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Intercountry Comparisons of Poverty Based on a Capability Approach: A Pilot Study

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Intercountry Comparisons of Poverty Based on a Capability Approach: A Pilot Study*

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Abstract

Inter-country comparison and aggregation of poverty based on elementary capabilities provides an alternative to existing money-metric approaches that is more coherent and meaningful. A study of three countries from three continents (Nicaragua, Tanzania, and Vietnam) demonstrates that a capability-based approach can be implemented using existing data. Standard errors of poverty measures are estimated and used to make poverty comparisons and to assess their robustness to the choice between money-metric and capability-based approaches to identifying the poor. The international coordination of poverty line construction and survey-design is recommended in order to permit routine capability-based inter-country poverty comparison and aggregation.

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1 Introduction

How should poverty be estimated? As pointed out by Sen (1981) all poverty assessments involve two distinct exercises: identification (of who the poor are and how poor they each are) and aggregation (of the previously identified information concerning who is poor and to what extent). A coherent exercise of poverty assessment must adopt an identification criterion which is at some level of specification applied uniformly to all individuals. In keeping with this requirement, exercises of poverty assessment within a national context typically adopt for purposes of identifying the poor a poverty line defined in relation to some uniform standard. The uniform standard may be defined in terms of commodities (for example, as a certain quantity of money income, or as the money income required to purchase a certain bundle of commodities), in terms of the characteristics of commodities (for example, as the money income required to purchase a bundle of commodities possessing certain characteristics such as aggregate calorie content), or in term of final achievements (for example as the money income required to purchase a bundle of commodities sufficient to confer a certain level of achievement of utility, of a relevant elementary capability or index of capabilities, or another valued end).[1] An invariant identification criterion (at some level of specification) is a minimal and inescapable requirement of a coherent poverty assessment exercise.

Efforts to assess poverty at the regional and global level are no less subject to this demand. Meaningful inter-country comparison and aggregation requires that a common identification criterion should be applied in all countries. Almost all existing producers of global poverty estimates have attempted to meet this demand through a 'money-metric' approach in which the common identification criterion is specified in terms of an 'international poverty line' (IPL) expressed in PPP dollars of a specific year.[2] Although this approach seems superficially to establish a common standard, it may do so only in a hollow sense, and fail to maintain an *appropriate* form of invariance across countries, Reddy and Pogge (2003). An important reason is that the PPP conversion factors used fail to reflect the requirements of an invariant level of purchasing power over essential commodities. Moreover, the IPL itself has not been set at a level that reflects the cost of achieving basic human requirements,

[1] See e.g. Sen (1999).

[2] A very important exception is Gordon et al (2004). The phrase 'money-metric' is used here to signify that the international poverty line is defined in relation to a money amount rather than an explicit standard in a final achievement space. This use of the phrase differs from its technical use in other contexts, in which it refers to the idea that increments in agents' final achievements may be equivalently expressed as increments to their money income.

as would be required for the poverty measurement exercise to be *meaningful* as well as coherent.

An alternative to the money-metric approach to international poverty comparison and aggregation is a capability-based approach. In the latter, a poverty line is defined in each country (or perhaps sub-national jurisdiction) which corresponds to the minimal cost of achieving a set of income-dependent elementary human capabilities which are held *invariant* across countries (or jurisdictions). The resulting poverty lines express an identification criterion which possesses a common and meaningful interpretation across countries. The consequent poverty assessment exercise is by construction both internally coherent and meaningful, and does away altogether with the use of PPPs, thereby avoiding a major source of uncertainty and confusion. Conceptually, the capability-based alternative involves nothing more than the generalization to the global level of the approach to poverty assessment that is already widely viewed as most appropriate at the national level. The alternative should be implemented through a transparent, reasoned and participatory process of determining the relevant elementary capabilities (that are invariantly to be deemed necessary to achieve in order to avoid poverty) as well as the detailed methodology of translating this conception into poverty lines and survey designs in each country [See Reddy and Pogge (2003) for a full discussion of a possible approach to doing so]. The poverty lines that correspond to an invariant conception in the space of capabilities may of course themselves vary parametrically with circumstances, such as relative prices, environmental conditions, and contextual norms. An exercise of coordination is required to specify the "high-level" and invariant capabilities-based conception to which the monetarily identified poverty-lines all correspond. In the absence of an exercise of international coordination of this kind, the capability-based alternative is not yet realizable.

