Measuring Consumption and Price in LSMS Surveys

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1. Reporting periods and their effects on the measurement of consumption

In this section, we examine three LSMS surveys, from Pakistan, South Africa, and Vietnam, and report how different reporting periods affect measures of consumption. The survey instrument for each country is different, so that it is necessary to work through the cases one at a time, discussing in turn the design of the questionnaire, the details of the construction of the consumption measure, and the differences in the measures. Much hinges on the precise details of how the questions are asked. In spite of the differences in the survey, it is possible to come to some general conclusions and recommendations, and these are reported in a final, summary subsection.

1.1 Pakistan Integrated Household Survey 1991

1.1.1 The survey design and consumption questions

The Pakistan Integrated Household Survey (PIHS) collected data on 4,794 rural and urban households in Pakistan between January and December 1991. There were separate questionnaires for males and females, and information on food consumption was collected in Section 12 of the female questionnaire. Consumption data are collected at the second visit to the household, a visit that takes place fourteen days after the first. In practice, there was considerable variation in the time between visits, as can be seen by comparing the dates of the first and second interviews. Twenty-eight percent of households were visited exactly 14 days apart, 55 percent either 14, 15, or 16 days apart. and 90 percent between 11 and 21 days inclusive.

Total consumption is built up from food purchases and gifts (Section 12a), consumption of own-produced food (Section 12b)—each of these sections has detail on some forty food groups —non-food (Section 11), imputed rent, actual rent and utilities (Sections 2 of the Male Questionnaire) and other expenditures, including birth-control expenses (Section 13 of the Female Ques-

tionnaire) and transfers (Section 16 of the Male Questionnaire.) Only some of the consumption items are asked at more than one frequency. Section 12a on food expenditures collects two measures, as does Section 11b on 21 non-daily non-food expenses including clothing, footwear, household equipment and fittings, repairs, transportation, medicine, recreation, personal services, education, and postal articles. Other items of expenditure are reported only once, and are common to the various totals.

The questionnaire on food expenses works as follows. There are 34 commodities which are listed in Table 2 below. For each commodity, the respondent is asked whether, in the last twelve months, "has your household purchased (in cash or in kind) any *xxx* or have you received *xxx* as a gift or payment in-kind?" where *xxx* is each of the commodities in turn. If the answer is no, the interviewer passes on to the next commodity or the next section. In our calculations, these households are code as having zero expenditures; it is helpful to think of them as *never* purchasing the good in question. Respondents who report purchases, gifts, or payment in-kind are asked about purchases in two different ways.

In the first, the respondent is asked whether "Since my last visit, you have purchased any *xxx*," and if so, the *quantity* purchased, the *units* in which that quantity is measured, and the *cost per unit* in rupees. There are eleven different units to choose from: kilos, *maunds*, pieces, bottles, liters, acres, *kanals*, grams, rupees, total amount, and dozens; the use of rupees except "in very specific circumstances" is discouraged in the Field Manual, though we have been unable to discover anything about those special circumstances. Note that, apart from the "total amount" and "rupees" it is not necessary to know the units in order to calculate expenditures; quantities are reported in the same units as cost per unit, so that their product should give expenditures since the

last visit.

The second set of questions concerns "normal" expenditures and is asked of the same respondents. The first question is "How many months each year do you normally purchase *xxx*?" and the second is "How much do you normally spend on *xxx* during one of the months that you purchase *xxx*?"

The two measures of food expenditure are then constructed as follows. For the "last visit" measure, the reported quantity is multiplied by the reported cost per unit, the result divided by the number of days since the last visit, and the answer scaled by 365/12, the number of days per month. This is "monthly expenditures since last visit." The "usual monthly" measure of expenditure is derived by multiplying the reported number of months during which purchases are normally made by the reported normal expenditure in each and dividing by 12. For each household, all such expenditures are summed over the 34 food groups to give the two measures of food expenditure.

The non-food questionnaire (Section 11b) is a good deal simpler. Again there is the preliminary question about whether there were any purchases in the last 12 months. Those who report such purchases are asked whether they have purchased "during the past two weeks, i.e. since my last visit," and if so, how much they have spent. They are then asked how much they have spent on the item in the last twelve months. There is no reference to quantities, to units, or to normal expenditures. Note too the identification of the time since last visit as the "past two weeks," something that it is not literally correct, which does not appear in the food section, and which has the effect of making it unclear whether the reporting period should be assumed to be 14 days or the actual elapsed time since the first interview.

In spite of the differences in the food and non-food sections, we shall combine the last visit

measures of food and non-food, together with the common measures of food, non-food, and other items into a single "last visit" measure of total expenditure. Similarly we combine the "usual month" measure of food expenditures with a twelfth of the "last twelve months" expenditure on non-foods together with the common items to define a "usual month" measure of the total.

1.1.2 Two measures of total expenditure

The two measures of household expenditure per capita (PCE) are compared in Table 1, for the total and for food and non-food separately. There are large differences between the estimates of monthly expenditures in the "last visit" column on the left, and in the "usual month" column on the right. Mean PCE is more than two and a half times larger when estimated from a "last visit" basis than from a "usual month" basis. The differences are much larger for food, where the ratio of means is 3.6, than for non-food, where the ratio is 1.31. In both cases, median expenditures are much closer for the two distributions, 160 rupees versus 155 rupees for food, and 112 versus 105 rupees for non-food. The difference between the two distributions lies predominately in the upper tail, so that the 75th percentiles are much further apart than the 25th or 50th percentiles, and the differences in standard deviations are very large, 1,820 rupees for the "last visit" measure, and only 333 rupees for the "usual month" measure. Similarly, the standard deviations of logarithms, itself a useful measure of inequality, is twice as large for PCE from the last visit measure. Once again, the difference in this measure of spread is much larger for food, 1.30 versus 0.58, compared with 1.08 versus 0.75 for non-food.

Figure 1 shows estimated densities for the distributions of the logarithms of per capita food expenditure, at the top left, per capita non-food expenditure, at the top right, and PCE at the

bottom left. (The hybrid densities in the bottom right figure will be discussed below.) The logarithmic transformation makes the densities more nearly symmetric. As is to be expected from Table 1, the last month measures are considerably more spread out than are the usual measures, and, for food, there is evidence of positive skewness, even after the logarithmic transformation. Indeed, the upper left-hand figure has a suggestion of bimodality, with the second mode located around a logarithm of per capita expenditure of 8.

The differences between the two measures are in the direction that is to be expected. Foods, especially cereals, can be bought for storage, so that in a relatively short period some people will purchase nothing, while others, who are "stocking-up" may purchase a great deal. So the shorter the reporting period, the more variance there will be. "Normal" expenditures are likely to be further smoothed by the respondent, who may eliminate large purchases, even if made regularly, and who may report something close to actual consumption of the item. Nevertheless, the results in Table 1 and Figure 1 are troubling in a number of respects. First, in a large enough sample and with many goods, we would expect mean expenditures to be roughly the same if the only differences came from frequency of purchase effects. The means here are far from the same. Second, food is typically bought more frequently than the non-food items, several of which are quite lumpy, so that the biggest differences between the distributions should be in non-food, not food as is the case here. Third, the non-normality of the distribution of the logarithm of food expenditures, and in particular the hint of a second mode, suggests the possibility of contamination, or at the least, problems that come from measurement error rather than reality. Fourth, the effects of the reporting period are much larger than those that we shall encounter for the other countries, as well as those in the literature. Of course, the survey instruments are not identical, and the large

effects here may be a feature of the unique design, an explanation that could be correct whether or not measurement error is a substantial problem.

Before going on to a more detailed investigation of the results from the PIHS, it is worth considering what would be the effects of the differences in the distributions if they were taken at face value. For inequality measures, the consequences are clear, and the effects of the reporting period are large relative to any of the real differences in inequality that we are used to. Table 1 shows that the two PCE distributions have the gini coefficients are 0.675 and 0.350, a range that effectively spans all known gini coefficients. In this particular case, measures of poverty are less affected because, as shown in Figure 2, the two cumulative distribution functions cross a little above the 30th percentile, which is in the vicinity of reasonable poverty lines for Pakistan.

1.1.3 A detailed look at responses to the food questionnaire

Tables 2 through 5 report some of the responses from Section 12a of the questionnaire. Purchase frequencies for the 34 commodities are reported in Table 2. In the first column, we tabulate the percentage of sample (not weighted) households who reported any purchase in the last year; the fraction of households reporting such purchases varies from less than two percent for baby formula, milk powder, canned foods, and coffee through to more than 90 percent for dal, refined sugar, vegetables, and tea. The second column reports the percentage of sample households who report a purchase since the last visit, conditional on reporting a purchase in the last year. Once again, these numbers look sensible. There is less variation than in column 1, although there is a good deal of correlation between column 1 and column 2. This is what we should expect; foods like dal or vegetables are bought by nearly all households on a frequent basis. Where the two per-

centages differ, there are good reasons. For example, a third of households never buy fresh milk, but the other two thirds buy it frequently. Mangos and other fruits are seasonal, and so are bought by a large fraction of households at some point during the year, but by only a small fraction in the last two weeks. The third and fourth columns show the average numbers of months in which the food is usually purchased, split up into households who have bought in the last two weeks and households who have bought in the last year but not in the last two weeks. The former is always larger than the latter, and the difference is least for the most frequently purchased goods. Again this is sensible, though it implies heterogeneity of purchase frequency in the population of buyers; some buy more often than others, and those are more likely to show up as purchasers in the time between interviews.

We have no way of objectively assessing the reliability of these data, but there is nothing in this table that is hard to interpret.

Table 3 takes up a number of other issues. The results in the first three columns use the information on purchases since last visit to calculate household averages of monthly expenditures. All three averages are computed over households that report purchases in the last year, and start from the reported quantities and reported costs per unit. Households that say they purchase in the last year but not since the last visit are recorded as making zero purchases, and are included in the averages. Households that report no purchases in the last year are excluded altogether, so that the first three columns are calculated conditional on purchasing some of the good in the last year. For the numbers in the first column, monthly expenditures are calculated by multiplying the reported quantity in physical units by the reported cost per unit to get an expenditure since the last visit, and then converting to monthly rates by dividing by the number of days since the last visit and

multiplying by the ratio of 365 to 12. Extreme outliers in cost per unit are excluded by removing those cases where the cost per unit is more than three standard deviations from the mean cost per unit for each choice of units (kilos, grams, maunds, etc.) When the unit is listed as "total amount" or "rupees" the reported "quantity" is treated as an expenditure. In the second column, the calculations are the same, except that we assume that the expenditures since the last visit relate to the last 14 days, so that instead of using the actual time since the last visit to convert expenditures to a daily basis, we divide by 14 before multiplying by 365 over 12. The third column repeats the calculations in the first column, but with a different treatment of costs per unit. After removing the outlying values of cost per unit, the reported cost per unit is replaced by the median cost per unit for each village (cluster) and type of unit. This is designed to remove outliers more comprehensively than is accomplished by the three standard deviation rule, and is justified by the assumption that prices within each survey cluster should be much the same across households.

