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Measuring Poverty Using Qualitative Perceptions of Welfare

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Subjective poverty lines —
based on the self-assessed
adequacy of a family's food,
housing, and clothing —
accord closely on average
with independent "objective"
poverty lines. There are
notable differences, however,
when geographic and
demographic poverty profiles
are constructed.

Summary findings

Pradhan and Ravallion show how subjective poverty lines can be derived using simple qualitative assessments of perceived consumption adequacy, based on a household survey. Respondents were asked whether their consumption of food, housing, and clothing was adequate for their family's needs.

Pradhan and Ravallion's approach, by identifying the subjective poverty line without the usual "minimum-income question," offers wide applications in developing country settings. They implement it using survey data for Jamaica and Nepal.

The implied subjective poverty lines are robust to alternative methods of dealing with other components of consumption, for which the subjective "adequacy" question was not asked.

The aggregate poverty rates based on subjective poverty lines come close to those based on independent "objective" poverty lines.

There are notable differences, however, when geographic and demographic poverty profiles are constructed.

Measuring Poverty Using Qualitative Perceptions of Welfare

Menno Pradhan and Martin Ravallion [1]

1   Introduction

The most common practice in drawing a poverty line starts with "objective" pre-determined nutritional requirements for good health and an active life. The poverty line is then defined as the value of a monetary measure of individual economic welfare, such as expenditure on all goods and services (with imputed values when necessary), at which these nutritional requirements are met given prices and reference tastes. People are deemed to be poor if and only if their welfare indicator is below this line, and a poverty measure is estimated on the censored distribution (such as the "headcount index" given by the proportion below the line). Methodological differences within this approach are known to yield different poverty measures.[2]

However (as has been noted before), there is an inherent subjectivity and social specificity to any notion of "basic needs", including nutritional requirements. For example, psychologists, sociologists and others have argued that the circumstances of the individual relative to others in some reference group influence perceptions of well-being at any given level of individual command over commodities.[3] By this view, "the dividing line ...between necessities and luxuries turns out to be not objective and immutable, but socially determined and ever changing" (Scitovsky, 1978, p.108). Some have taken this view so far as to abandon any attempt to rigorously quantify "poverty". Poverty analysis (particularly, but not only, for developing countries) has become polarized between the "objective-quantitative" schools and

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[2] Ravallion (1994) gives examples. For a critical overview of alternative methods of setting poverty lines found in practice in both developing and developed countries see Ravallion (1998).

[3] Runciman (1966) provided an influential exposition, and supportive evidence. Also see van de Stadt et al., (1985) and Easterlin (1995).

"subjective-qualitative" schools, with rather little effort at cross-fertilization.

An intermediate approach has emerged in a segment of the developed country literature on poverty. "Subjective poverty lines" have been based on answers to the "minimum income question" (MIQ), such as the following (paraphrased from Kapteyn et al 1988):

"What income level do you personally consider to be absolutely minimal? That is to say that with less you could not make ends meet".

One might define everyone whose income is less than the amount they give as an answer to this question as poor. However, this would almost certainly lead to inconsistencies in the resulting poverty measures, in that people with the same income, or some other agreed measure of economic welfare, will be treated differently. Clearly an allowance must be made for heterogeneity, such that people at the same level of living may well give different answers to the MIQ, but must be considered equally "poor" for consistency. Past empirical work has found that the expected value of the answer to the MIQ conditional on income tends to be an increasing function of income.[4] Past studies have tended to find a relationship such as that depicted in Figure 1, which gives a stylized representation of the regression function on income for answers to the MIQ. The point z^* in the figure is an obvious candidate for a poverty line; people with income above z^* tend to feel that their income is adequate, while those below z^* tend to feel that it is not. In keeping with the literature, we term z^* the "subjective poverty line" (SPL).[5]

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[4] Contributions include Groedhart et al., (1977), Colastanto et al., (1984), Danziger et al., (1985), Kapteyn et al., (1985, 1988), Stanovnik (1992) and Kapteyn (1994).

[5] The term "social subjective poverty line" might be preferable, to distinguish it from the individual subjective poverty lines. However, the meaning will be clear from the context.

It is also recognized in the literature that there are other determinants of economic welfare which will shift the SPL, such as family size and demographic composition. Indeed, the answers to the MIQ are sometimes interpreted as points on the consumer's cost function (giving the minimum expenditure needed to assure a given level of utility) at a point of "minimum utility", interpreted as the poverty line in utility space. Under this interpretation, subjective welfare assessments provide a means of overcoming the well-known problem of identifying utility from demand behavior alone when household attributes vary.[6]

Our main aim in this paper is to develop and implement a qualitative model of perceived consumption needs which allows us to identify the subjective poverty line without the minimum income question. We believe that our approach has marked advantages, particularly for applications in developing countries. While the MIQ has been applied in a number of OECD countries[7], we know of no attempts to apply it in a developing country. There are a number of potential pitfalls in doing so. "Income" is not a well-defined concept in most developing countries, particularly (but not only) in rural areas. It is not at all clear whether or not one could get sensible answers to the MIQ. The qualitative idea of the "adequacy" of consumption is a more promising one in a developing country setting. We will demonstrate that one can still estimate the SPL without the MIQ; less demanding qualitative questions suffice.[8]

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[6] On this identification problem see Pollak and Wales (1979), Deaton and Muellbauer (1980), Pollak (1991), and Browning (1992). On the use of subjective welfare assessments to identify cost and/or utility functions see van Praag (1991) and Kapteyn (1994).

[7] See for example Hagenaars (1986) for a cross-European comparisons and De Vos and Garner (1991) for a US-Dutch comparison.

[8] Other problems might be anticipated in applying the subjective approach in developing countries. It was suggested by some of those we spoke to in discussions leading up to this study that we

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We also aim to extend the range of variables that one deems relevant to explaining the variance in perceptions of poverty. It is important, we believe, to test whether objectively measured income or consumption has power in explaining subjective measures of welfare in a developing country context; if it does not, then many of the policies that are typically promoted in the name of "economic development" may bring disappointing outcomes in terms of human satisfaction. It is of interest to consider other possible determinants of perceived poverty. An obvious (although by no means sole) source of peer-group effects on subjective assessments of minimum consumption needs is the geographic neighborhood. We will test for effects of neighborhood living standards on subjective assessments of individual welfare in developing countries.

The following section outlines our qualitative model of the subjective poverty line. In section 3 we present our results for two (quite different) developing countries, namely Jamaica and Nepal. Section 4 concludes.