This pilot-study aims to combat scepticism regarding the possibility of capability-based international comparison and aggregation. It shows that despite the absence of prior international coordination it is possible to use existing surveys to undertake the construction of capability-based internationally comparable poverty statistics. The study demonstrates this by using the ability to achieve adequate nourishment as a uniform capability-based criterion for identifying the poor, and compares the resulting poverty statistics to those that are generated using the money-metric approach to identifying the poor across countries. It also demonstrates that the validity of some statements concerning the relative extent of poverty across countries is independent of the choice of identification criterion whereas the validity of other statements crucially depends on this choice. Although the aim of the study is to show the feasibility and desirability of undertaking capability-based poverty comparisons using available data, it is not meant to suggest that available data is fully adequate for this purpose. The development of common international survey design

and poverty line construction protocols is an inescapable requirement for increasing the coherence and meaningfulness of international poverty comparison and aggregation.

We do not claim that the poverty estimates produced here are 'first best' estimates of poverty in each country. It is obvious that various enhancements can and should be undertaken to generate adequate poverty assessments for each country (for example, the use of adult-equivalence scales). However, these imperfections of the current study are imperfections of all existing regional and global money-metric poverty estimates.

2 Inter-Country Comparisons and Aggregation of Poverty

The cost of achieving a set of elementary capabilities can be described in an accustomed way. It is assumed that for each individual there exists some set of commodities (which may be called the adequacy set) that suffices to achieve the elementary capabilities that are of interest. The minimal cost of achieving a bundle of commodities in the adequacy set can be identified, given the prices faced by an individual and appropriate technical assumptions, as illustrated in Figure (1). A particularly simple approach is that in which the adequacy set is assumed to be common across persons. In the illustrative example we provide in this pilot study, the ability to be adequately nourished is taken as a centrally relevant elementary capability, which 'anchors' the identification exercise. If it is assumed that a certain (invariant) level of calories is sufficient for all persons to achieve the capability of adequate nourishment then, given further information on the adequacy set (the assumed relationship between admissible commodity bundles and calories), it is possible to identify the minimum cost of achieving the capability of interest. The potential inadequacies of this approach are obvious. Most prominently, it is insufficiently attentive to the diverse characteristics of persons (for instance, their different ages, genders or occupations) which may influence the manner in which they are able to transform commodities into capabilities. Nevertheless, we adopt a version of this approach for simplicity. Indeed the approach we apply in this study, for operational simplicity, is even narrower: it demands that a *specific* calorifically adequate bundle (reflecting the pattern of consumption of a reference quintile of the population in each country, chosen according to a rule defined below) be attainable at the poverty line.

We construct poverty estimates for three countries: Nicaragua, Tanzania, and Vietnam using a *common* capability-based (nutritionally anchored) approach as well as using the money-metric "$1 per day" and "$2 per day" international poverty lines. We subsequently explore the robustness of inter-country poverty comparison and aggregation to the choice of identification concept.