The alternative treatment of prices and of reporting periods has an effect on the results, at least for some of the foods, but the effect is swamped by the differences between the first three columns on the one hand, and the fourth column on the other. The fourth column is the average of usual monthly expenditures computed as one twelfth of the number of months during which purchases are usually made multiplied by the amount normally spent in such months. Except for a few cases—wheat flour, melons, bananas, mangos, and chapatis—the average of monthly expenditures reported since the last visit are larger than the average of monthly expenditures reported as normal. The differences are reported in column 9 and are occasionally *very* large—tea, milk powder and canned foods have differences of more than 500 rupees per month. Because some of these —milk powder and canned foods, for example—are only ever purchased by a few households

(see Table 2, column 1), the effects on average expenditures over all households are not necessarily large. But tea is bought by 93 percent of households, so that tea alone accounts for a nearly 3,000 rupee difference between average monthly expenditures on a last visit versus usual month basis. Although no other food has so large an effect, the numbers for poultry, beef, mutton are also large, as are those for gram, dal, groundnuts, vegetable oils, ghee, milk, yoghurt, and fish.

Although it might be possible to argue the case for the other goods, it is clear that the last visit estimates for tea are invalid. Further investigation shows that the problems lie in the reported costs per unit, and in some sort of confusion in administering the questionnaire. Tables 4 and 5 list the most extreme cases, for poultry in Table 4, and for tea in Table 5. For chicken, the first column lists the reported quantities purchased since the last visit, in the units reported in the last column; in most cases these are grams, but there is one case in the table of "pieces"and four cases of kilos. The reported costs per unit are in the second column, and the comparable normal monthly expenditure in months when bought is reported in the third column. These are individual cases where the quantity purchased since last visit times unit cost is more than 10 times greater than the normal monthly expenditure. In the case of tea in Table 5, we show cases where reported expenditures since last visit are at least 400 times larger than usual monthly expenditures. In both cases, it is clear that whatever are the true units, they are not as reported. Even in these extreme cases, the reported physical amounts are typically reasonable relative to the reported units; 500 grams of chicken or 800 grams of tea are plausible purchases in the last two weeks. But the cost per gram is clearly not as reported here; in some cases it looks as if what is recorded as a unit cost is in fact the amount spent and in others the amount usually spent, so that the product of quantity and price is the something like the square of what it ought to be. Unfortunately, there does not appear to be

in any general rule that can be used to correct the data. There are large numbers (not shown in the tables) of cases where the price per unit looks appropriate, large number of cases where it is clearly not, and a large number of cases where it might or might not be correct. We can think of no mechanical way of programming a correction, and without it, the data on purchases of food since last visit are unusable.

1.1.4 Expenditures since last visit and the time since last visit

The last four columns of Table 3 investigate another issue, the effect of the time since last visit on the reported expenditure since the last visit. It is reasonable to suppose that the time between the interviewer's visits should be independent of the true rate of daily expenditure, so that any relationship with responses is a feature of the design and not of reality. If there is a relationship in practice, it could come from an effect of the reporting period on what people can remember. Some studies show that the reported rate of consumption falls with the length of the reporting period, and experiments by Scott and Amenuvegbe (1990) with households in the Ghanaian LSS showed that, for 13 frequently purchased items, reported expenditures fell on average by 2.9 percent for each day added to the recall period. The results in the last two columns of Table 3 are consistent with such effects, at least for some goods. The coefficients are negative for 30 of the 34 foods, and have *t*-values in excess of two in 13 of the cases. For the totals shown in Table 1, the last visit measure of per capita total household expenditure declines by 1.6 percent (*t*-value is 3.6) for every extra day of time between interviews; for food the decline is 2.5 percent per day (4.8) and for non-food. it is 0.9 percent per day (2.2).

However, there are other interpretations of these results. As we have seen, there are problems

with units of measurement for at least some of these commodities. Because we do not understand the precise nature of these problems, we have no reason to link them with the number of days between visits, but some of the largest negative coefficients in the penultimate column are for the same goods where there are clear problems with the units. Secondly, there is some ambiguity in the survey questions. In Section 12 on food purchases, which is the relevant section of the questionnaire, respondents are asked about amounts purchased "since my last visit," but in Section 11 on non-food purchases, the corresponding question is "During the past two weeks, i.e. since my last visit," so that it is unclear in either section what the response means when the time since last visit is different from 14 days. (The interviewer instructions emphasize time since last visit as the reference period, and make it clear that this is only approximately 14 days, but this may or may not have been emphasized in practice.) If we assume that respondents are remembering the last 14 days and not the time since the last visit, we need not correct the reported purchases for time since last visit, but only convert them to a monthly basis. The regression coefficients in the fourth and third last columns in Table 3 show that, by and large, there is little relationship between this measure of expenditure and the number of days between visit, which is what we would expect on the 14 day interpretation.

Note finally that there are possible recording errors in the dates of the interviews and thus in the number of days between visits. Since the rate of expenditure involves dividing by the number of days, measurement error will induce a downward "division" bias in the relationship between expenditures and days. Bias from this source should be the same percentage for all goods, which is not obviously incorrect, although once again matters are obscured by the contamination.

1.1.5 Non-food expenditures

The questionnaire also has two reporting periods for a subset of non-food expenditures. Section 11b asks respondents whether they have spent anything on the commodity in the last 12 months, and if so, how much, as well as whether and how much they have spent in the last two weeks or since the last visit, depending on how we interpret the question. For non-foods, there is no attempt to collect information on quantities or on units, which makes matters a good deal simpler and avoids the problems that we have identified in the food categories. Perhaps as a result, and as we have seen in Table 1, monthly non-food expenditures on a last visit basis differ less from those on an annual basis than is the case for food expenditures. Even so, Table 6 shows that there are some marked differences for individual commodities, and once again that mean expenditures on a last visit basis are typically larger than on a usual month basis, where here usual month is interpreted as one twelfth of annual expenditures. Although there is nothing as severe as the problems with tea in Table 3, there are large differences for clothing and medicine, and a large negative difference for education and professional services. If the underlying distribution of expenditures is positively skewed, so will be the sampling distribution and more so the shorter the reference period, so that we should expect the last visit mean to exceed the annual mean. Without further information, it is hard to know whether the differences in the Table are too large to attribute to this relatively innocuous cause, or whether there is a problem. If the latter, an obvious possibility is that people are more likely to forget purchases that were made the longer the elapsed time since they were made.

The final two columns of Table 6 repeat the regressions of expenditure rates on time since last visit. Once again, the coefficients are predominately negative, and often significantly so, and once

again, we cannot be sure of the cause although the findings are consistent with progressive recall failure as the recall period lengthens.

Although the monthly rate of non-food expenditures from the last year is less dispersed than non-food expenditures over (approximately) the past two weeks, the behavior of total expenditure is dominated by its food component. This can be seen by computing a hybrid measure of food and non-food by adding the usual month food expenditures—the only valid measure that we have for this survey—with monthly expenditures on non-food calculated from the last visit report. The estimated densities for this and for the pure usual month total are shown in the bottom right panel of Figure 1. The two densities are quite similar, and the differences are unlikely to be important for welfare measurement.

1.2 South African Project for Statistics on Living Standards and Development, 1993

1.2.1 The survey design and consumption questions

The South African survey collected data from 9,000 households in the last few months of 1993, before the transition to the Mandela government, but very much in anticipation of the elections the following spring. Although the survey was based on LSMS protocols, it was constrained in various ways, not least by short interview times and by the decision to interview households only once. The food questionnaire, Section 3, has only a single reporting period, the last month, so that it is not possible to make the same sort of comparisons as in Pakistan, with the limited exceptions noted below. The non-food questionnaire, Section 4, has four subsections, on regular non-food spending, on occasional non-food spending, on a summary of food and non-food spending, and on household durables. The last is a list of durables owned, the first refers to expenditure in the last

month, and the second to expenditure in the last year. However, the summary section 4.3 asks for expenditures for up to three frequencies, expenditure in the last month, usual monthly expenditure, and expenditure in the last year. There are nine categories in this questionnaire, for four of which (groceries, food eaten out, cars and other vehicles including hire purchase agreements, and payments to domestic servants and gardeners) we have the actual and usual monthly expenditures, for another four of which (furniture including hire purchase agreements, clothing, insurance, and saving contributions) we have all three measures, and for one of which (holidays), we have only a single annual measure.

Table 7 reports the results for the eight categories where we have multiple response periods. The first column shows how many of the 8,850 households in the survey reported any expenditures at any frequency, the number who reported identical amounts for last month and a "usual month," and for the cases where we have annual measures, the number of households who reported an expenditure for last year that was twelve times their reported usual monthly expenditure. The rest of the table reports summary statistics for the different distributions; the mean, the 25th, 50th and 75th percentiles, and the standard deviation.

In contrast to the Pakistani case, the most obvious feature of this table is the similarity across the distributions; the reporting period does not seem to have very much effect. Substantial fractions of households gave identical answers to the "last month" and "usual month" questions, even for items like "food taken out" that are reported in any form only by about a fifth of household. For vehicles, this at first seems surprising, but note that regular hire purchase payments are included in the response, are likely to be the same from month to month. For clothing, but not for furniture, insurance, or saving, nearly all of the overlap between actual and usual month expendit-

ures come from households that report buying nothing at either frequency. Such households would not appear for the first four categories in the table. For insurance and saving, where there are regular monthly contributions, most households report that last month's payment is the usual monthly payment, and that last year's expenditure is twelve times the usual monthly payment.

The distributions of expenditures between last month and usual month are almost identical for the first four categories. (The divergence in the means and standard deviation for vehicles comes from a single outlier that could reasonably be eliminated.) For the last two categories, insurance and saving, where we are dealing with regular monthly payments, the three distributions are also very close. The only cases where there are real differences are for the durable or semi-durable categories furniture and clothing. For furniture, there are many more zeros among last month and usual month reports than among reported expenditures for the last year. Apart from a few large records that disappear in the usual month reports, the distributions of usual month and last month are very similar. For clothing, the difference in zero reports between monthly and annual bases is even more pronounced, but here the three distributions are quite different from one another. While it is not clear exactly what accounts for these differences, it is clear that, for durable or infrequently purchased goods, a question about usual monthly purchases is not a good substitute for a question about purchases over the last year. A "usual month" is more likely to be interpreted as a modal month than an average month.

