates but are intermediate, almost half way, between them and the CPD rates. The explanation, once again, lies in the large inflation in food prices in Vietnam during this period dwarfing that in India.
5. To see how the food PPP rates presented in Table 9 compare with PPP rates reported elsewhere, we calculated the Re/Dong PPP rates for these years from the PPP rates of these currencies reported in <http://www.economywatch.com/economic-statistics/economic-indicators/Implied_PPP_Conversion_Rate/> . The Re/Dong PPP rates are 304.02, 321.27, and 383.34. The corresponding Re/Dong PPP rates from figures reported in the website <https://uqicd.economics.uq.edu.au/>[[12]](#footnote-12) are 261.42 in 1998 and 292.83 in 2005. No PPP rates are available from the latter for the years beyond 2005. These are PPP rates based on all items, food and non-food, while the PPP rates of Table 9 are based on food items only. The 2005 QAIDS based PPP rates are much closer to the former than the latter which seems to be biased downwards in relation to both the other sets of PPPs. However, the QAIDS based PPPs, as also the other food PPPs, move far ahead of the PPPs from the former website during the last period, 2008-9. Once again, the explanation lies in the sharp rise in Vietnamese food prices that puts the food PPPs out of line with the PPPs based on all items. As we report below, this has dramatic implications for the estimates of the relative welfare level of the Vietnamese and the Indian household vis-a-vis one another.

Table 10 presents the QAIDS based food PPPs between India and Vietnam calculated at five different reference utility levels, namely, at 30% (“ultra poor”), at 50% (“poor”), at 200% (“rich”) and at 300% (“ultra rich”) of median household expenditure of the NSS 61st round data, besides at the median expenditure itself, for rural, urban and rural-urban combined sectors. Table 10 also presents the pair wise differences in the PPP values along with the associated t-statistics. Both the sectors agree that the PPP increases with household affluence. In the rural sector and at the all country level all the t-statistics are highly significant. In the urban sector the PPP s differ significantly in the middle section of the population. Thus, Table 10 provides evidence of the sensitivity of the PPP estimates to the reference household, an issue that received hardly any attention in the literature. The evidence also confirms large variation across the PPPs corresponding to the reference households, especially in the rural areas, less in the urban. At the all country level, for example, the PPP of 260.37 Dong per Rupee for an “ultra poor” household at 30% of median expenditure is considerably lower than the PPP figure of 344.23 Dong per Rupee for a median household. It is clear that the provision of a single PPP that is intended for use at all levels of affluence severely restricts its usefulness especially in cross country welfare comparisons. This has the policy implication that in poverty calculations using the US $1[[13]](#footnote-13) a day poverty line, one needs to use different PPPs in calculating the number of “ultra poor” and the “poor” in a given country. This adds to the evidence, presented above, on the need to use regionally varying cross-country PPPs (in cross country inequality and poverty comparisons) and regional poverty lines (in intra national poverty comparisons).

**4.3 Comparing the levels of Living between India and Vietnam**

Table 11 reports the values of the 2004-5 Sen (1976) welfare index, namely, the inequality adjusted mean expenditure on the six food items in the two countries. The last column reports the ratio of the Sen (1976) welfare values in the two countries. The table compares the relative welfare of the Vietnamese vis-a-vis the Indian, under alternative PPP rates used in converting the Indian expenditures from Rupees to Dong. The table shows the impact of allowing the PPPs to vary across different expenditure percentiles on the relative levels of living. This table also allows rural urban comparison. The following points are worth noting.

1. All the PPPs agree that, in 2004-5, the Vietnamese enjoyed a higher standard of living than the Indian.
2. All the PPPs agree that the welfare disparity between India and Vietnam is higher in case of the urban residents than the rural ones.
3. The similarity ends there. The use of expenditure percentile specific PPPs sharply reduces the welfare disparity between India and Vietnam in relation to the others.
4. The use of the ICP PPP leads to a magnitude of welfare disparity that lies between that from the use of expenditure specific and expenditure invariant food PPPs considered in this paper.

Table 12 shows how the relative welfare levels between the two countries have moved over the period spanned by the three NSS rounds/VLSS-VHLSS surveys. This table brings out the divergence between the magnitudes of the welfare ratios corresponding to the QAIDS based PPP rates and those from the PPP rates obtained from the website mentioned earlier. The 2004-5 snap shot is not quite the complete picture. There is a wide divergence between the two in the earlier and later years. If we focus on the period between 2004/5 and 2008/9, we see that both the PPPs agree that, due to the much higher food inflation in Vietnam than in India, there has been a large decline in the relative welfare of the Vietnamese over this period. There is general agreement that over the period, 2004-8, the picture of relative affluence of the Vietnamese household gave way to one of relative deprivation in relation to the Indian household. However, the use of the non-demand systems and all item based PPPs greatly understates the extent of this decline in relation to the preference consistent food PPPs proposed in this study. Consequently, by the end of the period considered in this study, the former exaggerates greatly the relative welfare of the Vietnamese in relation to the latter. This is dramatised by the result that in 2008-9, while the food PPP s show that urban Vietnam experienced a welfare level that is half that in urban India, the all item PPPs record the exact reverse with urban Vietnam ahead of urban India by around 30%. This is an indictment of the all item PPPs that underplay the role of high food inflation in increasing deprivation both within and between countries.

1. **Summary and Conclusion**

This study marks a departure from the previous literature on purchasing power parity (PPP) by proposing a demand system based methodology for calculating the PPP that takes account of consumer preferences and allows for the substitution effect of price changes. The study is conducted within a framework that allows for regional variation in preferences and price changes both inside the country and between countries. The framework is used to calculate PPP between the Indian Rupee and the Vietnamese Dong. These Asian countries were chosen for, principally three reasons: (a) both of them registered impressive economic growth following significant economic reforms, (b) they have comparable household expenditure surveys with quantity and expenditure information of food items at unit record levels covering contemporaneous time periods, and (c) though not identical, these two countries have comparable item classifications. This is the first study in the published literature that calculates the PPP between countries not only at the aggregate country to country level, but also between sectors (namely, rural to rural and urban to urban) and by expenditure classes. This paper also provides evidence on how the spatial prices and the PPP have moved over the period, 1998/9 to 2008/9, that suggests that the Rupee has strengthened against the Dong over this period. On the way to calculating the spatial prices and PPP, the study extends the methodology due to Cox and Wohlgenant (1984) to construct prices from unit values that incorporate quality and demographic effects.

A particular advantage of the PPP procedure proposed here, that it shares with the “weighted CPD” procedure [Rao (2005)], is that it allows the calculation of standard errors of the PPP. The usefulness of this is illustrated by the tests of PPP between expenditure classes which question the conventional practice of using a single economy wide PPP in inequality and poverty comparisons. The policy significance of the PPP estimates is further underlined by their application in the comparison of levels of living between India and Vietnam, and the observation that the magnitude of relative welfare is quite sensitive to the procedure used to calculate the PPP used in the welfare comparisons.

The evidence of this study points to the potential for future such investigations that combine calculation of spatial prices with PPPs in a uniform analytical framework. However, for such studies to proceed there needs to be greater and improved information than is currently available. For example, cross-country studies such as the present study require more countries to conduct household expenditure surveys and provide unit record information on quantity and expenditures at the household level. Even for countries such as India and Vietnam that provide data on household consumption in quantity and expenditure terms, such information is restricted to food items only - they need to be provided for the non-food items as well. There needs to be greater synchronisation between countries on the time periods for their surveys and on the definition of the items used. Collection of prices is another area where the need for more information cannot be overstated.

One limitation of this study is the use of unit values from the expenditure records in the household budget surveys as prices. Adjusted or not, unit values of the various items are unsatisfactory proxies for prices. While the corrections minimise the distortions in the unit values, they do not eliminate them completely. However, reliance on them is unavoidable as there is hardly any information on regional market prices. One of the messages of this study is the need to embark on a project to make available regional prices using methods such as “price opinion” suggested by Gibson and Rozelle (2005). However, as McKelvey (2011) has found recently, such price information is not free of bias either.

**References**

Almas, I. (2011), “International Income Inequality: Measuring PPP Bias by Estimating Engel Curves for Food”, mimeographed, Norwegian School of Economics and Business Administration, Bergen, and forthcoming in American Economic Review.

Atella, V., Menon, M. and F.Perali (2004), “Estimation of Unit values in Cross Sections without Quantity Information and Implications for Demand and Welfare Analysis”, in Household Behaviour, Equivalence Scales, Welfare and Poverty, edited by C. Dagum and G. Ferrari, Physica-Verlag.

Aten, B and T. Menezes (2002), “Poverty Price Levels: An Application to Brazilian Metropolitan Areas,” World Bank ICP Conference, Washington, D.C., March11–15, 2002.

Banks, J., R. Blundell and A. Lewbel (1997), “Quadratic Engel Curves and Consumer Demand”, Review of Economics and Statistics, 79, 527-539.

Chotikapanich, D., R. Valenzuelaand D.S.P.Rao (1997), “Global and regional inequality in the distribution of income: estimation with limited and incomplete data”, Empirical Economics, 22, 533-46.

Clements, K., Wu, Y. and J. Zhang (2006), “Comparing international consumption patterns”, Empirical Economics, 31, 1-30.

Coondoo, D., A. Majumder and S. Chattopdhyay (2011), “Estimating Spatial Consumer Price Indices Through Engel Curve Analysis”, Review of Income and Wealth, 57(1), 138-155.

Coondoo, D., A. Majumder and R. Ray (2004), “A Method of Calculating Regional Consumer Price Differentials with Illustrative Evidence from India”, Review of Income and Wealth, 50(1), 51-68.