2   A qualitative model of subjective poverty lines

We assume that each individual has his or her own reasonably well-defined consumption norms at the time of being surveyed. At the prevailing incomes and prices, there can be no presumption that these needs will be met at the consumer's utility maximizing consumption vector. Let the consumption vector of a given individual be denoted y, and let z denote the matching vector of consumption norms for that individual. The subjective basic need for good k

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may well find that almost everyone thinks their consumption is inadequate in a low-income country. Later we will see that there is little truth to this view for the two developing countries in our study.

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and household i is given by:

$$z_{ki} = \varphi_k(y_i, x_i) + \varepsilon_{ki} \quad (k=1,..,m; \, i=1,..,n) \tag{1}$$

where φ_k $(k=1,..,m)$ are continuous functions, and x is a vector of indicators of economic welfare at a given consumption vector. We assume that each φ_k has a positive lower bound as actual consumptions approach zero, and that the function is also bounded above as consumptions approach infinity. The error terms, ε_{ki}, are assumed to have zero mean, and be independently and identically normally distributed for all i with variance σ_k^2. The distribution functions of the standard normal error terms ($\varepsilon_{ki}/\sigma_k$) are denoted F_k $(k=1,..,m)$.

We define the subjective poverty line as the expenditure level at which the subjective minimums for all k are reached in expectation, for a given x. A household is poor if and only if its total expenditure is less than the appropriate SPL for a household with its characteristics. Thus the SPL satisfies:

$$z^*(x) = \sum_{k=1}^{m} z_k^*(x) \tag{2}$$

where $z_k^*(x)$ is defined implicitly by the fixed point relationship:

$$z_k^*(x) = \varphi_k(z_1^*(x),...,z_m^*(x), x) \quad (k=1,..,m) \tag{3}$$

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A solution of this equation will exist as long as the functions φ_k are continuous for all k.[9]

This provides a multidimensional extension to the one dimensional case based on the MIQ, as illustrated in Figure 1. The SPL is the level of total spending above which respondents say (on average) that their expenditures are adequate for their needs. However, we do not assume that the MIQ is answerable, and so we cannot observe z_{ki} directly. Rather we know from a purely qualitative survey question whether actual expenditure on good k by the i'th sampled household (y_{ki}) is below z_{ki}. The probability that the i'th household will respond that actual consumption of the k'th good is adequate will then be given by:

$$Prob\,(y_{ki} > z_{ki}) \;=\; F_k[y_{ki}/\sigma_k - \varphi_k(y_i,\; x_i)/\sigma_k] \tag{4}$$

As long as the specific parameterizations of the function φ_k are linear in parameters (though possibly nonlinear in variables) one can estimate the model as a standard probit. Let us follow the literature on the MIQ and assume a log linear specification for the individual subjective poverty lines. Equation (1) is then:

$$lnz_{ki} \;=\; \alpha_k + \beta_k' y_i + \pi_k' x_i + \varepsilon_{ki} \quad (k=1,..,m;\; i=1,..,n) \tag{5}$$

where $y' \equiv (lny_1,...,lny_m)$.

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[9] This follows from the Brouwer fixed point theorem given our boundedness assumptions. Stronger assumptions are needed to rule out multiple solutions.

If we observed the values of z_{ki} (analogously to the answers to the MIQ) then a unique

solution for the subjective poverty line could be obtained by directly estimating equation (5) and

solving, assuming that the following matrix is non-singular (in obvious notation):

$$
B = \begin{bmatrix} 1-\beta_{11} & . & . & . & -\beta_{1m} \\ . & & . & & . \\ . & & . & & . \\ . & & . & & . \\ -\beta_{m1} & . & . & . & 1-\beta_{mm} \end{bmatrix}
$$

The (unique) solution for $z^* \equiv (lnz_1^*,..,lnz_m^*)$ is then given by (in obvious notation):

$$
z^* = B^{-1}(\alpha + \Pi x) \tag{6}
$$

However, the parameters B, α and π are not identified when we only have qualitative

data on consumption adequacy relative to latent norms. Equation (4) becomes:

$$
Prob\,(y_{ki} > z_{ki}) = F_k[(lny_{ki})/\sigma_k - (\alpha_k + \beta_k'y_i + \pi_k'x_i)/\sigma_k] \tag{7}
$$

As in any probit, we do not identify the parameters of the underlying model generating the latent

continuous variable (equation 5), but only their values normalized by σ_k. Thus, armed with only

the qualitative welfare assessments (telling us $Prob\,(y_{ki} > z_{ki})$), we cannot identify the

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parameters of the model determining the individual basic needs.

That fact does not, however, limit our ability to identify the SPL. To see why, consider

first the special case of one good with $lnz = \alpha + \beta lny + \varepsilon$. The SPL is $\alpha/(1-\beta)$. The probability of

reporting that actual consumption is adequate is $F[lny(1-\beta)/\sigma - \alpha/\sigma]$ which only allows us to

identify $(1-\beta)/\sigma$ and α/σ. Nonetheless $\alpha/(1-\beta)$ is still identified.

This property caries over to the more general model with more than one good, and other

sources of heterogeneity in welfare, as in (5). In this case, define the estimable normalized

matrix B_σ, obtained by post-multiplying the B matrix by the column vector formed by

σ_k^{-1} $(k=1,..,m)$. Similarly define the normalized vector α_σ and parameter matrix Π_σ (so, for

example, the k'th element of α_σ is α_k/σ_k.) It is clear that we can always re-write the solution

for the SPLs given by (6) in terms of the observed (normalized) parameters:

$$z^* = B_\sigma^{-1}(\alpha_\sigma + \Pi_\sigma x) \qquad (8)$$

Thus we can solve for the subjective poverty line without the MIQ as long as we have the

qualitative data to determine $Prob(y_{ki} > z_{ki})$ for all i, k. Instead of asking for the minimum

income, we simply ask whether current consumptions are adequate.