1.3 Vietnam Living Standards Survey 1992–93.

1.3.1 The survey design and consumption questions

The Vietnam survey is essentially a full living standards survey, so that the questionnaire is more

similar to that for Pakistan than for South Africa. Questions about food consumption are contained in Section 11, which has two sections, one for special, holiday expenses, which asks questions about consumption "in Tet and in holiday occasions during the past 12 months," and one concerning normal expenses. Only the latter has multiple reference periods. For 45 food categories, respondents are asked if "during the last 12 months, have any members of your household consumed any, either by purchasing, obtaining by barter or consuming it from household production." Those who give an affirmative reply are asked whether they have bought any since the last visit, and if so, how much, and then in how many months the last 12 months they have purchased, how often they usual bought in such months, and the quantity and value of those usual purchases. Respondents are not asked for quantities and costs per unit since last visit, but only for expenditures, so that the problems with units in the Pakistani survey do not occur. The usual month measures can be used to calculate a "usual" price, but the expenditure is reported directly and is not calculated. As for Pakistan, expenditures since last visit are converted to monthly rates by dividing by the number of days since the last visit, and then multiplied by the ratio of 365 to 12. As for Pakistan, there is some variability in the number of days since last visit, but it is much less. For 72 percent of households, the time between visits is exactly 14 days, and for 94 percent the time is 13, 14 or 15 days.

Expenditures on non-foods are reported in Section 12 of the questionnaire, daily expenses in Section 12A, annual expenses in Section 12B, inventories of durable goods in Section 12C, and remittances out of the household in Section 12D. Annual expenses are gathered at two frequencies, expenditures since the last visit, and expenditures in the last year. In the totals shown below, we combine the two last visit measures and the usual month measure for food with one twelfth of

annual expenditures for non-food, and add to each the various other expenditures that are reported at only a single frequency. Because households in Vietnam are typically very poor, food shares are high, and non-food expenditures are only about ten percent of food expenditures. There are also very few households in the survey that report any expenditures on utilities or rent, so that while a complete accounting of household consumption would require the inclusion of these items, as well as of imputed rents and the user cost of durable goods, we ignore them in the present exercise. For the issue of reporting periods, it is only for the food and non-food items that there is an issue; in the following analysis, we devote most attention to the former because of its overwhelming importance.

1.3.2 Measures of total expenditure

Table 8 presents summary statistics of per capita total household expenditure (excluding housing and utilities) for the last visit and usual month measures, for the total, and for the food and non-food components separately. For the total, and for food, which is 90 percent of the total, the two sets of numbers are extremely close. As we might expect, the usual month measure is less dispersed, but the difference is small; the standard deviations are 220 versus 227, the standard deviation of logs is 0.71 as opposed to 0.75, and the gini coefficient 0.364 versus 0.385. The two measures of non-food expenditures differ by rather more, but note that the means, medians, and first and third quartiles are not very different. The differences in the standard deviations are a good deal larger, and are generated by six "outliers" in the last month measures; these could be errors, or genuine observations. There is some lumpiness in these non-foods, and we would generally prefer the usual month measure for this reason.

Figure 3 shows the density estimates corresponding to the three panels in Table 8. The food and total densities are almost indistinguishable by reporting period, and although the two non-food densities are different, they make little difference to the total. Figure 4 shows a section of the two cumulatives between the second and fifth deciles. Although the last visit measure will typically show more poverty than the usual month measure, the differences are of no importance for the welfare calculations in which we are interested.

1.3.3 Details of the food and non-food questionnaires

Table 9 presents results from the food questionnaire (Section 11B) for the 45 food categories in the survey. The first column shows the fraction of sample (not population) households buying in the last year followed by, in the second column, the fractions of those who have bought since the last visit. The next two columns show the numbers of months in which the food is bought, conditional on not having bought since the last visit, in column three, and conditional on having bought in column four. All four of these columns look sensible, and none suggests any problem with the interpretation of the questions.

Columns five and six show two monthly expenditure rates based on the last visit questions. Column five uses the actual number of days since last visit, on the supposition that people answer what is asked, expenditures since last visit, while column 6 assumes that the reference period is 14 days, however many days have actually expired. Because the time since the last visit is so closely dispersed around 14 actual days, these two columns do not differ in any important respect. Column 7 shows the mean value of usual month expenditures, and there are some differences from the mean last visit measures in Column 5. In 18 cases out of 45, the usual month measure is

larger than the last visit measure, and these cases include the cases where the differences are largest, "ordinary" rice and food and drinks taken away from home. Nevertheless, over all 45 categories, the positive differences come close to canceling these in total, so that the sum of the last column, where the differences are taken over all households including those that make no purchases at all, is only −0.09 thousand dongs a month.

Table 9 does not report the effects of time between visits on the amount reported, essentially because the results are much less clear (and thus much less of a problem) than in Pakistan. For the totals in Table 8, expenditure per capita in total, for food, or for non-food, regressions on time since last visit show no significant effects, either in level or in logs, and whether or not we divide by time since last visit or by 14 days to obtain the daily rate. For some of the detailed categories in Table 9, the regressions show a significant correlation—for example, the regression of monthly expenditure on ordinary rice on time since last visit has a coefficient of −7.4 with a t-value of −6.4, so that, for this important commodity, reported expenditures since the last visit do not increase with the length of time since that visit—but there are other foods where the effect goes in the other direction, and for the vast majority of categories, there is no apparent effect of any kind.

In spite of their unimportance in the totals but for completeness, Table 10 reports the same detail for the non-food categories. Many of the items shown are purchases of durable goods that would not be included in the usual consumption-based welfare measures, but are shown nevertheless. For most of these goods, the mean of the last visit measure is larger than the annual measure, although there are important exceptions such as clothing material, and among the durable categories, building materials, though home repair is a case where the annual measure is a good deal larger than the last visit measure. The same is true for weddings and other ceremonies and for

gifts and transfers out of the household. Expenditures on weddings and ceremonies are one of the largest non-food items in Vietnam. Note also that 40 percent of households report funeral expenditures in the last 12 months.

1.4 Summary, conclusions, and recommendations

The mass of evidence in these three surveys would benefit from a more formal analysis using a model of purchase frequency and purchase amount. However, our main purpose here has been to examine whether conclusions about poverty and inequality are likely to be much affected by the choice of reporting period, and to make recommendations about practices on reporting periods for future Living Standards Surveys.

For food expenditures, our three examples yield only a single observation, that for Vietnam. The Pakistani data from the last visit are not usable, and the South African survey had only a single recall period for food. The Vietnamese data show that it matters hardly at all what is the response period for food; no substantial conclusion would be affected by using last visit or usual month approaches. For those non-foods where data are collected for two frequencies, last visit and last year—and here we have some evidence from all three countries—the results are as expected, the estimates computed from one twelfth of last year are less dispersed than those based on the last visit. For some non-foods, there is evidence from Pakistan, Vietnam and South Africa of lower means from the annual measures—consistent with progressive forgetting—but the effects are not uniform across commodities. The broad summary categories in the South African data yield very similar results for usual month and last month. Because non-food expenditures are typically smaller than food expenditures, and because there are foods, non-foods, and other items

that are collected at only a single frequency, our results across the three surveys are consistent with other evidence in the literature that reporting periods are not a major issue in computing overall poverty or inequality measures.

Is it worth continuing to collect more than one measure? A case can be made for abandoning whichever is the more time-consuming of the food questions, presumably the usual month questions, of which there are more. For non-foods, where some of the commodities have durable elements and are not purchased very frequently, there is a stronger theoretical case for usual month, or last year measures. That case would be weakened by strong evidence of progressive memory loss, but the evidence here is hardly strong enough to cause us to abandon the intuitively superior measure. If so, the case for keeping multiple measures comes down to one of insurance. It is hard to imagine a more central element in welfare measurement than data on food consumption. Had the Pakistan survey not collected usual month data on food, that section of the questionnaire would have been unusable, and we should have been left without an adequate welfare measure of any sort.

There are a number of other lessons from the results. There are potential difficulties with measuring units for quantities. It is not clear whether the Pakistan problems are specific to that survey, or more general. Living Standards Surveys have typically not attempted to collect quantity information on food items, although in the first surveys, in Côte d'Ivoire, there were serious problems with units on the farm production side. The South African food questionnaire adopted the extraordinary device of allowing respondents to specify their purchases in either quantities or expenditures (but not both), so that prices from the community questionnaire had to be used to construct expenditure totals. It is not clear how well this worked, or whether it is possible to get internal

cross-checks. However, it should be noted that quantity information on food purchases is a regular feature of the Indian NSS surveys (also of the standard Pakistani surveys and of the Indonesian SUSENAS surveys), and the prices from the NSS data are a close match with price information from other sources. So there is nothing inherently impossible about collecting such data, and such information on prices is inherently valuable in studying policy and behavioral responses. We shall return to this topic in the next section.

Another cause for concern is the (in Pakistan more than) occasional relationship between monthly totals based on purchases since last visit. One obvious recommendation is that it be made clear in the questionnaires whether the reporting period is two weeks or the time since last visit. But there are multiple interpretations of our results, that our inferences about the time between visits are noisy, that people tend to forget purchases the longer ago they were made, or that people are confused about the question itself. This is an issue that would repay further study.

2. Measuring prices

As we have seen in Section 1, the consumption questionnaires for the Pakistani and Vietnamese surveys either report the unit cost of purchases directly (Pakistan) or permit its calculation by dividing a reported expenditure by a reported quantity (Vietnam.) For both of these surveys, there was also a community or price questionnaire that was used to collect information on prices at the cluster level so that it is possible to compare the two measures. It is not entirely clear how close the correspondence ought to be. Unit costs are not market prices; commodities are hardly ever perfectly homogeneous so that different households can buy different qualities and pay more or less per kilogram. Nor is it always the case that each cluster consists of a few houses with a single

shop or market. There can be a wide range of prices within the cluster, and there is nothing that prevents respondents from reporting purchases that were made outside the cluster in which they live. Nevertheless, the two sets of numbers can provide at least a rough cross check. Finally, it is not always possible to match the commodities from the consumption questionnaire, where respondents usually report expenditures on a commodity group over a period of time, and those in the price questionnaire, where the price is typically the price that would be paid for a single transaction.

2.1 Pakistan

We have already discussed in Section 1.1.1 the reporting of unit costs in the consumption questionnaire. Direct measurement of prices was handled as one section of the community questionnaire. For each cluster or primary sampling unit (psu) in the survey, the interviewers were instructed to obtain two sets of prices for a list of goods, 26 foods and 11 non-foods, one from a local shopkeeper, and one from shopkeepers in the *mandi* (large market) located nearest to the community. For eleven of the foods, or for ten when tea is excluded, there is a sufficiently close match to allow comparison, and the results are summarized in Table 11.