Cox, T. L. and M. K. Wohlgenant (1986), “Prices and Quality Effects in Cross-Sectional Demand Analysis”, American Journal of Agricultural Economics, 68 (4), 908-919.

Deaton, A. S., Friedman, J. and V. Alatas (2004), “ Purchasing power parity exchange rates from household survey data: India and Indonesia”, Working paper no. 173, Research Program in Development Studies, Woodrow Wilson School, Princeton University.

Diewert, W. E. (2005), “Weighted Country Product Dummy Variable Regressions and Index Number Formulae”, Review of Income and Wealth, 51(4), 561-570.

Feenstra, R.C. and D.S.P. Rao (2009), “Consistent Comparisons of Real Incomes across Time and Space”, Macroeconomic Dynamics, 13 (Supplement), 169-193.

Gibson, J. and S. Rozelle, (2005), “Prices and Unit Values in Poverty Measurement and Tax Reform Analysis”, The World Bank Economic Review, 19(1), 69-97.

Hill, R. J. (2000), “Measuring substitution bias in international comparisons based on additive purchasing power parity methods”, European Economic Review, 44, 145-162.

Hoang, L. V. (2009), “Estimation of Food Demand from Household Survey Data in Vietnam”, DEPOCEN Working paper series, no. 2009/12, available in <http://www.depocenwp.org>.

Majumder, A., Ray, R. and K. Sinha (forthcoming), “The Calculation of Rural Urban Food Price Differentials from Unit values in Household Expenditure Surveys: a new procedure and comparison with existing methods”, American Journal of Agricultural Economics.

Milanovic, B. (2002), “True World Income Distribution, 1988 and 1993: First Calculation based on Household Surveys alone”, The Economic Journal, 112, 51-92.

McKelvey,C. (2011), “Price, Unit Value and Quantity Demanded”, Journal of Development Economics, 95(1), 157-169.

Lancaster, G. and R. Ray (1998), “Comparison of Alternative Models of Household Equivalence Scales: The Australian Evidence on Unit Record data”, Economic Record, 74, 1-14.

Mishra, V. and R. Ray (2009), “Dietary Diversity, Food Security and Undernourishment: The Vietnamese Evidence”, Asian Economic Journal, 23 (2), 225-247.

Oulton,N. (2010), “How to Measure Living Standards and Productivity”, CEP Discussion Paper No. 949, LSE, London.

Oulton, N. (2012), “The Wealth and Poverty of Nations: True PPPs for 141 Countries”, CEP Discussion Paper No. 1080, LSE, London.

O’Donnell, C.J. and D.S.P. Rao (2007), “Predicting Expenditure Shares for Computing PPP Exchange Rates”, mimeographed, University of Queensland, Brisbane.

Prais, S. J. and H. S. Houthakker (1955), The Analysis of Family Budgets, Cambridge University Press, Cambridge (2nd edition, 1971).

Rao, D.S.P. (2005), “On the Equivalence of Weighted Country- Product-Dummy (CPD) Method and the Rao- System for Multilateral Price Comparisons”, Review of Income and Wealth, 51(4), 571-580.

Rao, D.S.P., Rambaldi, A. and H.Doran (2010), “Extrapolation of Purchasing Power Parities Using Multiple Benchmarks and Auxiliary Information: a New Approach”, Review of Income and Wealth, 56(1), Special Issue, S59-S98.

Ravallion, M., Datt, G and van de Walle, D (1991), "Quantifying Absolute Poverty in the Developing World," Review of Income and Wealth, 37(4), 345-61.

Reddy, S. and T. Pogge (2007): “How Not to Count the Poor” in Sudhir Anand and Joseph Stiglitz (ed.), Measuring Global Poverty (Oxford: OUP).

Sen.A. (1976), “Real National Income”, Review of Economic Studies, 43(1), 19-39.

Summers, R. (1973), “International Price Comparisons Based Upon Incomplete Data,” Review of Income and Wealth, 19(1), 1–16.

World Bank (2008), Global Purchasing Power Parities and Real Expenditures: 2005 International Comparison Program available at <http://siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf>.

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| **Table 1: Quality adjusted unit values of 6 food items in India (NSS 55th Round)a** | | | | | | | | | | | | | | | | | | | |
| **State** | | **Cereals/grams and cereal substitutes** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereals/grams/cereal subs** | **Pulses and Products** | **Milk and milk products** | **Edible oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereals/grams and cereal substitutes** | **Pulses** | **Milk and Milk Products** | **Edible oil** | **Meat, Fish and Egg** | **Vegetables** |
|  | | **All India** | | | | | | **Rural** | | | | | | **Urban** | | | | | |
| **Andhra Pradesh** | | 10.46 | 28.17 | 10.36 | 40.36 | 55.19 | 7.37 | 10.65 | 28.65 | 10.66 | 40.65 | 51.41 | 7.38 | 12.60 | 28.44 | 12.61 | 39.60 | 53.52 | 8.02 |
| **Assam** | | 12.28 | 27.88 | 21.79 | 46.00 | 49.64 | 6.15 | 12.77 | 28.58 | 12.81 | 45.77 | 48.92 | 6.60 | 13.88 | 28.88 | 15.23 | 47.47 | 55.85 | 8.96 |
| **Bihar** | | 10.11 | 22.58 | 14.03 | 42.54 | 49.40 | 5.05 | 10.99 | 23.52 | 13.38 | 42.38 | 41.72 | 5.82 | 12.23 | 26.07 | 15.88 | 43.86 | 49.58 | 6.96 |
| **Gujarat** | | 9.07 | 26.80 | 15.07 | 43.12 | 52.95 | 9.16 | 8.39 | 26.31 | 14.32 | 44.31 | 53.31 | 8.45 | 10.66 | 27.21 | 15.42 | 43.41 | 51.07 | 10.30 |
| **Haryana** | | 7.83 | 24.26 | 12.26 | 40.26 | 55.66 | 6.83 | 7.05 | 24.34 | 12.51 | 38.09 | 39.26 | 6.89 | 9.43 | 25.51 | 16.51 | 40.50 | 51.49 | 7.49 |
| **Karnataka** | | 10.79 | 27.29 | 10.29 | 40.29 | 52.80 | 7.00 | 9.92 | 25.73 | 10.42 | 40.65 | 49.04 | 6.84 | 12.81 | 28.57 | 11.58 | 40.57 | 60.67 | 7.60 |
| **Kerala** | | 12.51 | 29.36 | 13.31 | 50.32 | 31.15 | 9.69 | 12.71 | 29.31 | 13.60 | 50.68 | 30.74 | 10.06 | 13.16 | 29.54 | 13.68 | 53.12 | 32.78 | 10.19 |
| **Maharashtra** | | 10.08 | 26.41 | 13.41 | 40.41 | 56.91 | 8.43 | 9.27 | 25.58 | 10.96 | 41.02 | 61.27 | 8.32 | 13.23 | 28.84 | 15.65 | 43.64 | 55.78 | 11.64 |
| **Madhya Pradesh** | | 8.35 | 23.30 | 13.88 | 36.30 | 51.19 | 5.83 | 7.98 | 21.27 | 10.72 | 35.76 | 43.30 | 6.01 | 9.30 | 26.43 | 14.17 | 37.85 | 48.86 | 7.25 |
| **Orissa** | | 10.05 | 25.05 | 26.83 | 42.23 | 40.05 | 5.30 | 10.74 | 25.16 | 10.85 | 42.23 | 36.01 | 5.79 | 11.22 | 27.82 | 11.89 | 41.36 | 46.53 | 6.92 |
| **Punjab** | | 7.63 | 25.38 | 12.18 | 39.29 | 53.84 | 6.01 | 8.02 | 25.75 | 11.21 | 41.20 | 52.75 | 6.84 | 9.66 | 26.37 | 14.04 | 40.20 | 51.96 | 7.33 |
| **Rajasthan** | | 7.78 | 23.02 | 12.28 | 40.28 | 69.55 | 7.88 | 7.42 | 22.62 | 10.42 | 40.42 | 80.38 | 7.36 | 8.80 | 24.43 | 16.44 | 40.43 | 70.37 | 8.46 |
| **Tamil Nadu** | | 12.29 | 29.70 | 11.53 | 40.29 | 54.78 | 9.29 | 11.85 | 29.85 | 10.88 | 40.85 | 52.06 | 9.60 | 13.04 | 30.91 | 12.84 | 40.83 | 51.38 | 10.15 |
| **Uttar Pradesh** | | 8.06 | 24.82 | 12.35 | 39.52 | 50.76 | 5.02 | 8.20 | 24.12 | 10.75 | 40.38 | 46.23 | 5.27 | 9.69 | 26.68 | 14.71 | 39.40 | 38.83 | 6.49 |
| **West Bengal** | | 11.70 | 29.29 | 17.85 | 44.75 | 41.94 | 5.65 | 11.02 | 28.89 | 10.59 | 44.52 | 38.53 | 5.63 | 13.11 | 30.74 | 13.99 | 44.74 | 45.46 | 7.18 |
| **All India** | | 9.95 | 25.42 | 12.33 | 40.33 | 51.57 | 6.32 | 10.65 | 25.58 | 10.85 | 41.02 | 48.92 | 6.84 | 12.60 | 28.44 | 14.71 | 41.36 | 51.38 | 8.46 |
| aAll prices are in Rupees per Kilogram. | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |

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| **Table 2: Quality adjusted unit values of 6 food items in India (NSS 61st Round)a** | | | | | | | | | | | | | | | | | | |
| **State** | **Cereals/grams and cereal substitutes** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereals/grams and cereal substitutes** | **Pulses** | **Milk and Milk Products** | **Edible oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereals/grams and cereal substitutes** | **Pulses** | **Milk and Milk Products** | **Edible oil** | **Meat, Fish and Egg** | **Vegetables** |
| **All India** | | | | | | | **Rural** | | | | | | **Urban** | | | | | |
| **Andhra Pradesh** | 11.12 | 27.95 | 11.71 | 50.59 | 58.48 | 7.91 | 10.37 | 27.87 | 10.37 | 49.78 | 55.37 | 7.69 | 12.30 | 28.61 | 12.36 | 51.75 | 57.94 | 8.09 |
| **Assam** | 10.65 | 30.20 | 20.83 | 59.36 | 60.23 | 7.37 | 10.58 | 29.78 | 20.32 | 59.31 | 57.98 | 7.21 | 11.82 | 30.65 | 24.50 | 59.52 | 67.29 | 8.36 |
| **Bihar** | 9.08 | 24.60 | 14.03 | 57.40 | 51.88 | 5.43 | 8.98 | 24.34 | 12.60 | 57.27 | 50.27 | 5.29 | 10.14 | 26.30 | 16.00 | 57.61 | 55.42 | 6.00 |
| **Gujarat** | 9.61 | 27.24 | 16.55 | 53.72 | 64.49 | 10.39 | 8.50 | 26.34 | 15.78 | 53.57 | 63.77 | 9.84 | 10.59 | 27.69 | 17.40 | 53.84 | 72.93 | 11.38 |
| **Haryana** | 7.32 | 27.50 | 15.49 | 50.18 | 56.92 | 7.63 | 7.05 | 27.19 | 15.17 | 50.15 | 52.66 | 7.53 | 8.83 | 27.96 | 18.17 | 50.06 | 54.65 | 7.84 |
| **Karnataka** | 10.65 | 26.51 | 10.56 | 52.93 | 58.98 | 6.94 | 9.54 | 25.83 | 10.41 | 51.92 | 57.33 | 6.66 | 12.50 | 28.36 | 12.89 | 53.92 | 58.07 | 7.60 |
| **Kerala** | 12.05 | 30.71 | 15.08 | 65.16 | 30.94 | 9.97 | 11.92 | 30.98 | 15.06 | 63.81 | 31.46 | 9.89 | 12.72 | 30.06 | 15.59 | 65.70 | 33.69 | 10.49 |
| **Maharashtra** | 10.25 | 27.29 | 15.82 | 52.37 | 69.04 | 9.20 | 8.86 | 26.14 | 12.63 | 50.27 | 75.42 | 8.44 | 11.58 | 28.90 | 17.39 | 55.34 | 67.71 | 10.65 |
| **Madhya Pradesh** | 8.09 | 23.83 | 12.93 | 50.02 | 51.97 | 6.90 | 7.58 | 21.88 | 11.13 | 49.96 | 50.14 | 6.79 | 8.98 | 26.11 | 15.77 | 50.18 | 52.81 | 7.29 |
| **Orissa** | 8.47 | 25.57 | 17.19 | 58.57 | 44.78 | 6.56 | 8.39 | 24.81 | 16.08 | 58.48 | 42.45 | 6.41 | 9.91 | 27.30 | 17.43 | 58.57 | 53.13 | 7.15 |
| **Punjab** | 7.90 | 27.46 | 12.51 | 51.08 | 63.15 | 7.49 | 7.16 | 27.20 | 12.49 | 50.67 | 63.85 | 7.11 | 9.46 | 28.10 | 14.63 | 51.77 | 62.35 | 7.88 |
| **Rajasthan** | 7.21 | 25.26 | 13.90 | 54.86 | 87.81 | 8.58 | 7.03 | 24.90 | 13.78 | 54.71 | 94.39 | 8.25 | 8.45 | 26.04 | 17.06 | 54.83 | 85.40 | 8.65 |
| **Tamil Nadu** | 12.37 | 29.99 | 12.24 | 55.92 | 61.01 | 9.47 | 12.04 | 29.71 | 10.28 | 54.80 | 57.36 | 8.99 | 14.42 | 30.20 | 13.29 | 56.19 | 61.36 | 9.58 |
| **Uttar Pradesh** | 7.70 | 25.84 | 12.90 | 52.27 | 59.38 | 6.30 | 7.43 | 25.15 | 13.09 | 51.87 | 62.66 | 6.00 | 9.11 | 27.54 | 15.60 | 52.55 | 57.63 | 6.83 |
| **West Bengal** | 10.84 | 31.14 | 20.03 | 57.68 | 48.39 | 6.18 | 10.30 | 30.42 | 17.44 | 58.87 | 42.23 | 6.02 | 12.37 | 32.29 | 23.81 | 57.40 | 51.00 | 7.67 |
| **All India** | 10.08 | 27.63 | 14.64 | 55.02 | 60.20 | 7.81 | 8.98 | 26.14 | 13.09 | 54.80 | 57.36 | 7.53 | 11.58 | 28.61 | 15.77 | 55.34 | 58.07 | 8.61 |
| aAll values are in Rupees per Kilogram. | | | | | | | | |  |  |  |  |  |  |  |  |  |  |

**Table 3: Quality Corrected Unit Values for 6 Food Items in India (NSS 66th Round)a**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **Cereal and cereal Substitutes** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereal and cereal Substitutes** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereal and cereal Substitutes** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | |
|  | **All India** | | | | | | **Rural** | | | | | | **Urban** | | | | | |
| **Andhra Pradesh** | 18.44 | 70.82 | 22.91 | 60.73 | 90.05 | 17.79 | 16.62 | 69.53 | 22.30 | 52.67 | 85.20 | 16.81 | 23.55 | 73.60 | 27.01 | 64.65 | 101.69 | 19.49 | |
| **Assam** | 19.17 | 64.55 | 26.43 | 71.86 | 96.02 | 14.12 | 18.61 | 61.73 | 25.11 | 70.34 | 94.69 | 13.73 | 20.96 | 67.10 | 31.70 | 71.87 | 107.42 | 16.05 | |
| **Bihar** | 15.68 | 51.17 | 21.37 | 69.23 | 81.56 | 11.13 | 15.22 | 51.12 | 21.09 | 70.30 | 81.03 | 10.80 | 17.45 | 56.36 | 23.99 | 69.30 | 86.93 | 12.89 | |
| **Gujarat** | 15.75 | 62.53 | 25.53 | 62.05 | 97.24 | 16.73 | 13.68 | 60.72 | 22.56 | 60.59 | 100.42 | 15.80 | 18.53 | 64.72 | 27.26 | 66.21 | 93.40 | 18.33 | |
| **Haryana** | 13.93 | 55.99 | 27.12 | 61.01 | 81.88 | 14.85 | 12.87 | 55.36 | 25.68 | 60.50 | 99.71 | 14.33 | 15.90 | 57.63 | 30.89 | 62.30 | 82.89 | 16.83 | |
| **Karnataka** | 16.44 | 63.16 | 17.54 | 61.52 | 83.15 | 15.40 | 12.89 | 60.21 | 16.32 | 59.16 | 79.86 | 13.89 | 21.44 | 66.67 | 20.78 | 61.98 | 88.34 | 16.16 | |
| **Kerala** | 21.31 | 66.17 | 23.25 | 59.04 | 58.62 | 20.05 | 20.41 | 68.58 | 23.15 | 59.11 | 57.84 | 20.22 | 21.70 | 66.36 | 23.43 | 60.62 | 65.80 | 20.94 | |
| **Maharashtra** | 16.98 | 64.78 | 23.97 | 57.27 | 106.14 | 18.63 | 15.19 | 62.20 | 21.41 | 55.31 | 102.62 | 17.87 | 21.81 | 70.41 | 26.92 | 61.16 | 107.04 | 19.46 | |
| **Madhya Pradesh** | 13.66 | 58.00 | 21.31 | 56.96 | 81.56 | 13.69 | 12.61 | 54.64 | 20.42 | 60.02 | 72.45 | 13.01 | 16.09 | 61.86 | 23.88 | 57.90 | 84.01 | 15.85 | |
| **Orissa** | 14.07 | 61.83 | 19.00 | 66.05 | 75.38 | 14.03 | 13.43 | 59.79 | 18.59 | 65.09 | 72.61 | 13.21 | 17.61 | 68.17 | 23.36 | 66.32 | 87.65 | 15.91 | |
| **Punjab** | 14.85 | 58.26 | 23.27 | 61.25 | 96.61 | 15.56 | 13.68 | 56.15 | 21.69 | 61.57 | 86.92 | 14.77 | 17.53 | 60.12 | 23.86 | 64.00 | 95.76 | 16.82 | |
| **Rajasthan** | 13.36 | 54.45 | 20.71 | 63.19 | 141.61 | 15.49 | 12.84 | 53.69 | 19.29 | 64.38 | 147.02 | 14.93 | 15.65 | 58.40 | 27.31 | 63.23 | 141.38 | 17.20 | |
| **Tamil Nadu** | 13.52 | 58.64 | 21.98 | 61.72 | 93.52 | 18.08 | 11.77 | 56.46 | 20.50 | 61.12 | 89.17 | 17.91 | 16.33 | 61.52 | 22.42 | 62.79 | 95.66 | 18.93 | |
| **Uttar Pradesh** | 13.16 | 56.21 | 21.05 | 63.87 | 81.35 | 12.55 | 12.55 | 53.12 | 20.11 | 63.60 | 82.24 | 11.47 | 16.16 | 60.42 | 23.49 | 64.10 | 81.49 | 14.05 | |
| **West Bengal** | 17.88 | 66.22 | 22.04 | 71.34 | 78.25 | 12.56 | 12.55 | 53.12 | 20.11 | 63.60 | 82.24 | 11.47 | 21.10 | 69.60 | 27.37 | 71.14 | 91.21 | 14.98 | |
| **All India** | 15.68 | 61.29 | 22.04 | 63.19 | 90.05 | 15.49 | 14.61 | 58.78 | 21.16 | 63.58 | 85.58 | 14.85 | 18.78 | 63.36 | 25.47 | 66.21 | 95.74 | 17.20 | |