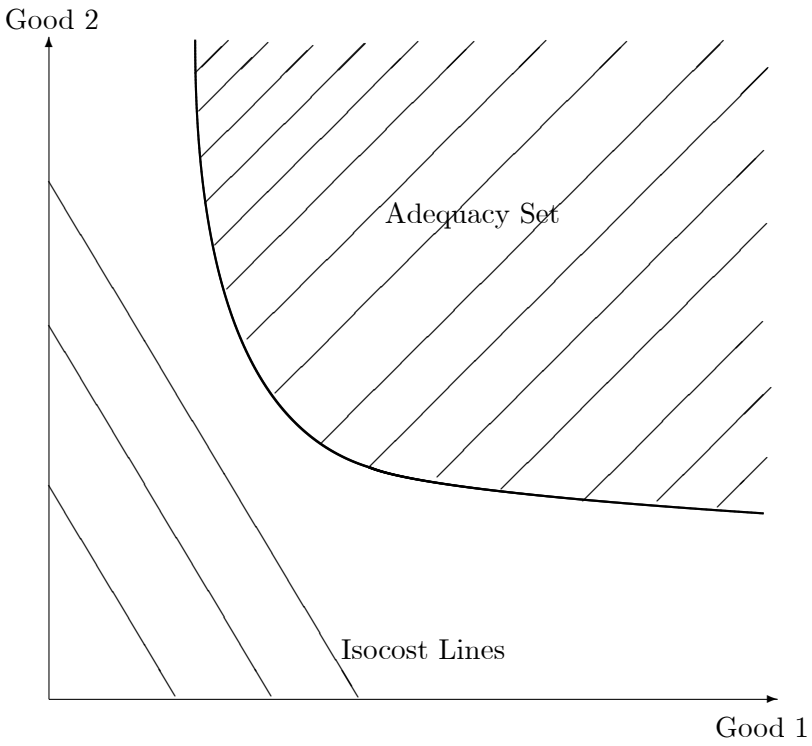

Figure 1: Adequacy Set and Isocost Surface

Although we apply a common nutritional (and specifically calorific) standard in all three countries, we attempt to account for differences in dietary norms and local prices. We follow to the extent possible an identical methodology of poverty line construction and survey analysis in all three countries. Since the surveys used were not designed with this end in mind, judgments on the part of the researchers were necessary in order to undertake the analysis. Despite the necessarily "second-best" nature of the exercise we believe that it represents a more coherent and meaningful approach for inter-country comparisons of poverty than does the prevalent "money-metric" approach.[3]

In the empirical exercise that follows, we attempt to identify poverty lines in three countries, each in a distinct continent, which correspond to a common nutritional standard (understood rather minimally in terms of food energy requirements, i.e. calories). We shall then make an allowance for non-calorie needs. The approach we take to identifying the allowance for non-food energy needs is to determine the ratio of non-food to food expenditure for a reference population in each country (to be defined) and to maintain this ratio at the poverty line. Implicitly, the ratio is permitted to differ across countries. The requirement for food expenditure is arrived at by determining the cost for the reference population of meeting the presumed calorie requirement while maintaining its present pattern of consumption of foods.

A set of premises that can be adopted to support this approach is that if the shortfall from the calorie requirement is some proportion for the mean person in the reference population, then the shortfall from the non-calorie (whether protein, carbohydrate, micro-nutrient or non-food requirement) is in the same proportion, and that the shortfall can be redressed in both cases through an identical expansion of expenditure. Is such an assumption plausible? Figure (2) illustrates two possible cases.

In the first case, the adequacy set is such that the 'scaling up' of the observed mean consumption bundle of the reference population, E, suffices to meet calorie energy and non-calorie requirements simultaneously, by permitting the purchase of consumption bundle R1. In the second case, the adequacy set is such that the 'scaling up' of the observed mean consumption bundle of the reference population, E, suffices to meet calorie requirements but does not suffice to meet non-calorie requirements. In the second case, the attainment of both calorie and non-calorie requirements simultaneously would require the ability to purchase a bundle such as

[3] An important exception to the dominance of the money-metric approach to international poverty statistics consists in the poverty estimates produced for countries in Latin American and the Caribbean by the Economic Commission for Latin American and the Carribbean (ECLA), which have been based loosely on a nutritional standard, see Altimir (1982). Although there are significant methodological problems present in the ECLA approach (in particular in the manner in which the nutritioanl standard it applies is adjusted to reflect the deomographic composition of each country) it is in the spirit of what is proposed here.