The table reports results separately for the four provinces of Pakistan, Punjab, Sindh, Baluchistan, and the Frontier Provinces. The first four columns list four measures of each price. For each psu, we compute the mean of the reported unit costs. The first column is the average of these means, the second is their median over all psu's, the third is the average price of the item obtained from the local shop, and the fourth is the average price of the item from the nearest *mandi*. The last three columns report correlation coefficients, calculated over all psu's in each province,

between the unit cost and local shop measures, between the unit cost and the *mandi* price, and between the two shop prices. Over provinces, the three measures are very similar, particularly if we limit the effects of outliers by using the median of unit costs. As is to be expected, *mandi* prices are usually lower than local prices, with most exceptions in the NWFP. But for a broad-brush measurement of price, it would not be of great importance which measure was used. Even so, there is a good deal of difference in the detail. Local shop prices and *mandi* prices are highly correlated, but the inter-cluster variation in unit costs is not always well-correlated with the variation in the two prices, and in a scattering of cases, the correlations are even negative.

Figure 5 shows the scatter diagrams for four "representative" commodities, basmati rice, dalda (vegetable oil), eggs, and fish. Mandi shop prices are measured on the horizontal axes, and the corresponding local shop prices and unit costs are plotted on the vertical axes with circles representing the former and crosses the latter. 45-degree lines are also shown. In all of these graphs, the unit costs are more dispersed than are either of the prices, and for basmati and dalda, there are several extreme observations. These could come from mistaken units or other recording errors—which is entirely plausible given the discussion in 1.1.3 above, but some of the dispersion undoubtedly reflects the fact that unit costs are conceptually distinct from prices. Given these different possibilities, it is difficult to know, even in the apparent absence of extreme outliers, as in the case of eggs, whether or not the scatter is larger than would reasonably be expected.

2.2 Vietnam

The Vietnam results are similar to those for Pakistan, in spite of the differences in methodology. The consumption questionnaire yields "usual month" reports of both expenditures and quantities,

and does so both for market purchases and for home produced items. For the latter, respondents are asked the quantity that they produced, and its value if it been bought in the market; this appears to elicit a "buying" rather than a "selling" price for these producer households. The price questionnaire, which was administered only in rural clusters, gives three distinct price measurements, each obtained by pricing a commodity in the local market. These three prices are usually very close to one another, so that we work here with their mean. There are 16 food items where we can closely match the two questionnaires.

The first and second columns of Table 12 reports the average unit costs for purchases and the market equivalent unit values for home production, in each case averaged over clusters. The latter is lower than the former for all these goods, so that either home production is of lower quality, or respondents report selling prices. The third column is the average of the mean price per cluster from the price questionnaire. The fourth, fifth and sixth columns report correlation coefficients between the three sets of price. In this case, it is the unit cost and unit value from the consumption questionnaire that are most highly correlated, though the coefficients vary from 0.11 (mangoes) to 0.91 (noodles.) As for Pakistan, there is correlation but also considerable variation between the unit costs (or values) and the direct measures of price. Figure 6 shows the scatters for (ordinary) rice, pork, cabbage, and mangoes. These do not show the outliers that we saw in the previous figure for Pakistan, but there is far from being a perfect relationship. Once again, in the absence of a model of the differences, it is hard to know how to interpret this evidence.

Table 1: Per capita household expenditures for two recall periods, Pakistan
(rupees per month)

	Monthly expenditures based on expenditures since last visit	Usual monthly expenditures
Per capita total household expenditure		
mean	850	334
median	321	269
25th percentile	180	186
75th percentile	723	388
interquartile range	543	202
standard deviation	1820	333
s.d. of logarithms	1.14	0.60
gini coefficient	0.675	0.350
Per capita food expenditure		
mean	646	178
median	160	155
25th percentile	94	109
75th percentile	329	217
interquartile range	235	108
standard deviation	1743	148
s.d. of logarithms	1.30	0.58
Per capita non-food expenditure		
mean	205	156
median	112	105
25th percentile	50	66
75th percentile	229	173
interquartile range	179	107
standard deviation	379	249
s.d. of logarithms	1.08	0.75

Note: Monthly expenditures since last visit are calculated from amount spent since last visit divided by the number of days since last visit multiplied by 365/12. Food includes the value of own-produced food. Non-food is the sum of clothing, footwear, personal effects, kitchen equipment, household textiles, furniture, and fittings, public transportation, health expenditures, recreation and travel, personal services, education, statioary, books, postal articles, rent, utilities, and other miscellaneous expenses. It excludes purchases of major durable goods, as well as home improvements and additions, housing and property taxes, purchases of land or buildings, death, birth, and marriage expenses, dowries, legal expenses, and cash losses. All statistics are calculated from household data with each household weighted by its sampling weight multiplied by the number of people in the household.

Table 2: Reported frequencies of purchase for various foods, Pakistan

(percentages of sample households or numbers of months)

commodity	buy in last year	buy since last visit	usual months if bought since last visit	usual months if not bought since visit	commodity	buy in last year	buy since last visit	usual months if bought since last visit	usual months if not bought since visit
wheat grain	26.9	29.1	9.8	5.9	gur	26.2	52.5	11.1	8.1
wheat flour	58.8	68.1	11.6	10.2	mutton, lamb, & goat	52.0	56.2	11.6	6.9
maize	7.6	19.8	7.2	4.7	beef & buffalo	78.4	75.8	11.7	8.9
jowar/bajra	1.6	27.2	7.3	5.1	poultry	51.2	28.5	10.2	6.4
basmati	55.8	54.5	11.3	8.2	eggs	58.7	38.1	9.4	5.8
coarse rice	51.9	66.9	11.5	9.3	fish	39.6	34.2	9.7	4.7
other grains	24.6	36.4	11.2	9.4	vegetables	92.7	95.6	11.9	10.1
gram	58.2	54.7	11.5	9.0	melon	72.4	13.2	4.4	3.0
dal	91.5	82.9	11.8	11.4	bananas	74.4	25.3	7.9	4.7
groundnuts	46.4	10.9	6.6	3.7	citrus fruits	77.7	23.9	5.3	4.0
vegetable oil	86.4	76.8	11.9	11.5	mango	79.2	18.6	3.9	3.2
ghee	26.8	41.6	10.1	6.5	other fruit	63.8	35.7	8.3	6.4
fresh milk	65.8	92.9	11.7	6.4	canned foods	1.9	23.4	8.9	7.2
yoghurt	31.7	40.3	9.2	6.3	bottled beverages	61.5	31.6	5.5	4.5
milk powder	1.6	28.8	12	10.8	chapati, nan & other breads	13.9	58.5	11.0	8.4
baby formula	0.9	42.6	10.2	9.6	tea	92.7	60.3	11.8	11.0
sugar (refined)	93.7	81.5	11.9	11.4	coffee	1.9	18.3	9.6	5.5

Note: Averages are computed over sample households and are not weighted to represent the population of either households or persons. Col.1 is the percent of households reporting a purchase in the last 12 months, Col.2 the percentage of those who have purchased since the last visit, Col. 3 the average number of months the food is normally purchased for those who report a purchase since the last visit, and Col.4 the same average over those who report not purchasing since the last visit of the interviewer.

Table 3: Alternative measures of monthly food expenditure, detail.

(rupees per month)

commodity	monthy expenditure from last visit	monthly expenditure from last visit (14 days)	monthly expenditure from last visit (median prices)	usual monthly expenditures	col 2 minus col 5	col 2 minus col 5 × fraction purchasing in last year	regression of last visit expenditure (14 days) on time since visit		regression of last visit expenditure on time since last visit	
wheat grain	231	231	224	171	60	16.1	-2.8	(0.3)	-27.7	(2.8)
wheat flour	212	233	210	236	-24	-14.1	2.7	(0.6)	-8.6	(2.1)
maize	52	60	52	34	18	1.4	-0.1	(0.0)	-0.7	(0.1)
jowar/bajra	87	90	87	53	36	0.6	-1.1	(0.1)	-3.0	(0.2)
basmati	76	85	74	59	17	9.5	2.7	(0.5)	-1.6	(0.3)
coarse rice	55	53	54	47	8	4.2	0.4	(0.3)	-11.1	(4.9)
other grains	52	53	58	24	28	6.9	-4.5	(1.2)	-5.8	(1.5)
gram	124	125	125	17	107	62.2	-8.0	(1.7)	-16.4	(3.5)
dal	127	137	124	47	80	73.2	-3.6	(1.0)	-10.7	(3.0)
groundnuts	102	104	102	11	91	42.2	-8.2	(1.0)	-10.5	(1.3)
vegetable oils	161	189	163	128	33	28.5	5.5	(0.8)	-6.4	(1.1)
ghee	262	299	253	75	187	50.1	32.3	(1.3)	10.9	(0.5)
fresh milk	271	290	268	234	37	24.3	-5.6	(0.4)	-16.7	(1.2)
yoghurt	123	126	125	27	96	30.4	-9.0	(1.1)	-15.4	(1.8)
milk powder	1143	1208	1143	185	958	15.3	-93.0	(0.5)	-88.8	(0.5)
baby formula	618	918	618	196	422	3.8	104.5	(1.0)	37.9	(0.5)
sugar (refined)	105	132	106	104	1	0.9	1.9	(2.1)	-6.2	(6.8)
gur	68	73	69	41	27	7.1	-0.1	(0.0)	-5.1	(1.8)
mutton	365	395	366	112	253	131.6	-17.2	(1.2)	-46.1	(3.0)
beef	220	255	223	99	121	94.9	-12.1	(1.6)	-26.0	(3.5)
poultry	270	260	269	45	225	115.2	-27.8	(1.4)	-39.8	(1.9)
eggs	29	33	30	23	6	3.5	0.3	(0.1)	-1.4	(0.6)
fish	189	222	181	52	137	54.2	-25.3	(2.6)	-44.5	(3.8)
vegetables	140	151	135	156	-16	-14.8	0.6	(0.6)	-7.4	(8.3)
melon	36	32	27	10	26	18.8	-6.6	(1.1)	-7.8	(1.3)
bananas	12	15	12	15	-3	-2.2	0.7	(2.2)	-0.2	(0.9)
citrus fruit	18	21	18	16	2	1.6	3.2	(2.4)	0.6	(0.6)
mango	15	17	16	19	-4	-3.2	-0.5	(1.7)	-1.1	(3.9)
other fruit	45	43	43	29	16	10.2	-5.2	(1.8)	-7.1	(2.3)
canned foods	561	489	563	50	511	9.7	-131.1	(1.6)	-148.6	(1.6)
bottled drinks	51	51	52	27	24	14.8	-1.5	(0.4)	-6.6	(1.6)
chapati	64	62	61	64	0	0	-2.5	(1.3)	-13.0	(5.2)
tea	3274	4239	3049	63	3211	2976.6	164.0	(3.8)	-72.3	(1.8)
coffee	360	554	360	45	315	6.0	19.3	(0..2)	12.0	(0.1)

Table 4: Listing of quantities, unit costs, usual expenditures, and units for chicken purchases