3 Results

For the purpose of this paper, qualitative questions on perceptions of consumption

adequacy were added to both the Jamaica Living Conditions survey of 1993 and the Nepal

Living Standards Survey of 1995/96. The questions asked are given in Table 1. (For Jamaica a similar question was also included for access to transport.) In the survey schedule, these questions came after a detailed consumption module. For house owners a rent is imputed based on the quality of the house, facilities and location of the residence. Consumption in kind (including from home production) is valued at local market prices and included in the consumption aggregate. Other information was also collected on a wide range of household characteristics. Aside from the addition of the "consumption adequacy" questions, the surveys followed the reasonably standard practices of the surveys done under the auspices of the World Bank's Living Standards Measurement Study.[10]

Table 2 summarizes the answers to the questions in Table 1. In all categories that can be compared, a higher percentage of respondents in Nepal than Jamaica said that their consumption was less than adequate. For Nepal, the percentages range from 42 to 59, while in Jamaica they range from 20 to 42, with schooling the lowest and housing the highest in both countries (though other categories are ranked differently).[11] Relatively few respondents in either country deemed their consumptions "more than adequate" in either country. Nonetheless, we considered it preferable to keep the information in his category, and use an ordered probit estimator. Table 3 gives summary statistics on the variables we will use in attempting to explain the differences in self-rated consumption adequacy.

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[10] For further information on these surveys see Grosh and Glewwe (1995). Deaton and Zaidi (1998) provide further details on the construction of the consumption measure.

[11] In Nepal, the survey also asked about the adequacy of "income"; 69% said their income was less than adequate, appreciably higher than for any consumption components. We will not use these answers, however, since it is implausible that respondents will have similar ideas about what "income" means; no doubt, many were answering about their cash income only.

In deriving subjective poverty lines from these data we consider three methods, each motivated by the model described in the previous section, but dealing in different ways with unobserved variables.

Method 1 anchors the subjective poverty lines to the perceived adequacy of food consumption alone. We ignore the answers given to the other questions in Table 1. This method is of interest because it corresponds closely to a widely used practice in constructing objective poverty lines in which the poverty line is a level of total consumption or income at which food spending is sufficient to assure that food consumption is deemed nutritionally adequate by pre-determined "objective" criteria of requirements for good health and normal activity levels (for a discussion of this method see Ravallion, 1998). The difference here is that we abandon nutritional requirements in favor of the information contained in the subjective qualitative assessments of food adequacy.[12]

Method 2 uses the answers on perceived adequacy of other non-food consumptions, as described in section 2. We did not use health care and schooling because these are to a large extent public goods for which the perception of adequacy is not necessarily related to private consumption. (We will be analyzing these data in future work.) All consumption which does not fall under the headings in Table 1 was lumped into a remainder, which we deal with in Method 2

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[12] Blaylock and Salmwood (1986) also use a food adequacy question in deriving poverty measures, though their approach is quite different to our Method 1. Blaylock and Salmwood use an ordered probit model of survey responses on food adequacy to predict the probabilities of inadequate food consumption at given poverty lines, which are chosen to correspond to predetermined food shares (by inverting an estimated Engel Curve for food, at the given food share). So in their method, the food share defines the underlying reference welfare level to which the poverty line is anchored. Our Method 1, by contrast, derives a poverty line in the consumption space which assures food adequacy in expectation. This is the more natural analogue of the idea of the "subjective poverty line", as discussed in the Introduction.

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by estimating a reduced form Engel curve for this component as a function of all other spending and the demographic and regional variables. The Engel curve is thus used to make an allowance for the remaining components of spending which is an estimate of the expected value for someone consuming the subjective poverty line levels of the other components.

Method 3 is the same as Method 2, except that we do not use the Engel curve allowance for the remaining consumption. Instead, we simply exclude the remaining consumption from both the poverty lines and from the welfare indicator.

As regressors we use log actual household consumption (in total for Method 1, and by component for Methods 2 and 3), log household size, demographic composition variables, log mean consumption in the primary sampling unit, and regional dummy variables.

A practical problem arose in the case of transport spending in Jamaica and clothing in Nepal, namely that the relatively large number of zero entries in the data created a very weak relation between actual consumption and perceived adequacy. In the case of clothing in Nepal the underlying reason may be that clothing is a durable, bought only infrequently because of the large travel distances to markets (especially in the hills and mountains). In Jamaica, the transport question was phrased as perceived adequacy of access to transport which could be sufficient even for those who do not use it. The result was a considerable instability in the poverty lines, whereby the allowances for these components could fluctuate wildly according to other household variables. We decided not to include these components in the subjective poverty line, although they are included in the consumption remainder under Method 2.

Table 4 gives the ordered probit estimates of the parameters of the model for food adequacy as a function of total consumption spending, log household size, demographic

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variables, the (log) mean consumption of the primary sampling unit, and regional dummy variables. For implementing Methods 2 and 3, Table 5 gives the results for the perceived adequacy of food, housing and clothing in Jamaica, while Table 6 gives the corresponding results for food and housing in Nepal. Notice that in these regressions we separately identify the corresponding consumption components. For Method 2 we also require the Engel curves for remaining consumption, as given in Table 7.

The regressions in Tables 4-7 are self-explanatory and there are few surprises. Actual measures of consumption tend to be highly significant predictors of perceived consumption adequacy. The perceived adequacy of food and housing tends to respond more elastically to actual spending on each component than on other components (Tables 5 and 6). Clothing in Jamaica, however, tends to respond more elastically to actual housing consumption than clothing; the lack of imputations for clothing services may be the reason. Larger households tend to perceive their consumptions as less adequate holding other variables constant. Holding per capita consumption constant, we find no significant economies of in Jamaica but we do for Nepal. From Table 4, the estimated elasticity of the SPL based on food adequacy in Nepal with respect to family size equals 0.47 (=0.37/0.79).[13] The demographic compositional effects tend not to be significant. Regional effects are stronger in Nepal, which is unsurprising given the country's much greater geographic diversity. There is also a strong negative effect of

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[13] It is widely assumed that poor households in low income countries do not face significant economies of scale in consumption since the share of their consumption going to "private" goods within the household is high. However, this assumption is questionable, and a quite wide range of elasticity values might be defended in such settings (Lanjouw and Ravallion, 1995). Nonetheless, we do find this size elasticity for Nepal to be surprisingly low. Household size might well be picking up so other factor influencing subjective perceptions of welfare, though what that factor might be is unclear. We hope to investigate this finding further in future work.

neighborhood consumption on perceived adequacy in Nepal, but not in Jamaica. The implied

elasticity of the SPL for Nepal with respect to mean consumption of the cluster is 0.29

(=0.23/0.79).

The region-specific SPLs are given in Table 8 for both countries and each method. We

give the poverty lines at mean points of other variables. However, the calculation of poverty

measures (to follow) naturally uses household-specific poverty lines rather than the averages in

Table 8. The last column gives previously established "objective" poverty lines for both

countries, which will be discussed later.