aAll values are in Rupees per Kilogram.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 4: Quality adjusted unit values of 6 food items in Vietnam (VLSS 1998)a** | | | | | | |
| **Region** | **Cereals and Cereal Products** | **Peanuts, sesame seeds, beans** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** |
| **Rural** | | | | | | |
| **North Vietnam** | 3954.62 | 6555.24 | 18507.72 | 10447.38 | 8888.94 | 1832.41 |
| **Central Vietnam** | 4400.02 | 5640.39 | 20157.3 | 11071.07 | 9081.23 | 2166.66 |
| **South Vietnam** | 4219.69 | 6877.13 | 19114.55 | 10775.22 | 11699.05 | 2527.67 |
| **Total** | 4135.61 | 6208.25 | 19308.74 | 10719.8 | 9856.65 | 2120.93 |
| **Urban** | | | | | | |
| **North Vietnam** | 3768.93 | 7980.29 | 23335.69 | 10727.47 | 16848.65 | 1884.59 |
| **Central Vietnam** | 3806.02 | 7554.25 | 17850.71 | 14221.84 | 13878.85 | 2373.03 |
| **South Vietnam** | 4551.17 | 7362.56 | 23606.05 | 12573.04 | 20012.28 | 3059.08 |
| **Total** | 4117.65 | 7548.84 | 22473.04 | 12272.71 | 16848.65 | 2666.18 |
| **All Vietnam** | | | | | | |
| **North Vietnam** | 3981.12 | 6652.76 | 19975.94 | 10501.82 | 10247.83 | 1726.75 |
| **Central Vietnam** | 4187.71 | 5620.36 | 19370.01 | 11679.61 | 9620.81 | 2265.27 |
| **South Vietnam** | 4337.01 | 7327.99 | 20615.9 | 11946.93 | 13495.74 | 2673.94 |
| **Total** | 4187.71 | 6652.76 | 19975.94 | 11679.61 | 10247.83 | 2265.27 |

aAll values are in Dongs per kilogram.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 5: Quality adjusted unit values of 6 food items in Vietnam (VHLSS 2004)a** | | | | | | |
| **Region** | **Cereal and Substitutes** | **Peanut, sesame seeds, beans** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** |
| **Rural** | | | | | | |
| **North Vietnam** | 3912.65 | 10747.62 | 14688.33 | 12661.16 | 4599.64 | 4754.03 |
| **Central Vietnam** | 3671.56 | 10483.46 | 14425.54 | 12293.71 | 6097.18 | 5591.05 |
| **South Vietnam** | 3952.79 | 12323.01 | 14913.91 | 12541.88 | 7745.59 | 6589.51 |
| **Total** | 3855.42 | 10756.60 | 14659.14 | 12520.53 | 6278.98 | 5828.44 |
| **Urban** | | | | | | |
| **North Vietnam** | 4700.13 | 12610.85 | 18538.97 | 17325.14 | 21687.77 | 5128.17 |
| **Central Vietnam** | 4328.10 | 11508.6 | 16788.11 | 15540.86 | 12600.52 | 5681.28 |
| **South Vietnam** | 4838.84 | 14686.24 | 15775.44 | 17289.42 | 9971.37 | 7163.05 |
| **Total** | 4649.01 | 12827.88 | 16662.18 | 16485.5 | 11949.72 | 6240.53 |
| **All Vietnam** | | | | | | |
| **North Vietnam** | 3973.86 | 10604.75 | 15604.75 | 13604.75 | 5522.79 | 4773.35 |
| **Central Vietnam** | 3793.08 | 10518.25 | 15518.25 | 13518.25 | 7047.11 | 5696.33 |
| **South Vietnam** | 4039.27 | 12493.64 | 15192.44 | 13493.64 | 8037.38 | 6517.57 |
| **Total** | 3973.86 | 10604.75 | 15518.25 | 13518.25 | 7047.11 | 5696.33 |

aAll values are in Dongs per kilogram.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Table 6: Quality adjusted unit values of 6 food items in Vietnam (VHLSS 2008)a** | | | | | | | | **Region** | **Cereal and Substitutes** | **Peanut, sesame seeds, beans** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | | **Rural** | | | | | | | | **North Vietnam** | 9008.72 | 20664.46 | 25682.59 | 26353.78 | 44458.65 | 6007.11 | | **Central Vietnam** | 9132.30 | 20773.75 | 27510.00 | 25091.32 | 39612.10 | 8836.43 | | **South Vietnam** | 10086.69 | 21391.62 | 30365.76 | 25601.54 | 47193.29 | 11662.26 | | **Total** | 9181.12 | 20733.10 | 26520.05 | 25664.50 | 43354.19 | 7147.32 | | **Urban** | | | | | | | | **North Vietnam** | 10402.29 | 23679.53 | 39524.74 | 29274.07 | 53903.18 | 8617.61 | | **Central Vietnam** | 9363.49 | 21899.04 | 34556.81 | 26831.40 | 49218.82 | 11489.29 | | **South Vietnam** | 9451.79 | 19222.20 | 42328.93 | 25233.37 | 50957.93 | 11773.70 | | **Total** | 9881.49 | 23041.42 | 39087.80 | 27711.08 | 52447.73 | 9697.22 | | **All Vietnam** | | | | | | | | **North Vietnam** | 9274.53 | 21142.66 | 29717.28 | 27152.54 | 46504.33 | 6397.49 | | **Central Vietnam** | 9256.67 | 20817.03 | 29027.86 | 25310.65 | 41737.65 | 9483.09 | | **South Vietnam** | 9915.98 | 20601.54 | 35855.61 | 25410.19 | 48691.83 | 11773.70 | | **Total** | 9315.58 | 20969.90 | 30071.62 | 26114.41 | 45322.86 | 7667.16 |   aAll values are in Dongs per kilogram. |

**Table 7: Spatiala Food Prices in India (QAIDS based)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **States** | **Rural b** | | | **Urban** | | |
| **NSS 55th Round** | **NSS 61st Round** | **NSS 66th Round** | **NSS 55th Round** | **NSS 61st Round** | **NSS 66th Round** |
| **Andhra Pradesh** | 0.960\*  (-4.09) | 0.994  (1.078) | 0.994  (-0.52) | 0.936\*  (-4.84) | 0.812\*  (12.97) | 1.079\*  (5.95) |
| **Assam** | 1.183\*  (7.98) | 1.060  (1.25) | 0.880\*  (-4.91) | 0.884\*  (-3.17) | 0.867\*  (2.59) | 0.976  (0.55) |
| **Bihar** | 0.879\*  (-18.81) | 0.578\*  (-30.69) | 0.751\*  (-17.03) | 0.862\*  (-11.67) | 0.719\*  (14.99) | 0.797\*  (8.94) |
| **Gujarat** | 1.092\*  (2.16) | 0.961\*  (-2.52) | 0.940\*  (-4.15) | 0.950\*  (-2.54) | 0.887\*  (5.35) | 0.926\*  (4.44) |
| **Haryana** | 0.902\*  (-2.02) | 1.060  (1.46) | 0.860\*  (-10.30) | 0.858\*  (3.17) | 0.801\*  (8.93) | 0.917\*  (5.01) |
| **Karnataka** | 1.001  (0.06) | 0.997  (-0.11) | 0.843\*  (-12.11) | 0.917\*  (-5.83) | 0.693\*  (21.91) | 0.882\*  (8.06) |
| **Kerala** | 1.243\*  (8.66) | 1.246\*  (7.02) | 1.303\*  (15.88) | 1.003  (0.07) | 1.091  (1.11) | 1.115\*  (5.47) |
| **Madhya Pradesh** | 0.745\*  (-22.46) | 0.914\*  (-6.64) | 0.985  (-0.98) | 0.748\*  (-20.48) | 0.924\*  (6.14) | 1.049\*  (3.21) |
| **Maharashtra** | 1.027\*\*  (1.97) | 0.641\*  (-50.94) | 0.774\*  (-17.58) | 1.057\*  (4.68) | 0.657\*  (25.73) | 0.790  (16.11) |
| **Orissa** | 0.760\*  (-14.68) | 0.546\*  (-36.73) | 0.762\*  (-19.56) | 0.814\*  (-5.11) | 0.599\*  (15.48) | 0.760\*  (11.58) |
| **Punjab** | 0.971  (-0.45) | 0.713\*  (-17.02) | 0.874\*  (-11.80) | 0.928  (-1.28) | 0.941\*  (2.20) | 0.815\*  (20.92) |
| **Rajasthan** | 1.057  (0.86) | 0.499\*  (-30.25) | 0.712\*  (-26.10) | 0.830\*  (-3.68) | 0.596\*  (9.61) | 0.763\*  (19.50) |
| **Tamil Nadu** | 1.273\*  (8.79) | 1.131\*  (5.29) | 0.988  (-0.68) | 1.020  (1.32) | 1.009  (0.50) | 0.930\*  (5.13) |
| **Uttar Pradesh** | 0.845\*  (-16.34) | 0.777\*  (18.93) | 0.712\*  (-37.93) | 0.760\*  (-27.52) | 0.677\*  (29.04) | 0.765\*  (31.51) |
| **West Bengal** | 1.003  (0.013) | 0.938\*  (-2.27) | 1.322\*  (8.88) | 0.983  (0.52) | 0.920  (1.50) | 1.136\*  (2.58) |
| **ALL INDIA** | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

a The State’s median household is the comparison household and the All India median household is the reference household.