(all cases where quantity times unit cost is greater than 10 times usual purchases)

quantity purchased since last visit	rupee cost per unit	usual monthly expenditure in months when is bought	unit of measurement
500	18	18	grams
500	20	60	grams
500	24	48	grams
500	25	25	grams
500	20	20	grams
500	30	30	grams
500	25	52	grams
500	22	44	grams
500	22	44	grams
500	22	22	grams
500	20	50	grams
500	25	25	grams
500	25	25	grams
50	35	25	pieces
2001	30	80	kilos
2	60	8	kilos
15	60	40	kilos
1001	40	50	kilos

Table 5: Listing of quantities, unit costs, usual expenditures, and units for tea purchases

(all cases where quantity times unit cost is greater than 400 times usual purchases)

quantity purchased since last visit	rupee cost per unit	usual monthly expenditure in months when tea is bought	unit of measurement
1000	56	50	grams
250	27	8	grams
500	96	48	grams
250	112	28	grams
800	60	40	grams
800	35	50	grams
750	75	75	grams
750	50	50	grams
800	25	25	grams
800	20	20	grams
800	30	40	grams
800	30	40	grams
200	200	70	grams
800	20	15	grams
800	25	25	grams
800	28	28	grams
800	20	20	grams
500	120.21	50	grams
800	52	52	grams
250	120.21	36	grams
600	100	100	grams
500	40	20	grams
125	125.5	25	grams

Table 6: Nonfood expenditures: detail of purchase frequencies and of question design on mean response

commodity	percent buying in last year	percent of col. 1 buying since last visit	monthly mean expenditure since last visit	monthly expenditure over last year	col. 3 minus col. 4	(col. 3 minus col. 4) x col 1.	regression of col. 3 on time since last visit with absolute *t*-value	
children's clothing	76	28	196	89	107	81	-7.85	(2.2)
adults' clothing	93	20	198	132	66	61	-6.01	(1.8)
children's footwear	73	23	61	33	28	20	-4.18	(2.7)
adults' footwear	93	15	61	48	13	12	-3.22	(2.4)
other personal effects	63	18	36	24	12	8	-2.74	(2.4)
clothing repair	87	18	44	34	10	9	0.52	(0.8)
kitchen equipment	50	18	69	29	40	20	-4.52	(1.7)
household textiles	36	13	76	39	37	13	-13.92	(4.6)
furniture & fittings	9	10	92	156	-64	-6	-3.80	(0.6)
other household effects	23	29	15	10	5	1	1.06	(1.9)
household effects repair	14	23	123	38	85	12	-22.40	(2.6)
vehicle repair & service	6	32	418	232	181	11	7.36	(0.3)
public transportation	70	50	75	48	27	19	-5.09	(5.1)
medicines	89	48	185	115	70	62	-9.64	(3.6)
medical services	41	30	88	59	29	12	-3.48	(1.1)
recreation & travel	26	24	127	82	45	12	-0.04	(0.0)
personal services	82	56	27	19	8	7	-1.34	(5.2)
education, prof. services	24	29	82	240	-158	-38	-1.10	(0.3)
stationery, books, etc.	13	26	41	35	6	1	-2.27	(1.3)
post & telephone	25	34	79	66	13	3	-5.44	(1.8)

Table 7: Reporting periods and expenditures on summary categories, South Africa

category	numbers of households	reference period	mean	25th percentile	50th percentile	75th percentile	standard deviation
Groceries							
# reporting	8735	actual month	345	150	228	400	341
# actual=usual	5291	usual month	339	150	200	400	336
Food eaten out							
# reporting	1896	actual month	123	35	90	160	172
# actual=usual	1076	usual month	117	30	80	150	178
Vehicles							
# reporting	1183	actual month	1207	200	400	850	7302
# actual=usual	902	usual month	605	150	360	719	863
Servants							
# reporting	1364	actual month	243	100	200	300	234
# actual=usual	1290	usual month	241	100	200	300	234
Furniture							
# reporting	2663	actual month	175	0	68	200	564
# actual=usual	2071	usual month	119	0	65	172	236
# annual=usual	346	annual basis	189	50	118	250	250
Clothing							
# reporting	6604	actual month	88	0	0	100	220
# actual=usual	3827	usual month	59	0	0	80	124
# annual=usual	478	annual basis	85	25	50	100	109
Insurance							
# reporting	2874	actual month	273	30	127	356	445
# actual=usual	2764	usual month	272	30	125	350	445
# annual=usual	2235	annual basis	274	30	125	350	480
Saving							
# reporting	2030	actual month	215	50	100	250	341
# actual=usual	1740	usual month	210	50	100	250	308
# annual=usual	1276	annual basis	236	50	100	240	610

Table 8: Per capita household expenditures for two recall periods, Vietnam
(dongs per month)

	Monthly expenditures based on expenditures since last visit	Usual monthly expenditures
Per capita total household expenditure		
mean	297	294
median	256	254
25th percentile	138	141
75th percentile	402	396
interquartile range	264	255
standard deviation	227	220
s.d. of logarithms	0.75	0.71
gini coefficient	0.385	0.364
Per capita food expenditure		
mean	273	272
median	232	228
25th percentile	115	117
75th percentile	379	374
interquartile range	264	257
standard deviation	216	215
s.d. of logarithms	0.82	0.77
Per capita non-food expenditure		
mean	24	22
median	13	16
25th percentile	5	10
75th percentile	28	27
interquartile range	23	17
standard deviation	48	22
s.d. of logarithms	1.18	0.77

Note: Monthly expenditures since last visit are calculated from amount spent since last visit divided by the number of days since last visit multiplied by 12/365. Food includes the value of own-produced food. All statistics are calculated from household data with each household weighted by its sampling weight multiplied by the number of people in the household.

Table 9: Alternative measures of monthly food expenditure, detail, Vietnam

commodity	buy in last year	buy since last visit	usual months if not bought since last visit	usual months if bought since last visit	monthy expenditure from last visit	monthly expenditure from last visit (14 days)	usual monthly expenditures	col 5. minus col 7	col 5 minus col 7 × col 1
ordinary rice	1.00	0.38	5.05	9.99	41.15	40.55	47.81	-6.67	-6.64
glutinous rice	0.40	0.15	4.91	9.23	3.09	3.02	1.93	1.16	0.46
maize	0.25	0.13	3.24	4.60	1.70	1.64	1.28	0.42	0.11
cassava	0.28	0.13	3.95	5.98	1.76	1.67	1.08	0.68	0.19
potato	0.51	0.18	4.56	7.10	1.46	1.45	1.24	0.22	0.11
barley, malt	0.00	0.67	1.00	6.50	4.40	4.35	2.33	2.07	0.00
bread, wheat	0.31	0.72	6.74	10.71	11.50	11.77	12.17	-0.67	-0.21
noodle	0.49	0.64	7.09	9.78	7.57	7.48	7.80	-0.23	-0.11
vermicelli	0.51	0.52	6.16	9.44	4.97	5.00	3.89	1.08	0.55
clear noodles	0.22	0.45	5.35	8.49	3.69	3.46	3.53	0.16	0.04
pork	0.94	0.74	7.84	11.01	28.78	28.75	27.32	1.45	1.36
beef, buffalo	0.18	0.44	5.56	10.52	10.88	10.85	12.85	-1.97	-0.36
chicken	0.59	0.07	4.98	9.12	3.15	3.25	3.75	-0.60	-0.35
duck, poultry	0.32	0.19	3.76	6.14	5.80	6.06	4.78	1.01	0.33
other meat	0.06	0.10	2.87	4.83	2.19	2.15	1.48	0.71	0.04
proc. meat	0.12	0.43	5.49	9.76	9.47	9.32	9.58	-0.11	-0.01
fat & oil	0.52	0.71	9.01	11.25	10.24	10.19	9.44	0.80	0.42
fresh fish	0.93	0.61	6.75	10.37	22.56	22.30	22.01	0.55	0.51
dried fish	0.35	0.39	4.90	7.94	4.97	4.92	5.58	-0.61	-0.22
other aquatic	0.41	0.11	4.60	6.45	0.71	0.70	1.32	-0.61	-0.25
eggs	0.57	0.36	6.33	10.09	4.99	5.02	4.68	0.30	0.17
soya curd	0.64	0.67	7.44	10.66	5.01	5.04	5.29	-0.28	-0.18
peanuts	0.46	0.22	4.61	8.13	1.56	1.53	2.08	-0.52	-0.24
beans	0.44	0.24	4.30	6.80	2.05	2.06	1.71	0.33	0.15
spinach	0.89	0.37	5.03	7.58	2.49	2.49	2.34	0.15	0.13
kohlrabi	0.52	0.19	3.26	4.58	1.28	1.30	1.49	-0.20	-0.11
cabbage	0.78	0.33	3.59	5.31	1.82	1.85	1.77	0.05	0.04
tomatoes	0.80	0.40	3.94	6.16	1.99	2.01	2.00	-0.01	-0.01
other veg.	0.86	0.45	4.94	9.07	5.11	5.13	4.34	0.77	0.67
oranges	0.34	0.33	3.96	6.92	4.24	4.21	3.26	0.98	0.34
bananas	0.73	0.38	6.42	10.19	2.73	2.73	2.34	0.40	0.29
mangoes	0.29	0.13	2.69	3.48	2.22	2.16	1.98	0.25	0.07
other fruit	0.50	0.27	5.41	8.00	2.96	2.92	2.62	0.34	0.17
fish sauces	0.95	0.71	8.13	11.44	5.34	5.26	4.72	0.62	0.59
salt	0.99	0.43	6.56	10.73	1.17	1.15	1.24	-0.07	-0.07
MSG	0.98	0.60	7.57	10.32	7.80	7.68	6.39	1.42	1.39
sugar, honey	0.78	0.52	6.18	9.78	5.61	5.52	4.40	1.21	0.94
candy, jams	0.27	0.61	6.44	10.41	6.79	6.63	10.66	-3.87	-1.03
milk & prod.	0.12	0.48	4.49	8.94	11.21	11.45	9.02	2.19	0.26
alcoholic bev.	0.48	0.60	6.56	10.25	8.81	8.66	7.32	1.49	0.72

Table 9, continued

commodity	buy in last year	buy since last visit	usual months if not bought since last visit	usual months if bought since last visit	monthly expenditure from last visit	monthly expenditure from last visit (14 days)	usual monthly expenditures	col. 5 minus col. 7	col.5 minus col. 7 × col. 1
coffee	0.09	0.59	8.64	10.88	8.32	8.33	7.01	1.32	0.12
tea	0.75	0.60	8.90	10.94	4.56	4.59	4.80	-0.24	-0.18
other beverages	0.09	0.51	5.63	8.85	6.61	6.40	8.50	-1.89	-0.17
food away	0.29	0.73	5.35	10.35	63.66	62.65	74.34	-10.68	-3.07
other	0.22	0.59	7.97	11.51	8.52	8.35	13.57	-5.06	-1.13

Notes: Units are fractions, columns 1 and 2, months, columns 3 and 4, and thousands of dongs, columns 5 through 9.