Method 2 requires the more prior estimation than either of the other methods; it requires

both the ordered probits by category of consumption and the Engel curve for the remainder. It is

to be expected that this creates imprecision in the resulting estimates. (Most methods of

calculating poverty lines require prior estimations, although we have not seen prior attempts to

calculate standard errors.[14]) How much so can be seen from Table 9, which gives standard errors

for the SPLs in Table 8, calculated by the Delta method. Standard errors increase substantially as

one moves from Method 1 to Method 3, and are highest for Method 2.

The aggregate poverty measures are given in Table 10; we give the popular headcount

index as well as the poverty gap index and the squared poverty gap index (introduced by Foster

et al., 1984) which penalizes inequality among the poor.[15] The three methods are in close

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[14] This is sometimes done for the poverty measures, though treating the poverty line as non-stochastic; see Kakwani (1993).

[15] Notice that, when comparing method 3 with the other two, the poverty measures do not necessarily follow the same raking as the poverty lines from Table 8. This is because the poverty lines are being applied to a differenet consumption aggregate under Method 3, in that the consumption remainder is excluded.

agreement, with headcount indices for Jamaica of 32-34% and 44-46% in Nepal. The proportionate divergence between the three methods is somewhat greater for the squared poverty gap.

As an aside, it may be noted that the headcount index for Method 1 in Table 10 is not the same as the percentage of people who say that their food is inadequate, as given in Table 2. This is in keeping with the SPL approach, which (as noted in the introduction) identifies the poor as those for whom total income or spending is less than the level which, on average, is deemed to be adequate "to make ends meet". Given latent heterogeneity and measurement error there will be people above this point who still feel that their level of living is inadequate, and people below this point who feel that it is adequate.

It is striking how close these aggregate poverty rates are to the results obtained by two independent studies of poverty in these countries which have been based on objective poverty lines. The Planning Institute of Jamaica (the statistics office of the government of Jamaica) estimated the incidence of poverty at 31.5% (Social Policy Development Unit, 1994). As part of the World Bank's Poverty Assessment for Nepal, Bank staff estimated the headcount index in Nepal to be 42% (Lanjouw, Prennushi and Zaidi, 1996). Both estimates are based on the same survey but use per capita poverty lines based on a food basket yielding minimum nutritional requirements (2245 calories per person per day for Jamaica and 2124 for Nepal).[16] The resulting poverty lines are given in the last column of Table 8.

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[16] The Nepal Study employed the same measure of consumption as this study. The Jamaican Planning Institute constructed their own consumption measure based on the same survey which was not available to the authors. The results quoted in table 8, 10 and 11 are directly taken from (Social Policy Development Unit, 1994). Figure 2 is based on the authors' calculations.

The regional poverty profiles vary more depending on the method used. Regional poverty profiles can be found in Table 11 for Jamaica and Table 12 for Nepal. The strongest differences are between Methods 1 and 2. This was to be expected since Method 1 only controls for differences in food adequacy by region. In Nepal for instance, housing conditions – holding everything else constant – are perceived to be less adequate in the western hills than in the eastern hills while for food adequacy the opposite holds. As a result method 2 yields a higher headcount index than method 1 for the western hills while the opposite holds for the eastern hills.

The urban versus rural poverty comparisons are of special interest in a developing country setting. Poverty comparisons between the two "sectors" have often been controversial, with different measurement methods giving very different results, including rank reversals (Ravallion and Baden, 1994). It has been argued that by ignoring relative welfare considerations, conventional approaches based on (objective) absolute poverty lines (which attempt to fix the real value of the poverty line between the two sectors) will tend to underestimate poverty in urban areas versus rural areas. The previous estimates we have quoted for both countries follow the conventional approach, and so they could also be criticized from this point of view. Yet, our subjective poverty lines tend to show even larger differences between rural and urban poverty measures than do the more conventional methods. Our results do not suggest that the conventional approach has underestimated urban versus rural poverty when compared to subjective poverty lines incorporating relative welfare effects, consistently with welfare perceptions.

Next we examine differences in the demographic poverty profile. Standard methods of setting poverty lines typically find that larger households are poorer in developing countries

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(Lipton and Ravallion, 1995). The relationship between poverty and household size is known, however, to be sensitive to measurement assumptions even within the class of standard "objective" methods (Lanjouw and Ravallion, 1995). The previous objective poverty lines for both Jamaica and Nepal followed the common practice in developing countries of having a constant per capita value, i.e., without any allowance for economies of scale in household consumption. In Table 13 we give our subjective poverty lines for various demographic groups, and each of the three methods described above. The SPL is found to increase less than proportionately with household size, with somewhat stronger economies of scale indicated for Nepal than Jamaica. For example, the poverty line for a family of four is (depending on the method) 2.3 to 2.4 times that for a single adult in Nepal, versus 3.1 to 3.9 in Jamaica.

Given the sizable scale economy in the Nepal SPL it should not be surprising that this greatly changes the demographic poverty profile when compared to poverty lines which do not incorporate scale economies. That is confirmed in Figure 2, which compares the poverty rates by household size implied by the previous objective poverty lines (Table 8) with those based on our SPL.[17] The per capita "objective" poverty line suggests that larger households tend to be poorer in both countries. This is also the case for the Jamaican poverty measures based on subjective poverty lines. However, for Nepal the poverty measures based on our SPL tend to fall as household size increases, though not monotonically. The objective poverty lines indicate that

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[17] Using Method 2; this choice made little difference. The relationship with household size was also similar for the poverty gap and squared poverty gap. The Social Policy Development Unit (1994) does not quote poverty measures by household size for Jamaica. We have calculated our own measures for Figure 2. However, since the precise definition of their consumption aggregate is not given in Social Policy Development Unit (1994), our consumption aggregate gives a slightly different (higher) aggregate poverty measure. Full details are available from the authors.

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single person families are the least poor, while the subjective poverty lines for Nepal indicate that they are the poorest.

As an aside on methodology, we also estimated our models using a probit estimator combining the "more than adequate" responses with the "just adequate" ones. The results were similar. For example, for Jamaica, the headcount varies from 34% for Method 3 to 35% for Method 2. For Nepal the headcount varies from 45% for Method 1 to 48% for Method 3. This was to be expected given that very few households reported their consumption to be more than adequate and the fact that the derivation of the poverty line is based on the first threshold only. These results suggest that in future surveys which are augmented to include a module on subjective welfare perceptions, it would be sufficient to include a simple yes/no answer on the question whether consumption is adequate for the household.