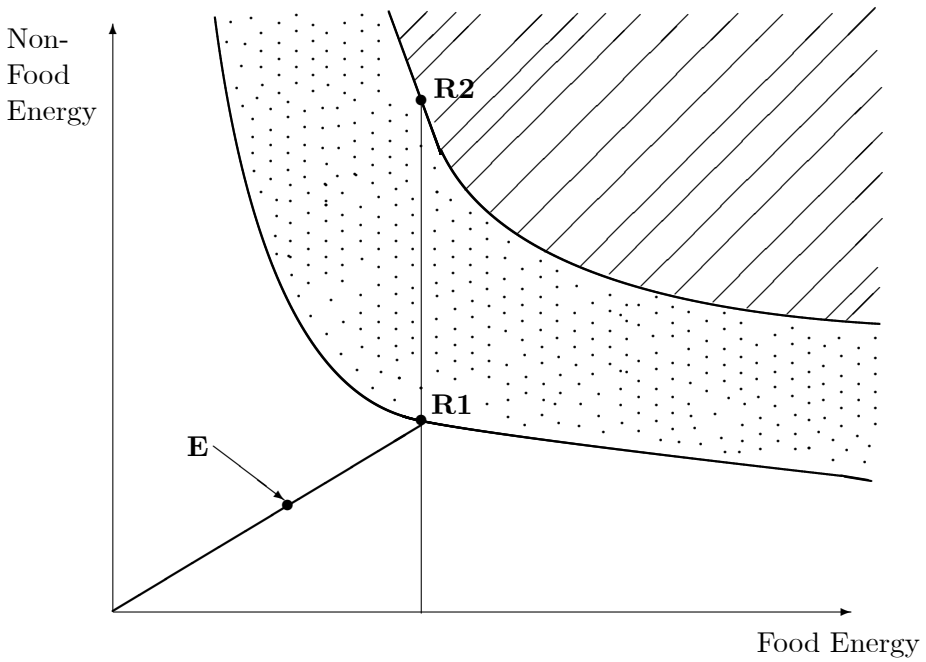

Figure 2: Food-Energy and Non-Food-Energy Expenditure Requirements

R2, which is more expensive than R1.

Our premise in what follows is that we are dealing with cases of the first kind. This is, however, a very poor assumption indeed, and suffices only because the intent of our exercise is illustrative rather than definitive. Engel's law , which is one of the few propositions in economics that has received widespread empirical validation, states that the share of expenditure on food diminishes with income. It appears to be true even at low levels of income, which is suggestive of the possibility that consumers may prioritize the satisfaction of food needs over the satisfaction of non-food needs.[4] Insofar as this is true, the expenditure required to meet calorie requirements and non-calorie requirements simultaneously will be different from the cost of purchasing R1 (and in the example shown, greater than it, since it is assumed that expenditures on requirements other than food energy must be expanded proportionally more than must expenditure on food energy in order that both requirements may adequately be met).

A more sophisticated approach to capability-based inter-country comparisons will address this issue frontally. However, in order to do so a more explicit specification of non-calorie requirements, as well as adequate survey data to identify the cost of meeting these requirements while abiding by prevalent norms, is needed. Such an exercise may not be readily feasible without the design of surveys specifically with this end in mind.

2.1 Data and Empirical Work

The three countries selected for this exercise are attractive choices for three distinct reasons. First, each of these countries lies in a different continent, thus allowing us to demonstrate that capability-based inter-country comparison and aggregation of poverty estimates can be undertaken despite the presence of (possibly very) different food habits and non-food expenditure patterns. Second, two of the countries chosen (Nicaragua and Tanzania) possessed very similar headcount ratios in the 1990s according to World Bank's estimates based on its \$1 and \$2 per day IPLs but the third country (Vietnam) possesses a very different headcount ratio from the other two, as summarized in Table (1).[5]

As a result, application of this methodology to these three countries enables us to explore whether substantially different ordinal as well as cardinal comparisons may result from an alternative approach to identifying the poor, both in comparisons in which the initial headcount ratios are clearly different and comparisons in which they are not.