Table 10: Alternative measures of monthly non-food expenditures, detail, Vietnam

commodity	buy in last year	buy since last visit	monthly expenditure from last visit	monthly expenditure since last visit (14 days)	one twelfth of annual expenditures	col. 3 minus col. 5	col. 3 minus col. 5 × col. 1
clothing material	0.69	0.11	11.93	25.92	20.25	-8.32	-5.72
clothes	0.62	0.13	11.64	25.29	11.20	0.44	0.27
mosquito net	0.25	0.08	6.75	14.67	3.82	2.93	0.74
underclothes	0.86	0.11	2.92	6.35	3.19	-0.27	-0.23
handkerchiefs	0.94	0.12	0.99	2.14	0.98	0.01	0.01
rush blankets	0.66	0.09	4.83	10.50	2.90	1.93	1.28
shoes	0.91	0.14	3.77	8.19	3.35	0.42	0.38
hats & raingear	0.83	0.14	1.95	4.24	1.59	0.36	0.30
other clothing	0.61	0.07	0.37	0.81	0.55	-0.17	-0.11
tailoring	0.55	0.07	2.63	5.72	5.67	-3.04	-1.67
electirc bulb, wire	0.36	0.12	6.89	14.98	4.93	1.97	0.71
china, glasses	0.54	0.08	2.12	4.61	1.93	0.19	0.10
pans, buckets	0.40	0.11	5.30	11.52	3.29	2.01	0.80
thermos	0.12	0.11	6.84	14.87	2.45	4.39	0.51
bags	0.24	0.15	3.72	8.08	1.00	2.72	0.65
lighter	0.53	0.25	1.88	4.07	1.17	0.70	0.37
hammock, pram	0.07	0.14	5.44	11.83	1.55	3.89	0.26
tools	0.18	0.14	19.27	41.87	15.70	3.57	0.66
building materials	0.20	0.10	104.53	227.10	131.20	-26.67	-5.41
new house ex mats	0.08	0.09	153.05	332.52	148.77	4.28	0.36
home repair	0.11	0.09	68.96	149.81	28.19	40.76	4.29
bike tire	0.50	0.12	5.43	11.81	2.99	2.45	1.23
bike parts	0.25	0.12	6.53	14.18	2.67	3.85	0.97
motorbike tire	0.05	0.08	15.77	34.26	12.45	3.32	0.17
motorbike bits	0.02	0.09	15.92	34.58	12.29	3.63	0.08
vehicle repair	0.27	0.14	10.44	22.69	4.03	6.41	1.76
public transport	0.26	0.20	13.86	30.11	8.56	5.30	1.36
ferry fares	0.09	0.35	6.42	13.94	3.71	2.71	0.26
other transport	0.05	0.02	0.41	0.90	2.49	-2.08	-0.10
books etc	0.16	0.61	7.94	17.26	5.84	2.10	0.33
entertainment	0.20	0.53	7.61	16.54	4.01	3.60	0.70
toys	0.10	0.19	4.25	9.22	1.80	2.45	0.24
postal	0.11	0.21	11.18	24.29	3.31	7.87	0.85
jewelry, watch	0.15	0.14	36.17	78.58	26.31	9.86	1.45
hairdressing	0.56	0.36	4.22	9.17	3.48	0.74	0.41
holidays	0.05	0.11	30.87	67.08	20.23	10.65	0.49
other cultural	0.04	0.23	6.74	14.64	5.38	1.35	0.06
income taxes	0.14	0.09	2.39	5.19	2.49	-0.10	-0.01
security fund	0.32	0.10	0.73	1.58	0.87	-0.14	-0.05
social funds	0.29	0.12	1.76	3.81	1.29	0.47	0.13
insurance	0.08	0.05	1.42	3.09	2.33	-0.91	-0.08
weddings etc	0.15	0.20	107.10	232.69	71.39	35.71	5.40
funerals	0.40	0.11	19.61	42.61	20.43	-0.82	-0.32
gifts	0.83	0.28	21.34	46.36	13.43	7.91	6.55
domestic services	0.00	0.39	49.59	107.75	48.26	1.33	0.01
other expenses	0.16	0.17	36.76	79.87	21.18	15.58	2.43

Table 11: Cluster level prices and unit costs, by province, Pakistan

	mean unit cost	median unit cost	mean local shop	mean mandi shop	corr cost & local shop	corr cost & mandi shop	corr local & mandi shops	mean unit cost	median unit cost	mean local shop	mean mandi shop	corr cost & local shop	corr cost & mandi shop	corr local & mandi shops
	PUNJAB							SINDH						
basmati	11.5	10.7	10.7	9.8	0.24	0.16	0.70	11.8	10.6	12.1	11.1	-0.07	-0.08	0.90
rice	6.1	6.0	6.1	5.3	0.19	0.14	0.86	6.6	5.8	5.7	5.2	0.16	-0.02	0.76
veg. oil	105.8	100.9	94.7	95.0	0.13	0.12	0.99	112.4	100.0	96.1	98.1	0.09	0.08	0.83
milk	6.7	5.8	5.9	5.5	0.08	0.15	0.87	8.1	7.9	8.3	8.1	0.79	0.60	0.78
sugar	11.9	11.9	12.9	10.9	0.28	0.31	0.62	12.8	11.9	11.2	10.5	0.19	-0.49	0.38
gur	7.4	7.4	6.9	5.9	0.10	0.08	0.86	9.0	8.0	7.2	6.8	0.25	-0.05	0.54
mutton	44.8	44.1	45.6	44.9	0.61	0.45	0.87	48.2	50.0	50.8	48.5	0.52	0.40	0.81
poultry	40.9	40.0	36.7	37.8	0.13	0.04	0.35	42.5	41.5	34.5	35.1	0.18	0.21	0.98
eggs	13.8	13.5	15.2	14.0	0.28	0.30	0.88	15.2	14.3	15.7	14.4	0.46	0.52	0.93
fish	27.3	25.0	36.4	32.4	-0.26	-0.07	0.94	30.6	29.8	35.5	34.2	0.27	0.38	0.85
	NORTH WEST FRONTIER PROVINCE							BALUCHISTAN						
basmati	11.2	11.1	9.9	10.6	0.22	0.35	-0.24	15.9	12.0	11.7	11.6	0.39	0.12	0.72
rice	6.6	6.4	7.6	6.8	0.45	0.41	0.96	11.6	6.0	7.0	6.3	0.03	0.09	0.96
veg. oil	105.6	105.9	109.7	110.5	-0.13	-0.49	0.11	160.4	150.0	94.4	90.5	-0.78	-0.77	1.00
milk	8.2	8.0	7.7	7.1	0.63	0.56	0.78	7.9	7.9	8.0	7.0	*	*	*
sugar	12.4	12.2	12.0	11.1	0.12	0.09	0.56	16.3	12.8	11.5	10.6	-0.29	-0.01	0.20
gur	12.3	9.9	9.3	8.5	-0.17	-0.28	0.96	8.4	8.0	6.0	5.2	0.22	0.50	0.95
mutton	42.5	40.0	41.8	45.3	0.69	0.61	0.92	62.6	51.4	59.4	51.9	0.69	0.68	1.00
poultry	42.5	43.6	33.6	35.4	-0.15	0.31	0.14	51.7	40.0	46.4	44.8	0.85	0.84	1.00
eggs	12.4	12.0	12.7	13.1	0.45	0.71	0.84	22.8	24.0	22.1	15.6	0.79	0.79	1.00
fish	25.1	25.0	23.0	30.1	0.57	0.52	0.97	35.5	36.6	35.9	33.4	0.69	0.70	1.00

Notes: * denotes that there is only a single observation so that correlation coefficients cannot be calculated. Prices and unit costs are in rupees; units are kilograms except for eggs (dozens) and vegetable oil or dalda (5 kilograms) , and milk (liters).

Table 12: Cluster level prices and reported unit costs, Vietnam

	unit cost for purchases	unit cost for home production	average of three market prices	correlation purchase & home prodn price	correlation purchase & market price	correlation home prodn. & market price
ordinary rice	1.82	1.78	1.76	0.90	0.59	0.51
glutinous rice	2.59	2.54	2.52	0.79	0.32	0.28
maize	1.80	1.25	1.46	0.56	0.49	0.41
cassava	0.64	0.44	0.74	0.51	-0.07	-0.06
clear noodles	5.03	3.64	4.69	0.91	0.77	0.68
pork	12.59	11.19	13.14	0.58	0.76	0.25
chicken	12.57	11.71	12.57	0.57	0.42	0.61
soya curd	3.50	2.43	2.86	0.82	0.19	0.28
spinach	0.75	0.53	0.74	0.36	0.25	0.26
kohlrabi	0.93	0.56	0.93	0.87	0.11	0.29
cabbage	1.12	0.60	1.22	0.69	0.31	0.97
tomatoes	1.48	0.90	1.84	0.59	0.54	0.32
oranges	3.68	2.75	3.70	0.45	0.36	0.36
bananas	1.17	0.94	1.27	0.51	0.15	0.18
mangoes	4.43	2.47	5.71	0.11	-0.34	0.10
salt	0.67	0.53	0.64	0.84	0.53	0.33

Notes: Prices are in thousands of dongs. Units are kilograms except for noodles (85 grams).