4   Conclusions

Methods of poverty analysis have differed radically between the "objective-quantitative" and "subjective-qualitative" schools, with little effort to learn from both. We have suggested a hybrid approach, building on past methods of subjective-welfare measurement, but adapted to a developing country setting.

It is difficult to believe one could get sensible answers to the minimum income question in most developing countries. For this and other reasons (including priors that almost everyone will think they are poor in a poor country) the subjective poverty line approach found in some of the developed-country literature has attracted little interest in developing countries. The method we have proposed allows one to retrieve the SPL from simple qualitative questions on perceived

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consumption adequacy added to an integrated household survey of the type favored in objective-quantitative welfare measurement.

We have implemented the approach using surveys for Jamaica and Nepal. The results seem encouraging. The reasonably close correspondence we have found between various methods suggests that even a single question on the perceived adequacy of food consumption will give poverty measures which accord closely with subjective poverty lines based on a fuller set of consumption components. The aggregate poverty measures obtained accord quite closely with more conventional "objective" methods.

However, more notable differences emerge in the geographic and demographic poverty profiles. The poverty measures by region are more sensitive than are the aggregates to the choice of method, though there is still considerable agreement on rankings. Interestingly, our subjective qualitative approach, incorporating effects of relative deprivation, does not tend to narrow the differentials in poverty measures between "poor" and "rich" areas. For example, our results suggest a larger difference in poverty measures between urban and rural areas than found by more conventional objective approaches based on a concept of basic and absolute consumption needs. People in poor areas perceive themselves to be even poorer than objective comparisons suggest. So our results do not suggest the SPL behaves more like a "relative poverty line" (which rises with average income) than an "absolute poverty line" (which does not).

Other differences emerge in the demographic poverty profile. Our SPL indicate sizable scale economies in consumption, particularly for Nepal. Indeed, the scale economy in our SPL for Nepal is strong enough to reverse the tendency for larger households to appear to be poorer when this assessed by commonly used "objective" methods.

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References

Blaylock, James R. and David M. Salmwood, "An Alternative Approach to Defining and

    Assessing Poverty Thresholds", *Western Journal of Agricultural Economics* 11 (1986):

    100-105

Browning, Martin, "Children and household economic behavior", *Journal of Economic*

    Literature 30 (1992): 1434-1475.

Colastanto, D., Arie Kapteyn and Jacques van der Gaag, "Two subjective definitions of

    poverty: Results from the Wisconsin Basic Needs Study", *Journal of Human Resources*

    19 (1984): 127-138.

Danziger, S., J. van der Gaag, E. Smolensky and M. Taussig, "The direct measurement of

    welfare levels: How much does it take to make ends meet", *Review of Economics and*

    Statistics 66 (1984): 500-505.

Deaton, Angus, and Muellbauer John, *Economics and Consumer Behavior* (Cambridge:

    Cambridge University Press, 1980).

Deaton, Angus and Salman Zaidi, "How to construct a consumption aggregate from household

    survey data", Development Research Group, World Bank, 1998.

De Vos, Klaas and Thesia I. Garner, "An Evaluation of Subjective Poverty Definitions:

    Comparing Results from the U.S. and the Netherlands", *Review of Income and Wealth* 37

    (1991): 267-285.

Easterlin, Richard A., "Will raising the incomes of all increase the happiness of all?",

    Journal of Economic Behavior and Organization 27 (1995): 35-47.

Foster, J., Greer, J., and Thorbecke E., "A class of decomposable poverty measures ",

Econometrica 52 (1984): 761-765.

Groedhart, Theo, Victor Halberstadt, Arie Kaptein and Bernard van Praag, "The poverty line:

Concept and Measurement", *Journal of Human Resources* 12 (1977): 503-520.

Grosh, Margaret E., and Paul Glewwe, "A guide to living standards measurement study

surveys and their data sets", Living Standards Measurement Study Working Paper 120,

World Bank, Washington DC.. 1995.

Hagenaars, Aldi J.M., *The Perception of Poverty*, (North Holland, Amsterdam 1986)

Hagenaars, Aldi J.M., and Bernard M.S. van Praag, "A synthesis of poverty line definitions",

Review of Income and Wealth, 1985: 139-154.

Kakwani, Nanak, "Statistical Inference in the Measurement of Poverty", *Review of*

Economics and Statistics 75 (1993): 632-639.

Kapteyn, Arie., "The measurement of household cost functions. Revealed preference

versus subjective measures", *Journal of Population Economics* 7 (1994): 333-350.

Kapteyn, Arie., Sara van de Geer, and Huib van de Stadt, "The impact of changes in

income and family composition on subjective measures of well-being", in Martin David

and Timothy Smeeding (eds) *Horizontal Equity, Uncertainty, and Economic Well-Being*,

Chicago, University of Chicago Press, 1985.

Kapteyn, Arie, Peter Kooreman, and Rob Willemse, "Some methodological issues in the

implementation of subjective poverty definitions", *The Journal of Human Resources*

23 (1988): 222-242.

Lanjouw, Peter, Giovanna Prennuhi and Salman Zaidi, "Building Blocks for a Consumption-

Based Analysis of Poverty in Nepal", mimeo, World Bank, Washington DC., 1996.

Lanjouw, Peter, and Martin Ravallion, "Poverty and Household Size", *Economic Journal* 105 (1995): 1415-1434.

Lipton, Michael and Martin Ravallion, "Poverty and Policy", in Jere Behrman and T.N. Srinivasan (eds) *Handbook of Development Economics Volume 3* Amsterdam: North-Holland, 1995.

Pollak, Robert, "Welfare Comparisons and Situation Comparisons", *Journal of Econometrics* 50 (1991): 31-48.

Pollak, Robert and T.J. Wales, "Welfare Comparisons and Equivalence Scales". *American Economic Review* 69 (1979): 216-221.

Ravallion, Martin, *Poverty Comparisons* Fundamentals of Pure and Applied Economics Volume 56, Harwood Academic Press, Chur, Switzerland, 1994.

_____, "Poverty Lines in Theory and Practice", LSMS Working Paper 133, World Bank, Washington DC., 1998.

Ravallion, M. and Bidani B., "How Robust is a Poverty Profile?", *World Bank Economic Review*, 8 (1994): 75-102.

Runciman, W.G., *Relative Deprivation and Social Justice.* London: Routledge and Kegan Paul, 1966.

Scitovsky, Tibor, *The Joyless Economy*, Oxford: Oxford University Press, 1978.