b Figures in parentheses are the t-statistic given by \* p<0.01, \*\* p<0.05, \*\*\*p<0.10 are level of significance for testing PPP=1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 8: Spatiala Food Prices in Vietnam (QAIDS based)** | | | | |  |  |
|  | **1998b** | | **2004** | | **2008** | |
| **Region** | **Rural** | **Urban** | **Rural** | **Urban** | **Rural** | **Urban** |
| **North Vietnam** | 0.886\*\*\* (-9.39) | 1.076 (1.31) | 0.872\*\*\* (-21.79) | 1.083\*\*\* (5.66) | 1.095\* (9.24) | 0.986 (-0.66) |
| **Central Vietnam** | 1.011 (0.81) | 0.922\* (-1.84) | 0.979\*\*\* (-2.69) | 0.976 (-1.26) | 0.960\* (-3.53) | 0.850\* (-5.82) |
| **Southern Vietnam** | 1.112\*\*\* (7.51) | 1.135\*\*\* (3.46) | 1.128\*\*\* (14.19) | 1.023\* (1.92) | 0.911\* (-4.99) | 0.995\* (-0.15) |
| **All-Vietnam** | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

a The Region’s median household is the comparison household and the All Vietnam median household is the reference household.

b Figures in parentheses are the t-statistic given by \* p<0.01, \*\* p<0.05, \*\*\*p<0.10 are level of significance for testing PPP=1.

|  |
| --- |
|  |

**Table 9: Food PPP of Vietnam with respect to India (India=1) using alternative proceduresa**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **QAIDS based estimates** | **CPD Index (Rao, 2005)** |  |  |  |  |
| **Year** | **Sector** | **Divisia Index** | **Paasche’s Index** | **Laspeyre’s Index** | **Fisher’s Index** |
| 1999-2000 |  |  |  | 361.153 | 274.779 | 608.632 | 408.949 |
| Rural | 387.67  (152.53) | 333.36  (20.33) |
|  |  |  |
|  | 418.86  (338.80) | 360.94  (19.13) | 405.367 | 335.625 | 629.104 | 459.503 |
| Urban |
|  |
|  |
|  | 414.43 |  | 382.56 | 278.633 | 640.348 | 422.4 |
| All | 346.74 |
|  | (124.09) | (15.26) |
|  |  |  |
| 2004-2005 |  | 385.65  (167.37) |  |  |  |  |  |
| Rural | 322.58  (26.77) | 343.723 | 192.32 | 558.731 | 327.803 |
|  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Urban | 379.13 | 407.05 | 400.957 | 280.289 | 584.229 | 404.664 |
|  | (402.44) | (27.68) |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| All | 344.23 | 388.89 | 318.353 | 191.794 | 521.634 | 316.3 |
|  | (122.35) | (22.55) |  |  |  |  |
|  |  |  |  |  |  |  |
| 2008 |  |  |  |  |  |  |  |
| Rural | 838.35 | 1025.47 | 587.390 | 539.688 | 680.643 | 606.081 |
|  | (232.90) | (53.32) |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Urban | 889.92 | 1079.17 | 614.310 | 559.601 | 746.356 | 646.268 |
|  | (395.24) | (57.20) |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| All | 811.37  (193.42) | 1054.62   (42.18) | 587.457 | 544.917 | 680.812 | 609.086 |
|  |  |  |  |  |
|  |  |  |  |  |  |
| a Figures in parentheses are the asymptotic standard errors. | | | | |  |  |  |

**Table 10: Pair wise comparison of QAIDS based Food PPPs evaluated at different reference utility levels: Vietnam and India for 2004-05**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Expenditure points** | **Per capita expenditure**  **(Rs.)** | **PPP a**  **(India=1)** | **Difference with PPP of b** | | | |
| **30% of median** | **50% of median** | **Median** | **200% of median** |
| **Rural** |  |  |  |  |  |  |  |
| **30% of median** | 83.29 | 294.50  (132.50) |  |  |  |  |
| **50% of median** | 124.94 | 328.53  (146.51) | 34.03\*  (14.35) |  |  |  |
| **Median** | 249.88 | 385.65  (167.37) | 91.95\*  (34.13) | 57.12\*  (21.39) |  |  |
| **200% of median** | 499.76 | 438.48  (340.51) | 143.98\*  (31.61) | 109.95\*  (24.14) | 52.83\*  (11.60) |  |
| **300% of median** | 749.65 | 466.05  (243.08) | 171.55\*  (34.16) | 137.52\*  (27.38) | 80.40\*  (16.01) | 27.57\*  (5.49) |
| **Urban** |  |  |  |  |  |  |  |
| **30% of median** | 97.78 | 333.73  (372.94) |  |  |  |  |
| **50% of median** | 146.67 | 350.78  (388.61) | 17.05  (1.50) |  |  |  |
| **Median** | 293.33 | 379.13  (402.44) | 45.40\*  (3.85) | 28.35\*\*  (2.40) |  |  |
| **200% of median** | 586.67 | 405.98  (850.97) | 72.25\* (3.64) | 55.20\*  (2.78) | 26.85 (1.35) |  |
| **300% of median** | 880.00 | 420.78  (530.05) | 87.05\* (4.12) | 70.00\*  (3.31) | 41.65\*\*  (1.97) | 14.80  (0.70) |
| **All** |  |  |  |  |  |  |  |
| **30% of median** | 87.88 | 260.37  (98.70) |  |  |  |  |
| **50% of median** | 131.82 | 290.73  (108.99) | 30.36\* (9.79) |  |  |  |
| **Median** | 263.64 | 344.23  (122.35) | 83.86\* (24.28) | 53.50\*  (15.49) |  |  |
| **200% of median** | 527.28 | 397.94  (363.39) | 137.57\* (17.02) | 107.21\*  (13.26) | 53.71\* (6.64) |  |
| **300% of median** | 790.92 | 428.56  (192.14) | 168.19\* (19.41) | 137.83\*  (15.90) | 84.33\* (9.73) | 30.62\* (3.53) |

a Standard errors in parenthesis.

b t-statistic in parenthesis.

\*p<0.01, \*\* p<0.05, \*\*\*p<0.10.All estimates are based on LQAIDS estimates for six food items.

**Table 11: Comparison of Food Expenditure based Welfare between India and Vietnam (2004-05)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** |  | **Sector** | **India** | | | | **Vietnam** | | |  |
| **Expenditure on 6 food items (Dongs)** | | **Gini** | **Sen’s Welfare** | **Expenditure on 6 food items (Dongs)** | **Gini** | **Sen’s Welfare** |
| **2004-05** | **Varying PPP between expenditure percentiles** | **Rural** | 119311.20 | 0.2878 | | 84969.40 | 118.77 | 0.2778 | 85.77 | 1.01 |
| **Urban** | 132966.60 | 0.2840 | | 95205.79 | 170.04 | 0.3209 | 115.48 | 1.21 |
| **All** | 116807.50 | 0.3041 | | 81291.20 | 131.33 | 0.2884 | 93.46 | 1.15 |
| **Median PPP** | **Rural** | 68742.77 | 0.2517 | | 51438.84 | 118.77 | 0.2778 | 85.77 | 1.67 |
| **Urban** | 95223.33 | 0.2663 | | 69868.76 | 170.04 | 0.3209 | 115.48 | 1.65 |
| **All** | 77278.48 | 0.2628 | | 56968.25 | 131.33 | 0.2884 | 93.46 | 1.64 |
| **ICPa PPP** | **Rural** | 88376.87 | 0.2517 | | 66130.65 | 118.77 | 0.2778 | 85.77 | 1.30 |
| **Urban** | 104287.00 | 0.2663 | | 76519.07 | 170.04 | 0.3209 | 115.48 | 1.51 |
| **All** | 94165.19 | 0.2628 | | 69416.82 | 131.33 | 0.2884 | 93.46 | 1.35 |

a ICP PPP rates against USD 1 in 2005: India (14.669), Vietnam (4712.75), INR/Dong=321.27

**Table 12: Temporal Movement in the Relative Welfare values and Sensitivity to the PPP used**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** |  | **Sector** | **India** | | | **Vietnam** | | | |  |
| **Expenditure on 6 food items (1000 Dongs)** | **Gini** | **Sen’s Welfare**  **(1000 Dongs)** | **Expenditure on 6 food items (1000 Dongs)** | | **Gini** | **Sen’s Welfare**  **(1000 Dongs)** |
| **1999a** | **Median PPP** | **Rural** | 99.98 | 0.2493 | 75.05 | 56.52 | 0.3604 | | 36.15 | 0.48 |
| **Urban** | 140.54 | 0.2616 | 103.78 | 115.19 | 0.2592 | | 85.33 | 0.82 |
| **All** | 119.75 | 0.2650 | 88.02 | 73.41 | 0.3313 | | 49.09 | 0.56 |
| **ICP PPP** | **Rural** | 78.40 | 0.2493 | 58.86 | 56.52 | 0.3604 | | 36.15 | 0.61 |
| **Urban** | 102.01 | 0.2616 | 75.32 | 115.19 | 0.2592 | | 85.33 | 1.13 |
| **All** | 87.85 | 0.2650 | 64.57 | 73.41 | 0.3313 | | 49.09 | 0.76 |
| **2004-05b** | **Median PPP** | **Rural** | 68.74 | 0.2517 | 51.44 | 118.77 | 0.2778 | | 85.77 | 1.67 |
| **Urban** | 95.22 | 0.2663 | 69.87 | 170.04 | 0.3209 | | 115.48 | 1.65 |
| **All** | 77.28 | 0.2628 | 56.97 | 131.33 | 0.2884 | | 93.46 | 1.64 |
| **ICP PPP** | **Rural** | 88.38 | 0.2517 | 66.13 | 118.77 | 0.2778 | | 85.77 | 1.30 |
| **Urban** | 104.29 | 0.2663 | 76.52 | 170.04 | 0.3209 | | 115.48 | 1.51 |
| **All** | 94.17 | 0.2628 | 69.42 | 131.33 | 0.2884 | | 93.46 | 1.35 |
| **2008c** | **Median PPP** | **Rural** | 424.84 | 0.2475 | 319.71 | 148.39 | 0.3444 | | 97.28 | 0.30 |
| **Urban** | 555.96 | 0.2730 | 404.21 | 309.84 | 0.2636 | | 228.16 | 0.56 |
| **All** | 450.14 | 0.2657 | 330.53 | 186.60 | 0.3253 | | 125.90 | 0.38 |
| **ICP PPP** | **Rural** | 194.26 | 0.2475 | 146.19 | 148.39 | 0.3444 | | 97.28 | 0.67 |
| **Urban** | 239.49 | 0.2730 | 174.12 | 309.84 | 0.2636 | | 228.16 | 1.31 |
| **All** | 212.68 | 0.2657 | 156.16 | 186.60 | 0.3253 | | 125.90 | 0.81 |