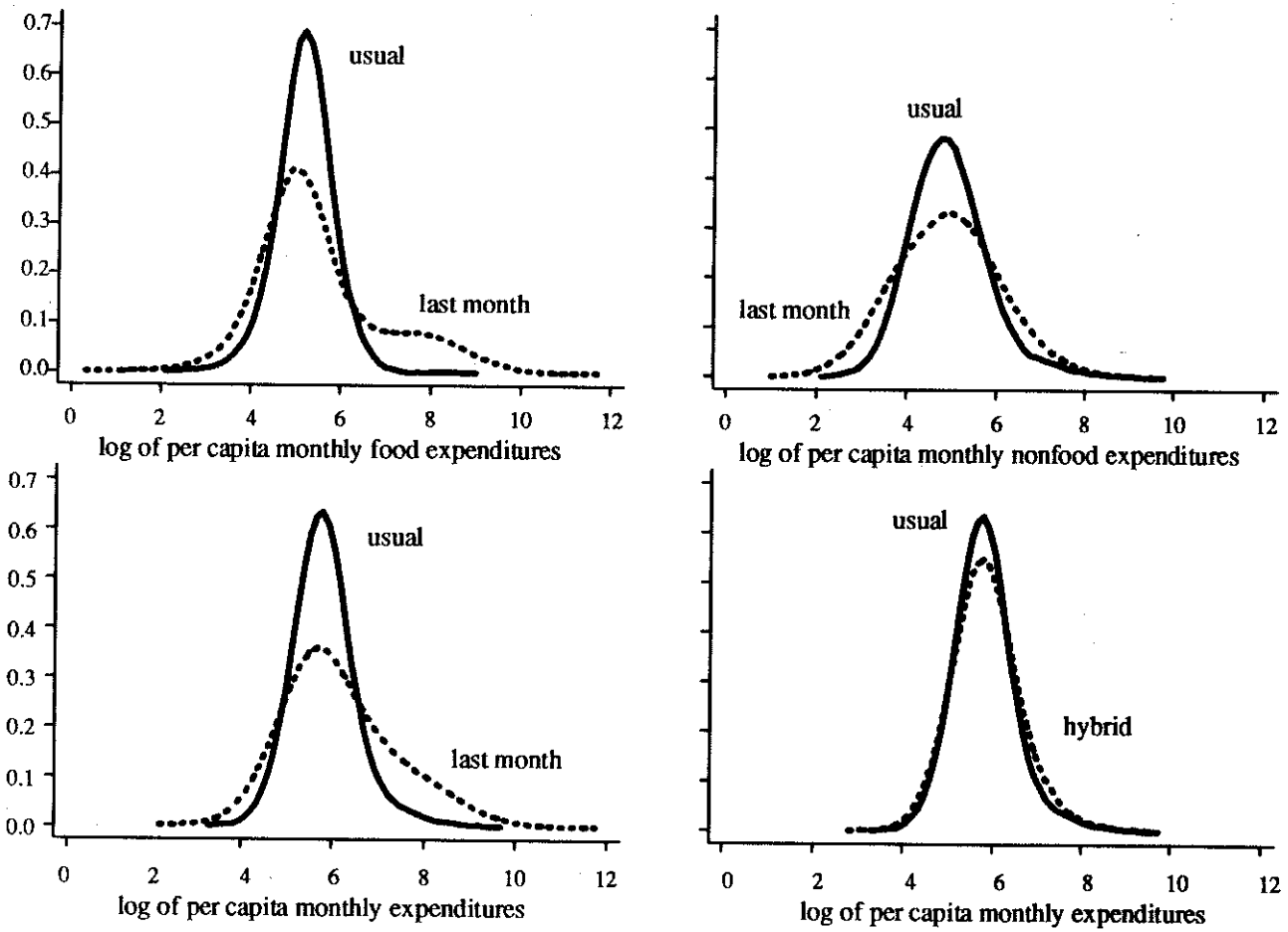

Figure 1: Estimated density functions for the logarithm of per capita food and non-food expenditures, Pakistan Integrated Household Survey, 1991.

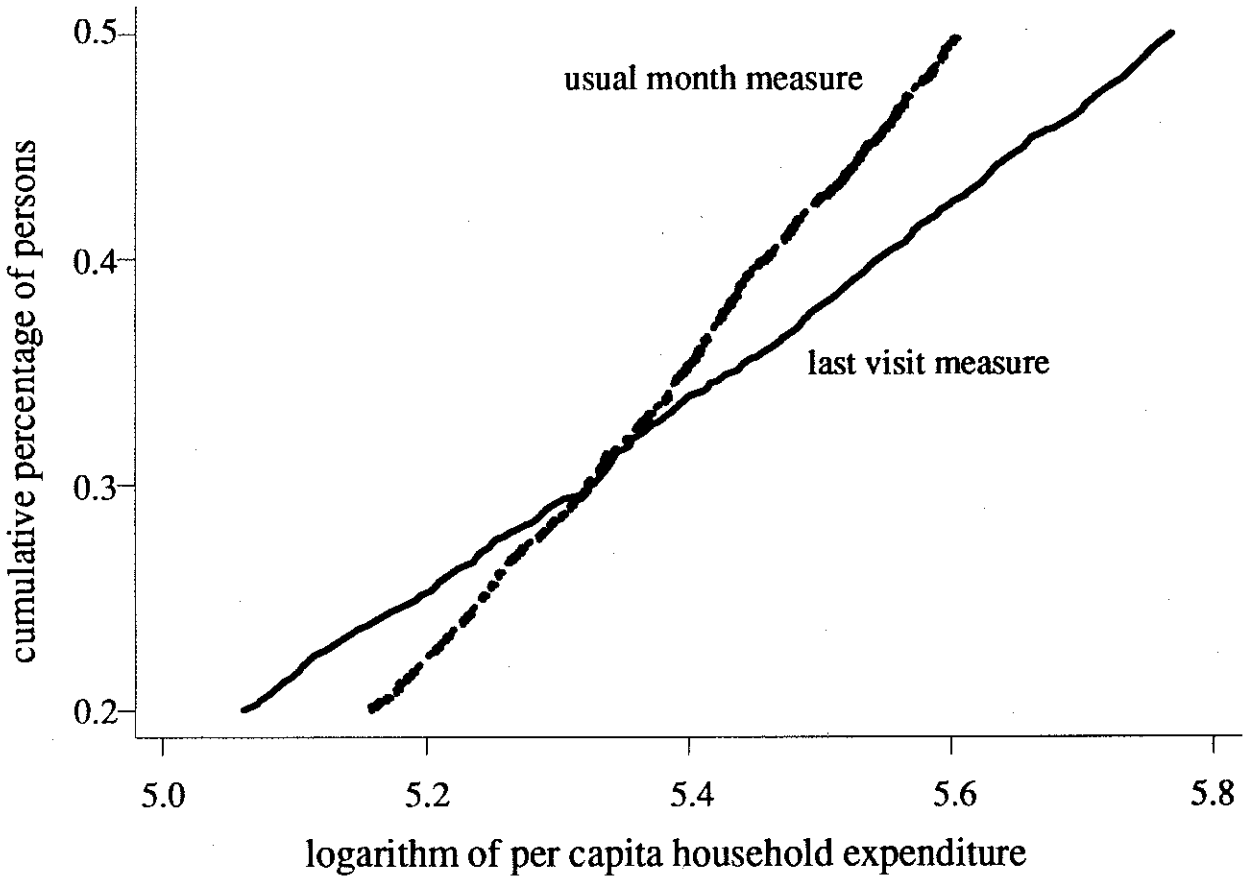

Figure 2: Detail of cumulative distributions of two measures of log(PCE), Pakistan 1991.

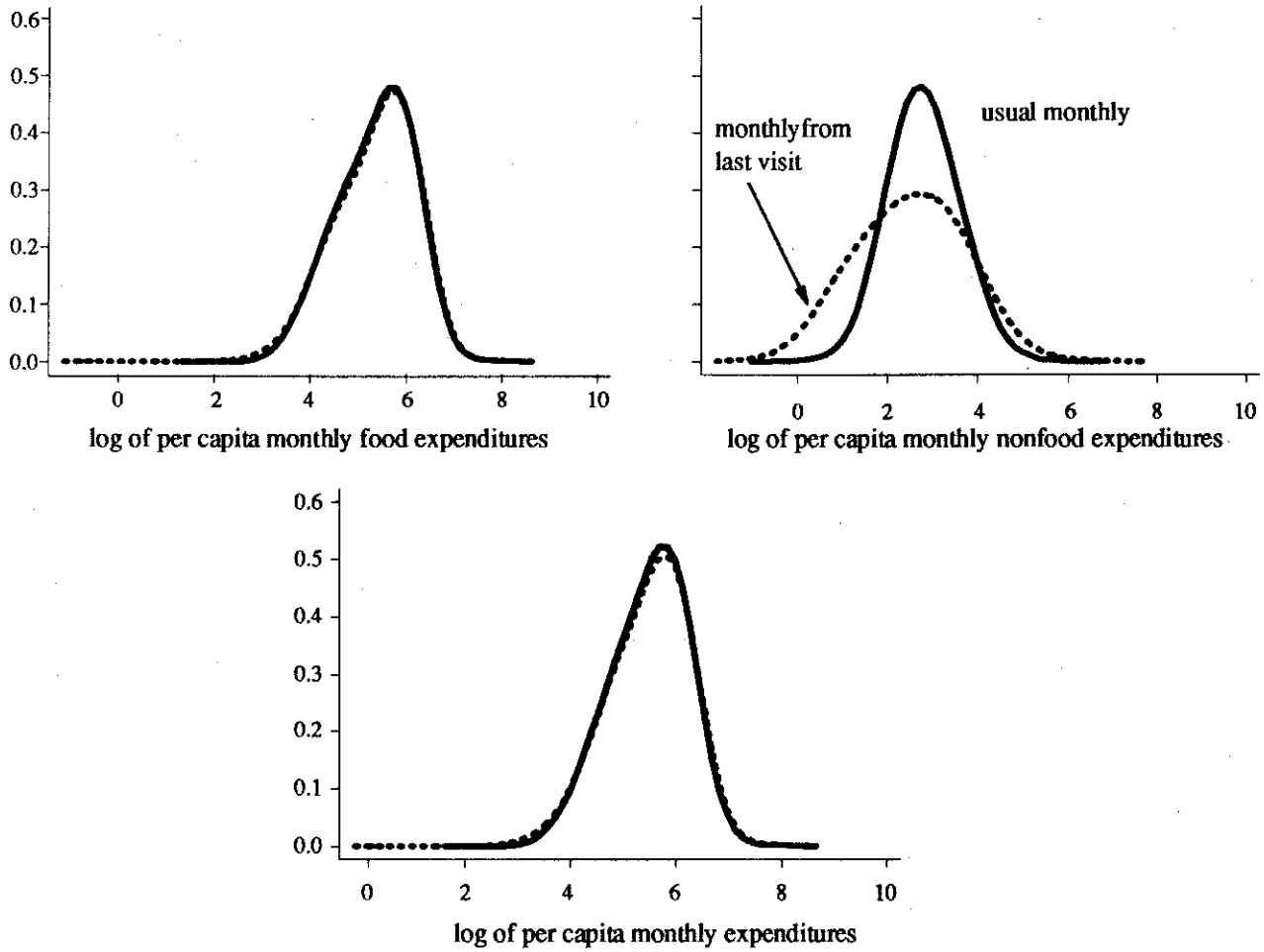

Figure 3: Estimated density functions for the logarithm of per capita food and non-food expenditures, Vietnam Living Standards Survey, 1992–93.