Social Policy Development Unit, "Estimates of Poverty in Jamaica: for the years 1992 and 1993", Planning Institute of Jamaica, Kingston, Jamaica, 1994.

Stanovnik, Tine, "Perception of poverty and income satisfaction. An empirical analysis of Slovene households", *Journal of Economic Psychology* 13 (1992): 57-69.

van de Stadt, Huib, Arie Kapteyn, and Sara van de Geer, "The relativity of utility:

    Evidence from panel data", *Review of Economics and Statistics* 67 (1985): 179-187.

van Praag, Bernard, "Ordinal and Cardinal Utility: An Integration of the Two Dimensions

    of the Welfare Concept", *Journal of Econometrics* 50 (1991): 69-89.

Figure 1: The subjective poverty line (z^*)

Subjective minimum
income

45°

z^* Actual
income
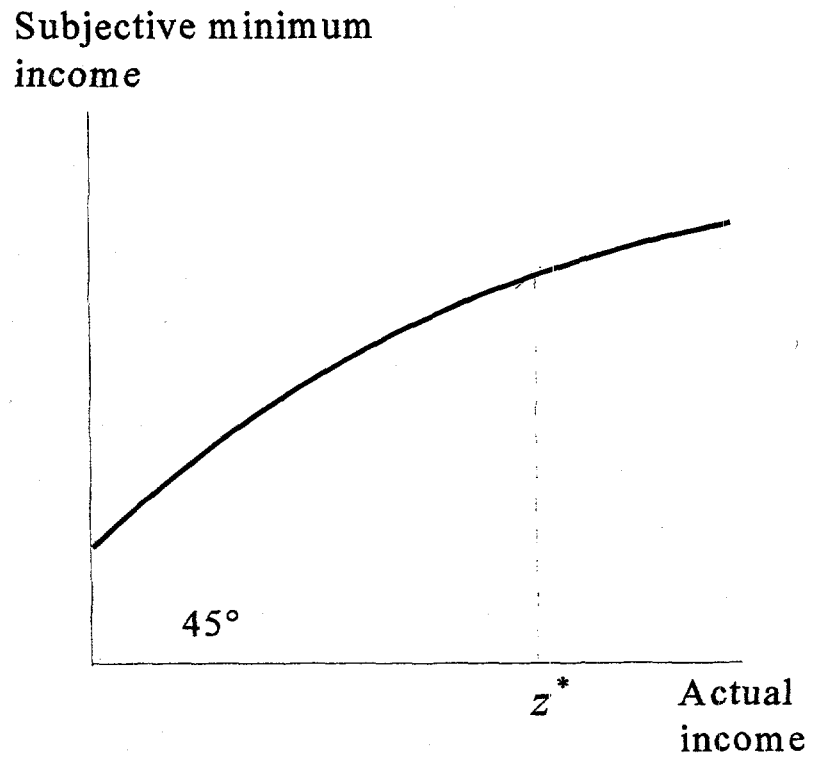
Figure 2: Poverty and Household Size

Jamaica

Nepal

25
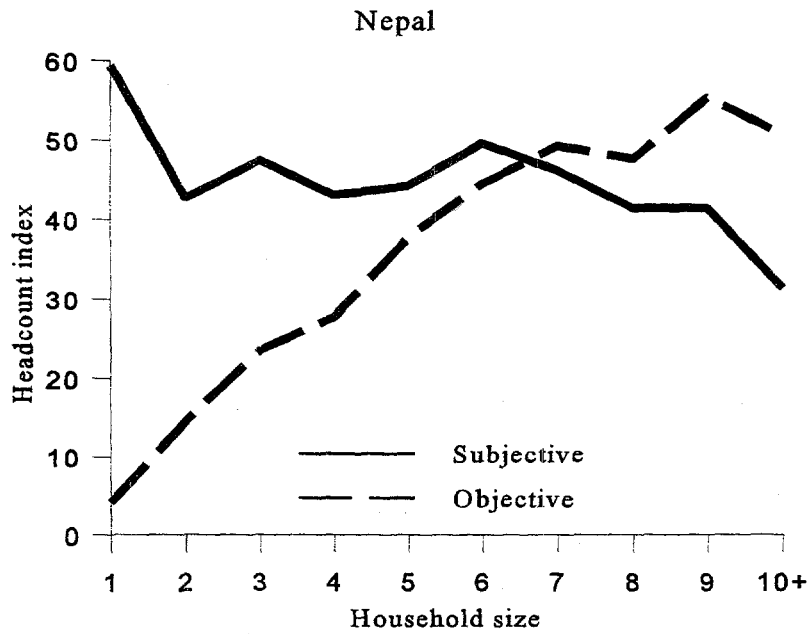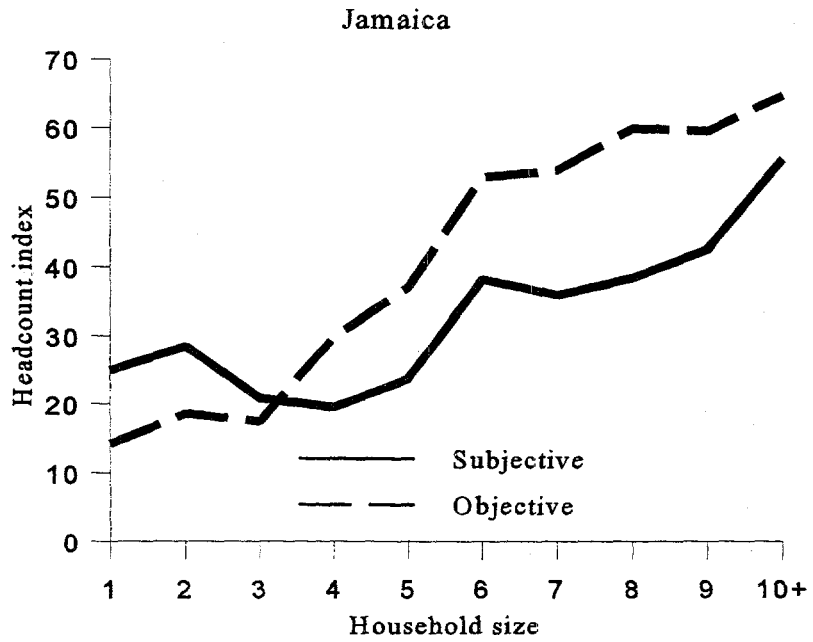
Table 1: Questions on consumption adequacy

I would like to ask your opinion of your family's standard of living	It was less than adequate for your family's needs.....1 It was just adequate for your family's needs.............2 It was more than adequate for your family's needs...3 Not applicable...4 "Adequate" means no more nor less than what the respondent considers to be the minimum consumption needs of the family
Concerning your family's food consumption over the past one month, which of the following is true?	
Concerning your family's housing, which of the following is true?	
Concerning your family's clothing, which of the following is true?	
Concerning the health care your family gets, which of the following is true?	
Concerning your children's schooling, which of the following is true?	