a ICP PPP rates against USD 1 in 1998: India (12.46), Vietnam (3789.65), INR/Dong=304.02

b ICP PPP rates against USD 1 in 2005: India (14.669), Vietnam (4712.75), INR/Dong=321.27

c ICP PPP rates against USD 1 in 2008: India (16.863), Vietnam (6464.29), INR/Dong=383.34

**APPENDIX**

**Table A1: Number of Districts (State wise) in India**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **States** | **NSS 55thRound** | | **NSS 61stRound** | | **NSS 66stRound** | |
|  | **Rural** | **Urban** | **Rural** | **Urban** | **Rural** | **Urban** |
| **Andhra Pradesh** | | 22 | 23 | 22 | 23 | 23 | 23 |
| **Assam** | | 23 | 20 | 23 | 23 | 27 | 27 |
| **Bihar** | | 52 | 47 | 55 | 55 | 38 | 31 |
| **Gujarat** | | 18 | 18 | 25 | 24 | 24 | 23 |
| **Haryana** | | 16 | 16 | 19 | 19 | 19 | 17 |
| **Karnataka** | | 20 | 20 | 27 | 27 | 25 | 27 |
| **Kerala** | | 14 | 13 | 14 | 14 | 14 | 14 |
| **Madhya Pradesh** | | 44 | 44 | 61 | 61 | 48 | 42 |
| **Maharashtra** | | 29 | 29 | 33 | 34 | 33 | 33 |
| **Orissa** | | 30 | 23 | 30 | 30 | 29 | 28 |
| **Punjab** | | 14 | 13 | 17 | 17 | 18 | 15 |
| **Rajasthan** | | 30 | 28 | 32 | 32 | 32 | 31 |
| **Tamil Nadu** | | 22 | 23 | 29 | 30 | 31 | 29 |
| **Uttar Pradesh** | | 71 | 62 | 83 | 83 | 70 | 70 |
| **West Bengal** | | 16 | 17 | 17 | 18 | 19 | 19 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table A2: Number of communes (region wise) in Vietnam** | | | | | | |
| **Region** | **VLSS 98** | | **VHLSS 04** | | **VHLSS 08** | |
| **Rural** | **Urban** | **Rural** | **Urban** | **Rural** | **Urban** |
| **North Vietnam** | 46 | 20 | 972 | 256 | 1223 | 332 |
| **Central Vietnam** | 41 | 11 | 624 | 193 | 617 | 186 |
| **South Vietnam** | 49 | 27 | 717 | 300 | 173 | 88 |
|  | 136 | 58 | 2313 | 749 | 2013 | 606 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table A3a: Per Capita Quantity and Value: India (Rural and Urban), NSS 61stRounda** | | | | | | | | | | | | |
|  | **Cereal and grams** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereal and grams** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** |
| **State** | **Per Capita Quantity** | | | | | | **Per Capita Value** | | | | | |
| **Rural** | | | | | | | | | | | | |
| **Andhra Pradesh** | 10.000 | 0.675 | 3.600 | 0.500 | 0.511 | 4.250 | 107.11 | 19.00 | 37.50 | 28.00 | 27.38 | 33.00 |
| **Assam** | 13.000 | 0.583 | 2.233 | 0.500 | 1.013 | 7.100 | 142.50 | 17.05 | 38.40 | 27.60 | 58.75 | 52.13 |
| **Bihar** | 13.333 | 0.667 | 4.000 | 0.417 | 0.400 | 6.938 | 117.00 | 16.00 | 51.43 | 24.00 | 21.56 | 36.14 |
| **Gujarat** | 9.500 | 0.750 | 6.015 | 0.875 | 0.366 | 4.333 | 82.33 | 20.50 | 88.00 | 47.25 | 22.50 | 44.00 |
| **Haryana** | 10.600 | 0.500 | 10.271 | 0.400 | 0.457 | 4.770 | 74.40 | 14.50 | 162.50 | 20.00 | 26.67 | 35.17 |
| **Karnataka** | 8.667 | 0.786 | 3.750 | 0.500 | 0.565 | 3.643 | 86.90 | 20.00 | 37.50 | 25.00 | 31.00 | 24.83 |
| **Kerala** | 9.600 | 0.556 | 3.750 | 0.400 | 2.548 | 3.875 | 118.29 | 17.20 | 52.50 | 26.25 | 76.67 | 36.70 |
| **Maharashtra** | 10.000 | 0.875 | 3.000 | 0.667 | 0.395 | 3.500 | 89.33 | 22.60 | 36.41 | 34.67 | 26.50 | 30.33 |
| **Madhya Pradesh** | 11.750 | 0.750 | 3.394 | 0.417 | 0.342 | 4.600 | 88.71 | 16.83 | 40.67 | 20.82 | 18.00 | 30.60 |
| **Orissa** | 13.917 | 0.500 | 1.925 | 0.286 | 0.449 | 5.950 | 116.00 | 12.29 | 25.00 | 16.00 | 20.00 | 37.00 |
| **Punjab** | 10.000 | 0.833 | 11.250 | 0.667 | 0.333 | 5.750 | 75.00 | 22.86 | 136.00 | 34.63 | 20.71 | 39.80 |
| **Rajasthan** | 12.500 | 0.500 | 7.667 | 0.429 | 0.263 | 3.625 | 86.50 | 11.50 | 100.00 | 22.50 | 24.00 | 29.20 |
| **Tamil Nadu** | 7.200 | 0.792 | 3.750 | 0.500 | 0.527 | 4.000 | 86.13 | 23.31 | 37.50 | 25.00 | 33.00 | 37.00 |
| **Uttar Pradesh** | 12.571 | 0.850 | 5.000 | 0.500 | 0.415 | 5.667 | 93.17 | 20.75 | 60.00 | 24.29 | 24.00 | 34.00 |
| **West Bengal** | 12.300 | 0.414 | 2.500 | 0.500 | 1.039 | 7.686 | 129.00 | 12.13 | 33.10 | 28.00 | 47.20 | 45.00 |
| **All India (Rural)** | 11.333 | 0.667 | 4.000 | 0.500 | 0.771 | 5.067 | 102.90 | 17.50 | 52.50 | 25.71 | 42.50 | 37.17 |
| **Urban** | | | | | | | | | | | | |
| **Andhra Pradesh** | 9.88 | 0.70 | 3.75 | 0.60 | 0.55 | 4.44 | 125.47 | 20.06 | 50.00 | 30.00 | 30.83 | 35.25 |
| **Assam** | 12.33 | 0.67 | 2.85 | 0.60 | 1.17 | 7.63 | 150.36 | 20.75 | 63.00 | 35.00 | 80.67 | 61.50 |
| **Bihar** | 12.71 | 0.75 | 5.02 | 0.50 | 0.50 | 7.94 | 128.00 | 20.20 | 78.50 | 29.00 | 30.00 | 45.75 |
| **Gujarat** | 8.33 | 0.90 | 7.00 | 1.00 | 0.46 | 4.99 | 89.50 | 24.70 | 115.00 | 56.00 | 28.57 | 56.00 |
| **Haryana** | 8.86 | 0.65 | 9.20 | 0.50 | 0.53 | 5.90 | 75.83 | 18.50 | 163.33 | 26.00 | 30.00 | 46.40 |
| **Karnataka** | 9.16 | 0.85 | 4.80 | 0.50 | 0.80 | 4.21 | 114.00 | 23.27 | 56.25 | 27.50 | 44.50 | 31.38 |
| **Kerala** | 8.50 | 0.57 | 3.75 | 0.44 | 2.51 | 3.45 | 108.75 | 17.40 | 56.00 | 28.33 | 76.67 | 35.63 |
| **Maharashtra** | 8.50 | 0.93 | 4.64 | 0.80 | 0.67 | 4.22 | 102.25 | 26.50 | 75.00 | 44.80 | 42.00 | 46.25 |
| **Madhya Pradesh** | 10.50 | 0.83 | 4.43 | 0.57 | 0.50 | 5.38 | 95.22 | 21.00 | 68.57 | 27.58 | 26.50 | 39.75 |
| **Orissa** | 12.83 | 0.60 | 3.00 | 0.38 | 0.62 | 6.24 | 125.00 | 16.00 | 43.50 | 20.83 | 32.00 | 44.60 |
| **Punjab** | 9.17 | 0.88 | 10.17 | 0.75 | 0.40 | 5.56 | 86.50 | 24.50 | 151.67 | 37.50 | 26.00 | 42.75 |
| **Rajasthan** | 11.29 | 0.50 | 7.65 | 0.50 | 0.41 | 4.50 | 94.67 | 13.61 | 120.00 | 30.00 | 32.00 | 38.67 |
| **Tamil Nadu** | 7.45 | 0.88 | 5.00 | 0.50 | 0.67 | 4.18 | 107.67 | 26.42 | 66.00 | 29.00 | 39.50 | 40.56 |
| **Uttar Pradesh** | 11.13 | 0.88 | 5.33 | 0.50 | 0.54 | 6.33 | 100.00 | 23.38 | 84.00 | 27.75 | 28.50 | 41.57 |
| **West Bengal** | 10.31 | 0.50 | 3.70 | 0.67 | 1.35 | 7.78 | 127.50 | 16.33 | 58.75 | 37.50 | 69.27 | 54.83 |
| **All India (Urban)** | 9.74 | 0.75 | 5.08 | 0.60 | 0.89 | 5.25 | 108.40 | 21.80 | 80.00 | 32.86 | 51.75 | 45.60 |

a Quantities are in Kilograms and values are in Rupees.