[4] Indeed, there is also evidence that at low levels of income, consumers prioritize the satisfaction of food energy requirements over the satisfaction of other nutritional requirements. This may be true even in relatively wealthy countries. See e.g. USDA (1999).

[5] Source: World Bank's World Development Indicators (accessed on-line on March 13th 2005).

Table 1: World Bank's Poverty Headcount Ratio Estimates

Year	1991		1993		1998	
Poverty Line ($ a day, PPP)	$1	$2	$1	$2	$1	$2
Nicaragua	...	...	47.94	77.78	44.71	79.03
Tanzania	48.54	72.53	...	...	...	...
Vietnam	...	...	14.63	58.16	3.8	39.68

Third, in each of these countries we were able to acquire access to well-designed household surveys in order to perform the exercise.

Each household survey asked questions about expenditure on food and non-food items. For Vietnam and Nicaragua the data are from the Living Standard Measurement Surveys conducted in these countries by the World Bank in collaboration with national statistical agencies. The data on Tanzania come from the Household Budget Survey conducted by Tanzanian National Bureau of Statistics.

The LSMS for Vietnam adopted a specific methodology of poverty line construction and survey analysis using a capability-based standard (a 2100 calorie nutritional "anchor"). We adopt the same methodology and use the household data sets for Nicaragua and Tanzania to compute comparable poverty lines for these two countries and to produce poverty estimates on the basis of the poverty lines constructed. We make every attempt to adhere to the methodology employed in Vietnam, to the extent possible, recognizing that there are many plausible alternative approaches to constructing a nutritionally anchored poverty line (as described ably, for example, in Ravallion (1994)). The methodology that was employed in Vietnam, and that we reproduced for Vietnam and extended to the other countries, is described below.

We calculated the bootstrapped standard errors for every poverty statistic to facilitate comparisons between the statistics related to different poverty lines concepts and to different countries. The bootstrap estimation relied on 1000 iterations for every poverty statistic estimated. This large number of iterations guaranteed in most, if not all, cases a very high confidence level in the calculation of the standard errors: a 5% significance level and about 4.5 percent deviation in magnitude from the limiting standard deviation. In evaluating the bootstrap accuracy performance we followed the methodology of Andrews and Buchinsky (2000).[6]

[6] We calculate standard errors both through bootstrapping and through the SEPOV command in STATA (which implements a standard error calculation based on theoretical premises), following the procedures proposed by Deaton (1997) and by Howes and Lanjouw (1998). In both instances, a simple two stage sampling design is assumed, whereas in fact all of the surveys we have examined involve a more complicated survey design. As a result, the standard errors we calculate cannot be viewed as more than indicative. This is of course not a problem unique to this case but would seem to beset much of the entire applied literature.

2.2 Methodology (Vietnam)

The head count ratio for Vietnam was calculated by the Vietnam Living Standards Survey (VLSS) as follows:[7]