Table 2: Perceived adequacy of consumption in Jamaica and Nepal

Percentages		Less than adequate	Just adequate	More than adequate	Not applicable
Food	Jamaica	39	55	6	0
	Nepal	47	51	2	0
Housing	Jamaica	42	50	8	0
	Nepal	59	41	0	0
Clothing	Jamaica	36	57	7	0
	Nepal	53	47	0	0
Transport	Jamaica	48	47	4	0
Health care	Jamaica	41	55	4	0
	Nepal	52	48	0	1
Schooling	Jamaica	20	35	2	43
	Nepal	42	38	0	19

Table 3: Descriptive statistics for explanatory variables used in analysis

	Jamaica mean	std. dev.	Nepal mean	std. dev.
Log food consumption	10.14	0.70	9.94	0.63
log housing consumption	7.98	1.20	7.87	1.37
log clothing consumption	8.58	1.00		
log household size	1.11	0.72	1.60	0.53
fraction males aged < 18	0.151	0.185	0.224	0.174
fraction females aged < 18	0.151	0.187	0.205	0.176
fraction males aged [18-60]	0.290	0.316	0.232	0.167
fraction females aged [18-60]	0.244	0.241	0.268	0.157
fraction males aged > 60	0.078	0.214	0.033	0.097
fraction females aged > 60	0.086	0.212	0.038	0.124
log mean consumption of cluster	10.10	0.42	8.97	0.63
Number of observations	1954		3373	

Table 4: Adequacy of food as a function of total consumption

(t-ratios in parentheses)	Jamaica	Nepal
log total consumption	0.64	0.79
	(11.69)	(16.01)
log household size	-0.54	-0.37
	(-8.25)	(-5.77)
fraction males age < 18	-0.13	-0.35
	(-0.72)	(-2.04)
fraction females aged < 18	-0.09	-0.45
	(-0.48)	(-2.60)
fraction females aged [18-60]	0.33	0.11
	(2.61)	(0.61)
fraction males aged > 60	0.12	-0.08
	(0.86)	(-0.34)
fraction females aged > 60	-0.01	0.11
	(-0.07)	(0.53)
log mean consumption of cluster	0.07	-0.23
	(0.83)	(-3.33)
other urban	0.17	-0.40
	(2.13)	(-3.85)
rural Jamaica	-0.004	
	(-0.070	
rural west hills Nepal		-0.45
		(-3.89)
rural east hills Nepal		-0.58
		(-5.71)
rural west Terai Nepal		0.003
		(0.03)
rural east Terai Nepal		-0.15
		(-1.34)
α_1	6.91	5.08
	(8.91)	(8.44)
α_2	8.92	7.58
	(11.37)	(12.41)
McFadden's Pseudo R^2	0.09	0.13

Table 5: Perceived consumption adequacy by commodity group in Jamaica

	Food	Housing	Clothing
log food consumption	0.24 (4.04)	0.04 (0.71)	0.13 (2.11)
log housing consumption	0.23 (7.51)	0.47 (14.29)	0.23 (7.60)
log clothing consumption	0.06 (1.64)	-0.02 (-0.59)	0.14 (3.83)
log household size	-0.39 (-5.58)	-0.18 (-2.64)	-0.29 (-4.19)
fraction males age < 18	-0.31 (-1.63)	-0.21 (-1.09)	-0.57 (-2.99)
fraction females aged < 18	-0.19 (-0.99)	-0.27 (-1.39)	-0.17 (-0.90)
fraction females aged [18-60]	0.15 (1.09)	0.04 (0.27)	0.09 (0.64)
fraction males aged > 60	-0.03 (-0.17)	0.61 (3.66)	0.15 (0.92)
fraction females aged > 60	-0.26 (-1.54)	0.58 (3.53)	0.35 (2.12)
log mean consumption of cluster	0.16 (1.89)	0.02 (0.28)	0.16 (1.89)
other urban	0.14 (1.75)	0.17 (2.07)	0.10 (1.24)
rural	0.08 (1.10)	0.33 (4.27)	0.08 (1.03)
α_1	5.69 (6.80)	4.05 (4.84)	5.17 (6.24)
α_2	7.73 (9.15)	5.98 (7.09)	7.21 (8.61)
McFadden's Pseudo R^2	0.09	0.12	0.08

Table 6: Perceived adequacy of food and housing in Nepal

	Food	Housing
log food consumption	0.60	0.22
	(10.60)	(3.81)
log housing consumption	0.32	0.32
	(12.57)	(12.03)
log household size	-0.37	-0.19
	(-5.660	(-2.72)
fraction males age < 18	-0.32	-0.43
	(-1.84)	(-2.37)
fraction females aged < 18	-0.43	-0.36
	(-2.44)	(-2.00)
fraction females aged [18-60]	0.06	-0.01
	(0.35)	(-0.04)
fraction males aged > 60	-0.07	0.18
	(-0.29)	(0.70)
fraction females aged > 60	0.07	0.14
	(0.34)	(0.62)
log mean consumption of cluster	-0.23	-0.37
	(-3.41)	(-5.16)
other urban	-0.34	-0.10
	(-3.26)	(-0.90)
rural west hills	-0.26	-0.75
	(-2.19)	(-5.99)
rural east hills	-0.40	-0.50
	(-3.62)	(-4.30)
rural west Terai	0.29	-0.54
	(2.14)	(-3.76)
rural east Terai	0.03	-0.25
	(0.25)	(-2.06)
α_1	5.40	0.75
	(8.67)	(1.16)
α_2	7.92	3.90
	(12.55)	(5.87)
McFadden's Pseudo R^2	0.14	0.12

Table 7: Engel curves for remaining consumption

	Jamaica	Nepal
constant	-1.02 (-3.36)	-1.78 (-5.24)
log core consumption	1.08 (36.31)	1.09 (34.05)
log household size	0.08 (2.11)	0.10 (2.20)
fraction males age < 18	-0.48 (-4.41)	-0.11 (-0.87)
fraction females aged < 18	-0.34 (-3.02)	-0.18 (-1.40)
fraction females aged [18-60]	-0.15 (-1.95)	-0.25 (-1.82)
fraction males aged > 60	-0.43 (-5.13)	-0.20 (-1.05)
fraction females aged > 60	-0.53 (-6.32)	-0.38 (-2.37)
other urban	-0.08 (-1.74)	-0.20 (-2.64)
rural Jamaica	-0.32 (-8.35)	
rural west hills Nepal		-0.79 (-11.07)
rural east hills Nepal		-0.56 (-8.48)
rural west Terai Nepal		-0.53 (-6.48)
rural east Terai Nepal		-0.53 (-7.62)
R squared	0.57	0.50

Note: Core consumption is food and housing, plus clothing for Jamaica. The dependent variable is total consumption minus core consumption.