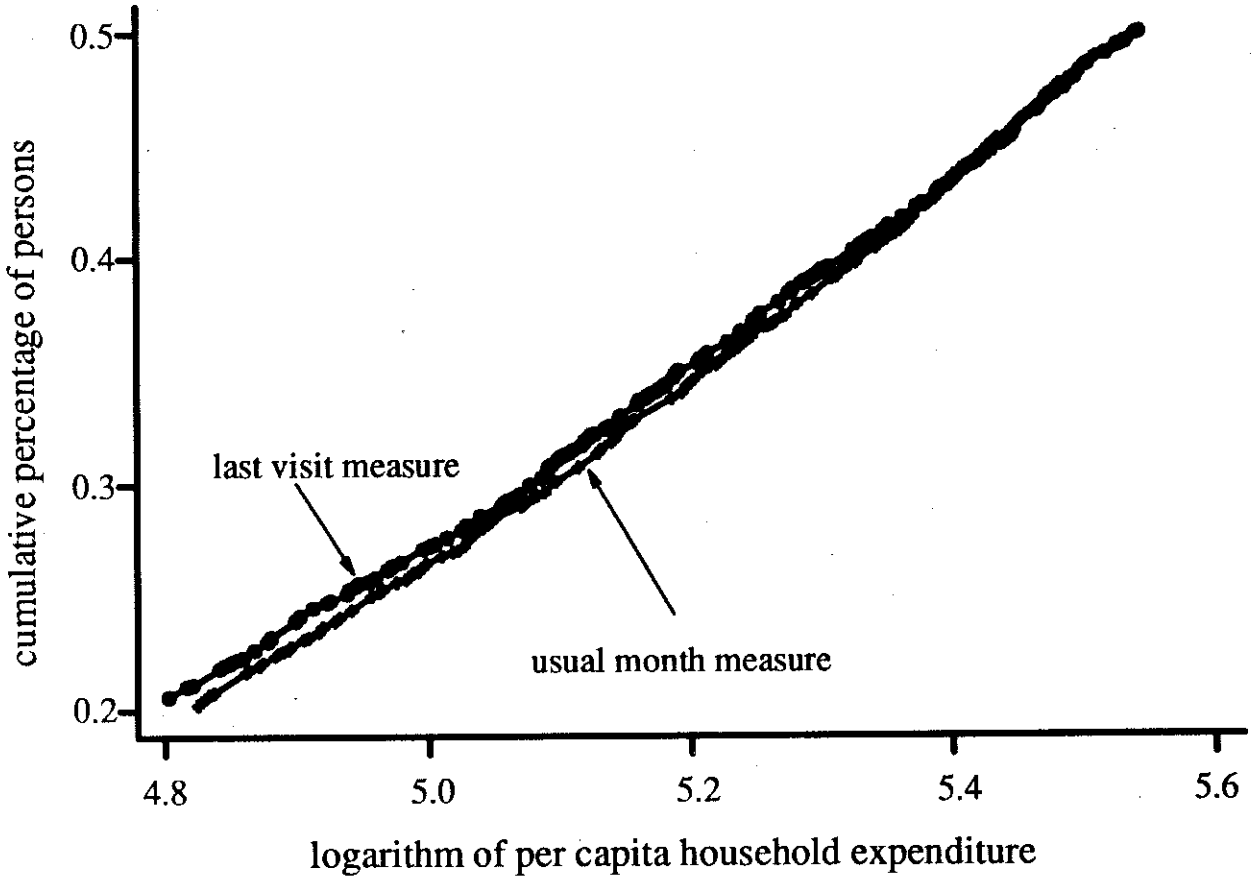

Figure 4: Detail of cumulative distributions of two measures of log(PCE), Vietnam 1992–93.

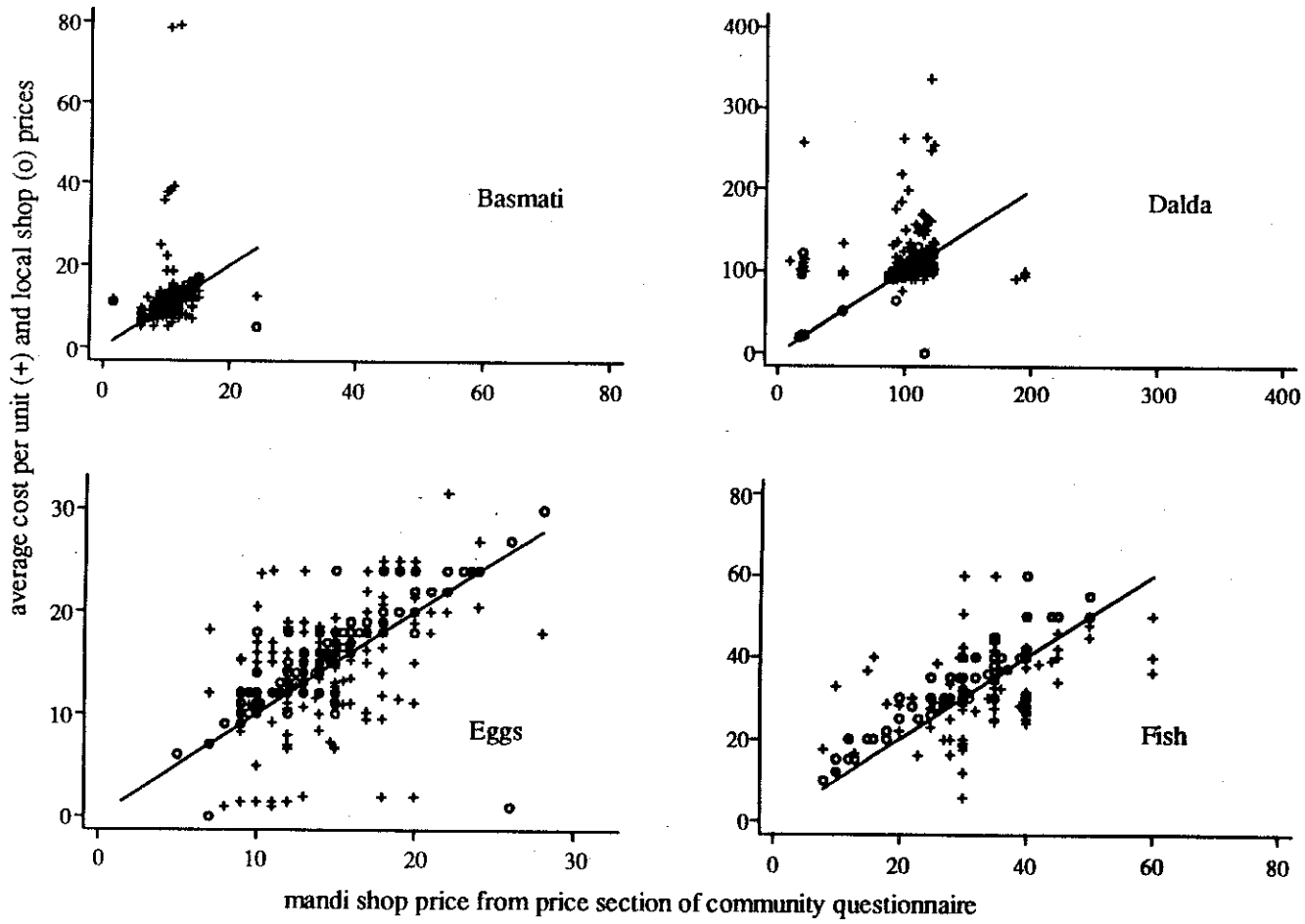

Figure 5: Price comparisons, average reported costs per unit, local shop price and mandi shop price, selected commodities, Pakistan

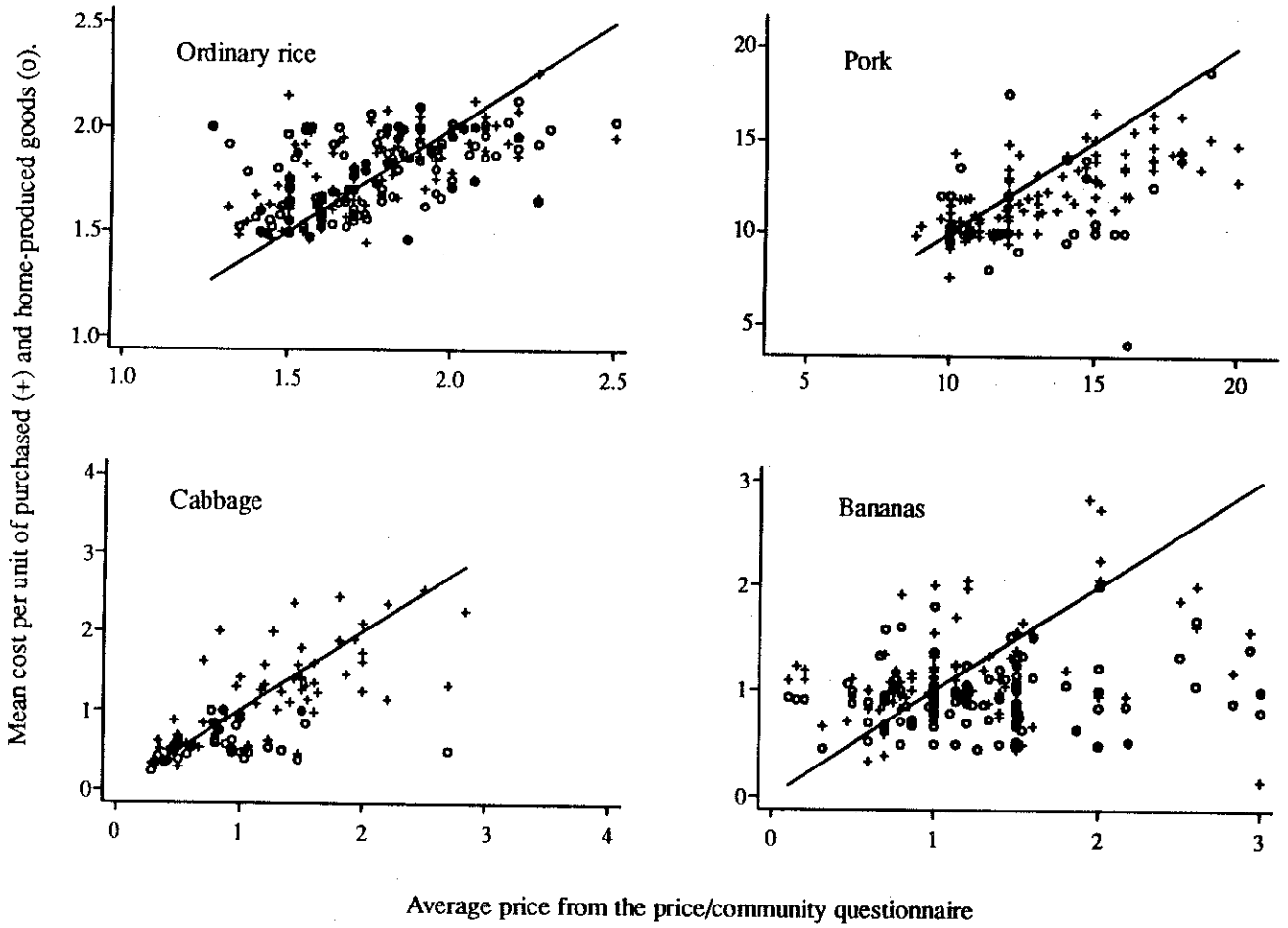

Figure 6: Price comparisons, average reported costs per unit for purchased and home-produced goods and average community price, selected commodities, Vietnam.