The calorie anchor used was 2100 calories per day. Using the data on household per capita expenditure from the VLSS 1993, survey households were divided into quintiles according to their total expenditures per capita. No distinction was made between rural and urban sectors. The average calorie intake per person per day was calculated for each quintile based on the quantities of food consumed by these households, with some calorie numbers imputed when exact quantities consumed were not clear.[8] The quintile whose calorie intake was closest to 2100 was identified as the 'reference quintile'. This was quintile three with a per-capita calorie intake of 2052 calories per day. Its average food basket was used to construct a "synthetic" food basket containing 2100 kilocalories and possessing the same consumption pattern as the reference quintile. The average quantities of the food items consumed by the reference quintile were scaled up linearly (by $2100 \div 1969$[9]) to create a synthetic food basket containing the required total calorie content. The food basket thus arrived at consists of 40 food items, with quantities in kilograms that must be consumed per capita per year to achieve a food energy intake of 2100 calories per day, given the assumed calorie contents of each food. To convert from daily calorie intake to yearly, 2100 was multiplied by 365. Median national prices calculated from the VLSS 93 commune-level price data were used to price the food basket. The prices recorded in the VLSS were observed in January 1993. Evaluation of the cost of the synthetic food basket at the median national prices gives rise to an estimate of the national "food poverty line" of 749,723 Dong per person per year. For the third quintile, non-food expenditures were 401,291 Dong per person per year. This number was scaled up by 1.023 ($= 2100 \div 2052$) to arrive at a non-food expenditure allowance at the poverty line of 410,640 Dong. The national overall poverty line was set accordingly at 1,160,363 Dong ($= 410{,}640 + 749{,}723$)—the sum of the food poverty line and the non-food expenditure allowance. To arrive at more specific regional poverty lines, regional price deflators were constructed from the price questionnaire of VLSS 93, in which the weights were the expenditure shares of all (food and non-food) items[10].

[7] The following description relies on the methodology described in World Bank (1999).

[8] Calorie data could not be found for barley/millet; moreover, for some categories the physical amount of the good was not reported because of irregular consumption of those food items. Consequently, the caloric values for a few items could not directly be calculated and had to be imputed. The pre-imputation figure for the third quintile was 1969 calories per capita. See World Bank (1999) for more details.

[9] The number 1969 is used instead of 2052 because 2052 is the post-imputation number. See footnote (8).

[10] We presume of the reference quintile, although this is not clearly specified in the survey docuemntation.

Since the survey was carried out in different months in different communes even within 1992-93, all household nominal expenditures were deflated so as to express them in the currency units of January 1993. For this monthly price deflators for 3 categories: rice, other food, and non-food items, provided by the Vietnamese General Statistical Office (GSO) were used.[11] We were able to reproduce the poverty estimates produced by the LSMS and include them in Tables (11) and (12)below along with associated standard errors (the methodology of constructing those is discussed further below). We provide resulting estimates for Vietnamese poverty in two different LSMS survey years, 1993 and 1998.

The methodology applied in Vietnam amounts to undertaking four steps: 1. Exogenously identifying a threshold of capability adequacy (the 2100 kCal calorie norm), 2. Determining the cost of achieving this threshold (the food poverty line) while maintaining the pattern of consumption of a reference quintile, 3. Establishing an allowance for non-food expenditures such that the ratio of this allowance to the food poverty line is the same as the ratio of non-food to food expenditures for the reference quintile. 4. Setting an overall poverty line, equal to the sum of the food poverty line and the non-food expenditure allowance, and determining the number of persons living in households with per capita consumption beneath this level.

3 Nicaragua

The data for Nicaragua are from the Nicaraguan LSMS for 1997-98 (known as the EMNV-1998 Survey). We have followed the methodology used in Vietnam to calculate the capability-based poverty line for Nicaragua. Note that the EMNV Survey also produced a poverty line for Nicaragua, which was also anchored in a calorie standard. However it used a somewhat different methodology to arrive at the poverty line. So as to achieve comparability between our cases to the extent possible we do not further consider that methodology in our calculations. More specific details regarding the procedure we applied are as follows:

3.1 Construction of Nicaraguan Poverty Line

1. The Nicaragua LSMS asked each survey household to report the quantities of foods purchased and foods received as gifts over the past 15 days. Households were asked questions about 62 different foods.[12] Our first step was to assess

[11] These were presumably national price deflators, although this is not explicitly noted in the survey documentation.

[12] The questionnaire had questions about 58 specific foods and 4 questions in which the household was asked to mention foods that it had purchased/received but that were not listed among the 58. Each household was required to report the quantity and the units for each food. For example, if a household reports a purchase of 5 kg. of rice the survey reports this as a value of '5' in the quantity

the calories consumed per day per person in each household. This required "converting" each food quantity consumed into the calories it contained. We used the same calorie conversion factors utilized by the World Bank in preparing its LSMS report.[13] We then multiplied each quantity-unit by the appropriate conversion factor to arrive at the implied calorie consumption from each food quantity. The aggregate of these resulting calories consumed over all foods gave the total calorie consumption per day by the household. This total was divided by the number of household members to arrive at the calorie expenditure per capita for each household.