**Table A3b: Per Capita Quantity and Expenditure: All India NSS 61stRounda**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Cereal and gram** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** | **Cereal and gram** | **Pulses and Products** | **Milk and Milk Products** | **Edible Oil** | **Meat, Fish and Egg** | **Vegetables** |
| **State** | **Per Capital Quantity** | | | | | | **Per Capita Value** | | | | | |
| **Andhra Pradesh** | 10.000 | 0.688 | 3.750 | 0.565 | 0.520 | 4.313 | 113.50 | 19.33 | 40.00 | 28.75 | 28.60 | 33.88 |
| **Assam** | 12.833 | 0.600 | 2.400 | 0.500 | 1.032 | 7.183 | 143.90 | 17.75 | 42.00 | 29.00 | 61.10 | 54.17 |
| **Bihar** | 13.200 | 0.667 | 4.286 | 0.429 | 0.438 | 7.183 | 120.00 | 16.80 | 60.00 | 24.86 | 23.00 | 38.29 |
| **Gujarat** | 8.875 | 0.833 | 6.429 | 1.000 | 0.400 | 4.650 | 86.00 | 22.33 | 100.80 | 52.00 | 25.00 | 49.17 |
| **Haryana** | 10.000 | 0.571 | 10.000 | 0.500 | 0.500 | 5.214 | 75.00 | 16.00 | 162.50 | 22.50 | 27.14 | 38.50 |
| **Karnataka** | 8.905 | 0.813 | 3.750 | 0.500 | 0.674 | 3.875 | 99.90 | 21.33 | 45.00 | 26.00 | 36.25 | 27.25 |
| **Kerala** | 9.150 | 0.563 | 3.750 | 0.417 | 2.540 | 3.725 | 114.90 | 17.30 | 54.00 | 26.88 | 76.67 | 36.33 |
| **Maharashtra** | 9.200 | 0.889 | 3.750 | 0.750 | 0.532 | 3.867 | 96.25 | 24.38 | 54.00 | 39.00 | 34.50 | 37.10 |
| **Madhya Pradesh** | 11.250 | 0.797 | 3.750 | 0.500 | 0.400 | 4.860 | 91.40 | 18.00 | 50.00 | 22.92 | 20.00 | 33.43 |
| **Orissa** | 13.600 | 0.500 | 2.286 | 0.300 | 0.500 | 6.033 | 118.33 | 13.25 | 30.00 | 17.50 | 22.83 | 39.00 |
| **Punjab** | 9.600 | 0.857 | 10.450 | 0.700 | 0.363 | 5.667 | 80.00 | 23.50 | 144.00 | 36.00 | 24.00 | 41.00 |
| **Rajasthan** | 12.000 | 0.500 | 7.667 | 0.500 | 0.333 | 3.900 | 89.55 | 12.17 | 110.00 | 24.00 | 25.71 | 32.33 |
| **Tamil Nadu** | 7.333 | 0.833 | 4.000 | 0.500 | 0.616 | 4.050 | 97.75 | 24.67 | 50.00 | 27.33 | 36.00 | 38.50 |
| **Uttar Pradesh** | 12.075 | 0.857 | 5.000 | 0.500 | 0.451 | 5.857 | 95.20 | 21.50 | 67.50 | 25.00 | 25.00 | 36.00 |
| **West Bengal** | 11.436 | 0.464 | 2.929 | 0.500 | 1.132 | 7.725 | 128.40 | 13.75 | 42.00 | 30.00 | 53.43 | 48.00 |
| **Total** | 10.650 | 0.700 | 4.500 | 0.500 | 0.809 | 5.150 | 105.14 | 19.00 | 63.00 | 28.00 | 45.71 | 40.00 |
| a Quantities are in Kilograms and values are in Rupees. | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table A4: Per capita quantity and expenditure: Vietnam (VLSS2004)a** | | | | | | | | | | | | |
| **Region** | **Cereals and Cereal Products** | **Peanuts, sesame seeds, beans** | **Milk and Milk Products** | **Edible Oil** | **Meat,Fish and Egg** | **Vegetables** | **Cereals and Cereal Products** | **Peanuts, sesame seeds, beans** | **Milk and Milk Products** | **Edible Oil** | **Meat,Fish and Egg** | **Vegetables** |
|  | **Per Capita Quantity** | | | | | | **Per Capita Value** | | | | | |
| **Rural** | | | | | | | | | | | | |
| **North Vietnam** | 14.67 | 0.13 | 0.25 | 1.52 | 2.28 | 0.75 | 48000.00 | 1250.00 | 3333.33 | 8666.67 | 7916.67 | 3700.00 |
| **Central Vietnam** | 13.67 | 0.11 | 0.25 | 1.10 | 1.54 | 0.50 | 43125.00 | 1166.67 | 3200.00 | 7333.33 | 6357.14 | 2708.33 |
| **South Vietnam** | 12.68 | 0.10 | 0.33 | 1.38 | 1.54 | 0.67 | 43333.33 | 1354.17 | 5433.33 | 9770.83 | 9229.17 | 4683.33 |
| **Total** | 13.98 | 0.12 | 0.25 | 1.35 | 1.83 | 0.63 | 45383.34 | 1250.00 | 3750.00 | 8645.83 | 7733.33 | 3687.50 |
| **Urban** | | | | | | | | | | | | |
| **North Vietnam** | 10.86 | 0.07 | 0.25 | 0.50 | 2.92 | 2.19 | 44208.33 | 900.00 | 5000.00 | 6833.33 | 47777.78 | 9583.33 |
| **Central Vietnam** | 10.91 | 0.08 | 0.25 | 0.67 | 2.27 | 1.23 | 41875.00 | 1000.00 | 4500.00 | 7000.00 | 20750.00 | 6166.67 |
| **South Vietnam** | 9.29 | 0.13 | 0.33 | 1.60 | 2.30 | 1.06 | 40222.22 | 2000.00 | 5333.33 | 23444.5 | 17875.00 | 9145.83 |
| **Total** | 10.46 | 0.08 | 0.30 | 1.00 | 2.54 | 1.39 | 42291.67 | 1250.00 | 5000.00 | 10000 | 23194.45 | 8466.67 |
| **All Vietnam** | | | | | | | | | | | | |
| **North Vietnam** | 13.94 | 0.10 | 0.25 | 1.32 | 2.46 | 0.94 | 47250.00 | 1180.56 | 3611.11 | 8000.00 | 9583.33 | 4500.00 |
| **Central Vietnam** | 13.20 | 0.10 | 0.25 | 1.01 | 1.68 | 0.60 | 42944.44 | 1111.11 | 3428.57 | 7222.22 | 7633.33 | 3333.33 |
| **South Vietnam** | 11.46 | 0.11 | 0.33 | 1.43 | 1.81 | 0.79 | 41944.45 | 1500.00 | 5333.33 | 12500 | 12104.17 | 5722.22 |
| **Total** | 13.18 | 0.10 | 0.27 | 1.29 | 2.03 | 0.78 | 44750.00 | 1250.00 | 4000.00 | 8958.33 | 9833.33 | 4500.00 |

aQuantities are in Kilograms and values are in Dongs.