Table 8: Subjective poverty lines for families with average characteristics - Jamaica and Nepal

	Method 1 Based on perceived adequacy of food alone	Method 2 Based on perceived adequacy of food, housing and (for Jamaica) clothing, and using an Engel curve for remaining consumption	Method 3 Same as Method 2, but excluding remaining consumption	Independent, previous estimates of objective poverty lines; Cost of basic needs poverty lines, anchored to pre-determined nutritional requirements
Jamaica				
Kingston	13110	10524	6290	14472
Other Urban	10082	7624	4743	14319
rural	13203	10980	7336	13203
Nepal				
Kathmandu	4129	5164	3674	6122
other urban	6790	8851	6552	5197
rural western hills	7256	12821	10657	5065
rural eastern hills	8620	5834	4721	5241
rural western Terai	4112	11896	9435	3964
rural eastern Terai	4973	3655	2963	4404

Note: All poverty lines are per capita. Poverty lines for Method 1,2 and 3 were calculated on the basis of country specific average household characteristics (see Table 3), and normalized by household size.

Table 9: Standard errors of the subjective poverty lines

	Method 1 Based on perceived adequacy of food alone	Method 2 Based on perceived adequacy of food, housing and (for Jamaica) clothing, and using an Engel curve for remaining consumption	Method 3 Same as Method 2, but excluding remaining consumption
Jamaica			
Kingston	1174	4906	2840
Other Urban	1141	3579	2160
rural	1011	4546	2958
Nepal			
Kathmandu	498	1494	1034
other urban	643	2544	1838
rural western hills	447	8174	6694
rural eastern hills	528	460	364
rural western Terai	387	11549	8994
rural eastern Terai	311	317	252

Note: Standard errors for the SPLs in Table 8, calculated using the Delta method.

Table 10: Aggregate poverty measures

Percentages	Headcount index	Poverty gap index	Squared poverty gap index
Jamaica			
Method 1	34.4	11.2	5.3
Method 2	31.5	13.2	7.7
Method 3	31.9	13.5	7.6
Previous estimate	31.5	n.a.	n.a.
Nepal			
Method 1	43.6	14.5	6.5
Method 2	43.0	16.7	8.6
Method 3	46.0	17.9	9.3
Previous estimate	42	12.1	5.0

Note: See Table 7 for description of alternative methods; see text for full details.

Table 11: Poverty profile by region for Jamaica

	Method	Headcount index	Poverty gap index	Squared poverty gap index
Kingston	1	21.4	6.1	2.8
	2	18.1	5.8	3.1
	3	16.8	6.2	3.3
	Previous estimate	21.8	n.a.	n.a.
Other urban	1	19.6	5.1	1.9
	2	13.2	4.3	2.2
	3	12.0	3.9	1.9
	Previous estimate	28.9	n.a.	n.a.
Rural	1	47.8	16.7	8.2
	2	46.5	21.1	12.5
	3	48.6	21.5	12.3
	Previous estimate	38.9	n.a.	n.a.

Table 12: Poverty profile by region for Nepal

Percentages	Method	Headcount index	Poverty gap index	Squared poverty gap index
Kathmandu	1	0.7	0.2	0.0
	2	1.1	0.3	0.1
	3	0.9	0.3	0.1
	Previous estimate	4	0.4	0.1
Other urban	1	30.5	9.1	3.8
	2	39.4	16.2	8.5
	3	40.3	15.9	8.3
	Previous estimate	34	10.9	4.4
Rural western hills	1	71.1	27.9	13.6
	2	84.7	39.7	22.4
	3	89.6	43.2	25.1
	Previous estimate	57	21.0	9.9
Rural eastern hills	1	66.7	23.5	10.8
	2	38.7	10.7	4.1
	3	43.1	11.2	4.2
	Previous estimate	33	9.1	3.6
Rural western Terai	1	22.6	4.5	1.4
	2	62.7	23.0	10.7
	3	68.3	24.3	11.2
	Previous estimate	46	11.2	3.9
Rural eastern Terai	1	31.5	7.0	2.3
	2	12.2	2.1	0.6
	3	12.7	2.3	0.7
	Previous estimate	39	8.7	2.9

Table 13: Household poverty lines by family composition

		Method 1		Method 2		Method 3	
Jamaica	family size	poverty line	index	poverty line	index	poverty line	index
one prime age male	1	16187	1.00	8096	1.00	5065	1.00
one prime age female	1	9626	0.59	5334	0.66	3551	0.70
one prime age male plus one prime age female	2	22428	1.39	12680	1.57	7888	1.56
one prime age male plus one prime age female plus one male child	3	36954	2.28	22063	2.73	14032	2.77
one prime age male plus one prime age female plus one female child	3	36138	2.23	22216	2.74	13878	2.74
one prime age male, one prime age female, one male child, one female child	4	50121	3.10	31599	3.90	19959	3.94
Nepal							
one prime age male	1	11985	1.00	10129	1.00	8256	1.00
one prime age female	1	10425	0.87	9772	0.96	8307	1.01
one prime age male plus one prime age female	2	15397	1.28	12878	1.27	10566	1.28
one prime age male plus one prime age female plus one male child	3	22018	1.84	19449	1.92	15725	1.90
one prime age male plus one prime age female plus one female child	3	22971	1.92	18574	1.83	15094	1.83
one prime age male, one prime age female, one male child, one female child	4	28268	2.36	23886	2.36	19198	2.33

Note: All poverty lines are at the household level and should be compared with total household consumption. Poverty lines for Method 1,2 and 3 were calculated on the basis of country specific average household characteristics (Table 3).

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