2. Next we took data on the total per capita expenditure by each household from the consumption aggregate files of the LSMS data and divided the sample into quintiles of per capita total expenditure.[14] For each of the five quintiles we computed the mean per capita calorie consumption. These means are presented in Table (2). As can be seen, at 2091.39 calories per day, the mean per capita calorie consumption of quintile 2 was closest in absolute difference to 2100.

   Therefore, the food poverty line was anchored to average the food basket of persons in the reference quintile, following the procedure adopted in Vietnam. A synthetic food basket was constructed by scaling up this average food basket (by multiplying by $2100 \div 2091.39 = 1.0041$) so that the synthetic food basket contained total calorie content equivalent to 2100 calories per day. The next task was to price the synthetic food basket. For each food whose quantity was reported by the household, the price at which the food was purchased was also reported in the survey. Moreover, households reported the monetary value of foods that they received as gifts. For each household, we identified the resulting unit-value information corresponding both to the purchased and received items. We then computed the median price of each food-unit combination over all survey households, the unit-value of the purchased and the gifted items being treated alike. These median prices were used to price the food basket consumed by each household. This total household expenditure was

variable field and 'kilograms' in the unit variable field. Another household may report 10 lbs. of rice, in which case the quantity variable field is reported as '10' and the units field as 'pounds'.

[13] The World Bank provided us with these conversion factors for each food, for each type of unit. For certain food-unit combinations no calorie conversion factors were available. The foods for which no conversion factors were available for *any* units are: ear of green corn; shrimp; passion fruit/calala/banana; lemon/sweet/sour orange/mandarin; apple/pineapple/melon/watermelon; avocado/chayote; green/ripe plantain; cabbage/lettuce; pipian cucumber; carrots/beets; coriander/celery/yerbabuena/parsley; candy/chocolate; jelly; seasonings; salt; tomato sauce; mustard/mayonnaise; soda/mineral water; cigarettes; and prepared food.

[14] To account for the non-random sampling design of the survey, we compute weighted statistics in all steps. The individual weights (or inflation factors) are provided in the LSMS data.

Table 2: Calories consumed per capita per day, by quintile. Nicaragua 1998

Quintile	Mean	Std. Dev.
1	1419.76	1118.61
2	2091.39	1297.82
3	2458.32	1617.71
4	2940.60	3007.98
5	3672.91	3897.25

Table 3: Expenditures by Quintile 2. Nicaragua 1998.

Variable	Observations	Mean	Std. Dev.
Annual food expenditure (food poverty line)	766	2036.53	909.01
Annual non-food expenditure	766	981.90	884.10

then divided by the total number of household members to arrive at the food expenditure per person per day in each household and was multiplied by 365 to arrive at the annual food expenditure per person in each household in the reference quintile. The mean of these per-person annual expenditures is taken to be the minimum purchasing power a person living in Nicaragua needed to have during 1998 to consume 2100 calories per day given reasonable adaptation of the least cost diet to local norms as reflected in the pattern of consumption of the reference quintile. This is the food poverty line for Nicaragua: 2036.526 Nicaraguan Cordobas per capita/per year.

3. To go from the food poverty line to the overall poverty line required adding an allowance for non-food expenditures [the mean non-food expenditure of the 2nd quintile (after scaling up by 1.0041)] to the food expenditure requirement identified above. Specifically, from the consumption aggregate files in the data set we derived the non-food expenditure by subtracting from total consumption as reported in the data the total food consumption (the sum of the values of purchased and gifted items, each scaled linearly to estimate daily consumption due to the use of different recall periods for different food items). We divided the total non-food expenditure of each household by the number of household members to arrive at an annual per capita non-food expenditure for each household. The mean of this variable was 981.898 Cordobas. We treat this value as the non-food expenditure allowance and add it to the food poverty line to arrive at an overall poverty line per year of 3018.4244 Cordobas (in the survey year). See Table (3).