**Table A5: Unit Price Regressions: India, NSS 61st Rounda**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Food Item | Variable | Coefficient | Std. Err | t-stat | R2 |
| **Cereals and Substitutes** | Per capita Food exp. 30 days | 0.0007\* | 0.0000 | 114.92 | 0.1343 |
|  | Proportion meals outside | 1.2659\* | 0.0683 | 18.55 |  |
|  | Head Age | 0.0013\*\* | 0.0004 | 2.89 |  |
|  | Male household head | -0.063\* | 0.0180 | -3.51 |  |
|  | Household Size | -0.234\* | 0.0037 | -63.29 |  |
|  | Adult Females | -0.0270\*\* | 0.0079 | -3.41 |  |
|  | Adult males | -0.071\* | 0.0068 | -10.42 |  |
| **Pulses and Substitutes** | Per capita Food exp. 30 days | 0.0003\* | 0.0000 | 27.06 | 0.0264 |
|  | Proportion meals outside | 0.3674\* | 0.1295 | 2.84 |  |
|  | Head Age | 0.0018\* | 0.0008 | 2.26 |  |
|  | Male household head | -0.0017 | 0.0315 | -0.05 |  |
|  | Household Size | -0.170\* | 0.0065 | -26.08 |  |
|  | Adult Females | 0.0077 | 0.0140 | 0.55 |  |
|  | Adult males | 0.0147 | 0.0121 | 1.22 |  |
| **Milk and Milk Products** | Per capita Food exp. 30 days | -0.0002\* | 0.0000 | -4.64 | 0.021 |
|  | Proportion meals outside | 1.4601\*\* | 0.5323 | 2.74 |  |
|  | Head Age | -0.0171\* | 0.0037 | -4.6 |  |
|  | Male household head | 0.2921\* | 0.1541 | 1.9 |  |
|  | Household Size | -0.0463 | 0.0310 | -1.49 |  |
|  | Adult Females | 0.0280 | 0.0667 | 0.42 |  |
|  | Adult males | 0.1684\*\* | 0.0571 | 2.95 |  |
| **Edible Oils** | Per capita Food exp. 30 days | 0.0008\* | 0.0000 | 41.61 | 0.0489 |
|  | Proportion meals outside | 0.5652\*\* | 0.2441 | 2.32 |  |
|  | Head Age | 0.0057\* | 0.0015 | 3.86 |  |
|  | Male household head | -0.2365\* | 0.0598 | -3.96 |  |
|  | Household Size | -0.2887\* | 0.0124 | -23.26 |  |
|  | Adult Females | -0.1298\* | 0.0266 | -4.89 |  |
|  | Adult males | -0.1287\* | 0.0230 | -5.6 |  |
| **Meat, Egg and Fish** | Per capita Food exp. 30 days | 0.0040\* | 0.0001 | 52.21 | 0.0462 |
|  | Proportion meals outside | -6.1191\* | 0.9270 | -6.6 |  |
|  | Head Age | 0.0274\* | 0.0059 | 4.64 |  |
|  | Male household head | -1.7084\* | 0.2283 | -7.48 |  |
|  | Household Size | -1.1147\* | 0.0486 | -22.95 |  |
|  | Adult Females | 0.2663\*\* | 0.1005 | 2.65 |  |
|  | Adult males | 0.1717\*\* | 0.0870 | 1.97 |  |
| **Vegetables** | Per capita Food exp. 30 days | 0.0000\* | 0.0000 | 53.8 | 0.0407 |
|  | Proportion meals outside | 0.0146\*\* | 0.0067 | 2.18 |  |
|  | Head Age | 0.0000 | 0.0000 | -0.24 |  |
|  | Male household head | -0.0033\*\* | 0.0017 | -2 |  |
|  | Household Size | -0.0105\* | 0.0003 | -30.23 |  |
|  | Adult Females | 0.0007 | 0.0007 | 0.95 |  |
|  | Adult males | -0.0007 | 0.0006 | -1.16 |  |

\*p<0.01, \*\* p<0.05, \*\*\*p<0.10.

aState and Region dummies have not been reported. Units for all food items are converted to kilograms where possible. For items with food consumption reported in numbers such as eggs and bananas the following conversion has been used. 1 egg (58 grams), 10 bananas (1 kg), 1 orange (150 grams), 1 pineapple (1.5 Kg), Lemons and ginger are not included.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table A6: Unit Value Regressions: Vietnam (VLSS 2004)a** | | | | | | |
| Food item | Variable | Coeff. | Std Err. | t-stat | p-value | R2 |
| **Cereals and Cereal Products** | Per capita Food Expenditure | 0.0002\* | 0 | 4.12 | 0 | 0.02 |
| Proportion of Food Outside | 120.86\* | 20.33 | 5.94 | 0 |  |
| Head Age | 0.01 | 0.35 | 0.02 | 0.99 |  |
| Male household head | -4.24 | 11.01 | -0.39 | 0.7 |  |
| Household size | -21.23\* | 4.32 | -4.91 | 0 |  |
| Adult Females | 2.12 | 7.06 | 0.3 | 0.76 |  |
| Adult Males | 1.46 | 6.2 | 0.24 | 0.81 |  |
| **Peanuts, sesame seeds, beans** | Per capita Food Expenditure | -0.001 | 0.001 | -1.18 | 0.24 | 0.03 |
| Proportion of Food Outside | 714.21\*\*\* | 379.45 | 1.88 | 0.06 |  |
| Head Age | 16.86\*\* | 6.59 | 2.56 | 0.01 |  |
| Male household head | -356.53\*\* | 205.53 | -1.73 | 0.08 |  |
| Household size | 121.94 | 80.66 | 1.51 | 0.13 |  |
| Adult Females | -385.61\* | 131.88 | -2.92 | 0 |  |
| Adult Males | -274.77\* | 115.93 | -2.37 | 0.02 |  |
| **Milk and Milk Products** | Per capita Food Expenditure | 0.009\* | 0.002 | 4.36 | 0 | 0.02 |
| Proportion of Food Outside | 443.78 | 793.72 | 0.56 | 0.58 |  |
| Head Age | -13.14 | 13.8 | -0.95 | 0.34 |  |
| Male household head | -426.48 | 430.47 | -0.99 | 0.32 |  |
| Household size | 441.55\*\* | 168.94 | 2.61 | 0.01 |  |
| Adult Females | -116.31 | 276.01 | -0.42 | 0.67 |  |
| Adult Males | -467.95\*\*\* | 242.35 | -1.93 | 0.05 |  |
| **Oils** | Per capita Food Expenditure | 0.0005 | 0.0008 | 0.62 | 0.54 | 0.01 |
| Proportion of Food Outside | 229.78 | 315.42 | 0.73 | 0.47 |  |
| Head Age | -2.61 | 5.48 | -0.48 | 0.63 |  |
| Male household head | 63.97 | 170.79 | 0.37 | 0.71 |  |
| Household size | -3.42 | 67.23 | -0.05 | 0.96 |  |
| Adult Females | 8.88 | 109.59 | 0.08 | 0.94 |  |
| Adult Males | -42.46 | 96.23 | -0.44 | 0.66 |  |
| **Meat, Egg, Fish** | Per capita Food Expenditure | 0.003\* | 0.001 | 3.34 | 0 | 0.03 |
| Proportion of Food Outside | 97.45 | 359.88 | 0.27 | 0.79 |  |
| Head Age | -12.18\*\* | 6.25 | -1.95 | 0.05 |  |
| Male household head | -412.88\*\* | 194.74 | -2.12 | 0.03 |  |
| Household size | 164.06\*\* | 76.53 | 2.14 | 0.03 |  |
| Adult Females | 6.09 | 124.93 | 0.05 | 0.96 |  |
| Adult Males | -274.31\*\* | 109.67 | -2.5 | 0.01 |  |
| **Vegetables** | Per capita Food Expenditure | 0.0004 | 0.0007 | 0.58 | 0.56 | 0.03 |
| Proportion of Meals Outside | 304.07 | 265.22 | 1.15 | 0.25 |  |
| Head Age | 5.8 | 4.61 | 1.26 | 0.21 |  |
| Male household head | 207.89 | 143.58 | 1.45 | 0.15 |  |
| Household size | -33.95 | 56.38 | -0.6 | 0.55 |  |
| Adult Females | -104.82 | 92.09 | -1.14 | 0.26 |  |
| Adult Males | -4.51 | 80.85 | -0.06 | 0.96 |  |

\*p<0.01, \*\* p<0.05, \*\*\*p<0.10. aRegion and commune dummies are not reported. Units for all food items are converted to kilograms where possible. For items with food consumption reported in numbers such as eggs and bananas, the following conversion has been used. 1 egg (58 grams), 10 bananas (1 kg), 1 orange (150 grams), 1 pineapple (1.5 Kg), Lemons are not included.

1. Examples include Chotikapanich, Valenzuela and Rao, (1997), Milanovic (2002), and Ravallion, Datt, and Van der Walle (1991). [↑](#footnote-ref-1)
2. See World Bank (2008). [↑](#footnote-ref-2)
3. See, for example, Reddy and Pogge (2007)’s critique of the World Bank methodology for fixing national poverty lines denominated in local currencies in cross country poverty comparisons. [↑](#footnote-ref-3)
4. See McKelvey (2011) for recent Indonesian evidence on the ability of unit values and market prices to act as satisfactory proxies of one another. [↑](#footnote-ref-4)
5. The QAIDS expenditure function [eqn. (2)] is inverted to obtain the reference utility level, , required in [eqn.(4)], from the reference per capita household expenditure, . [↑](#footnote-ref-5)
6. See Atella, Menon and Perali (2004) for an alternative methodology for constructing spatial prices in cross sections using the variability of budget shares that do not require quantity information. [↑](#footnote-ref-6)
7. These are the dominant food items that constituted nearly three fourth of total food spending in each country. [↑](#footnote-ref-7)
8. To save space, we have reported the regressions for NSS round 61 and VHLSS 2008 only. Those for NSS 55th round, NSS 66 th round and VLSS 1998, VHLSS 2008 are available on request. [↑](#footnote-ref-8)
9. See, for example, Mishra and Ray (2009). [↑](#footnote-ref-9)
10. Vietnam does not have the equivalent of the large cities and semi urban metropolitan centres that India has and, consequently, the “all Vietnam” figures are closer to those in “rural Vietnam” than in case of India. [↑](#footnote-ref-10)
11. See Mishra and Ray (2009) for evidence on disparity in affluence between the various regions in Vietnam. [↑](#footnote-ref-11)
12. See Rao, Rambaldi and Doran (2010) for the methodology for the PPP rates reported in the website. [↑](#footnote-ref-12)
13. This is separate from the argument of Reddy and Pogge (2007) on whether the $1 a day (or $ 1.25 a day as has been used lately) is an appropriate figure to use as the international poverty line. [↑](#footnote-ref-13)