3.2 Nicaraguan Poverty Estimates

Once we had computed the poverty line for Nicaragua, the next step involved calculating poverty estimates. From the household-level data set we created an expanded individual-level data set in which each member of each household was assigned the annual per capita expenditure of that household. We then calculated the headcount ratio, the proportion of persons in the population whose per capita expenditure was below the poverty line. Similarly we computed the aggregate poverty gap, income gap ratio, Sen Index and the Foster-Greer-Thorbecke indices with values of α equal to 1.5, 2, 2.5, 3, 3.5, and 4. We also calculated standard errors (the methodology is discussed further below) so as to judge the precision with which the poverty measures were estimated.

Our capability-based estimate of the headcount ratio is 30.61 percent. This is lower than the head count estimated in the LSMS Report (47.9 percent). However that estimation used a poverty line anchored in a higher calorie standard, 2226 calories per person per day. Also, the methodology used in the LSMS survey to compute the poverty line was different: it relied on the relationship between calorie intake and total expenditures estimated through a linear regression on the entire sample, unlike our methodology which relied on this relationship only for households which are close to consuming 2100 calories per day.[15]

Next, we compared our capability-based estimates of poverty in Nicaragua with the estimates that the $1 per day PPP methodology would have produced. The comparison was done with the poverty estimates corresponding to different poverty lines: the $1 PPP per day and $2 PPP per day poverty lines adjusted by the consumer price index or a food price index for the country[16]. The poverty lines are presented in Table (4).

The table indicates that our capability-estimates are lower than the $1 per day estimates. That this is so can be confirmed to the 99 percent confidence level using the standard errors presented in Tables (13) and (14).

4 Tanzania

The data for Tanzania are from the 2000/01 Tanzanian Household Budget Survey (HBS), conducted by the National Bureau of Statistics between May 2000 and June 2001. Same as for Nicaragua, we followed the method used in Vietnam to establish

[15] See World Bank (2001) for a detailed description of the methodology used in the Nicaragua LSMS.

[16] The consumer price indices used were sent to us by Shaohua Chen of the World Bank. They are the same ones used in the Bank's global poverty assessments and originate in the Bank's Development Data Group. The food price indices used are produced by the ILO and available via the World Bank's World Development Indicators on-line database.

Table 4: Poverty Lines, annual Nicaraguan Cordobas, 1998

$ 1/day general CPI	4017.20
$ 2/day general CPI	8034.40
$ 1/day food CPI	4119.44
$ 2/day food CPI	8238.87
Capability-based	3018.42

a poverty line.

4.1 Construction of Tanzania Poverty Line

1. The Tanzanian HBS asked each household surveyed about its food consumption from a wide spectrum of sources including food consumed from purchases, own production, received gifts, and other sources. Moreover the quantities of individual food items were reported, each with associated total monetary value; we established the median unit values for each food item and treated these as the median prices (as there was no other data on prices available in the survey). The total calorie consumption per capita within each household was established by using the calorie conversion tables found in the HBS final report. We calculated the total calories consumed by each household as a result of its consumption of each food item. We then summed these calorie amounts up over food items and divided by the total household size to compute household per capita calorie consumption for each household.

2. Food and non-food expenditure by each surveyed household were also reported in the HBS. Adding these up and dividing by the household size (number of members in the household) we arrived at the total expenditure per capita within each household; based on this variable we divided the sample into quintiles. For each quintile we calculated the average daily per-capita calorie consumption. Daily per-capita calorie consumption in the second quintile was the closest to 2100, the chosen calorie anchor. Hence, following the procedure used in Vietnam, the second quintile, with 2161.441 daily per capita calorie consumption see Table (5), was chosen as the reference quintile for use in the derivation of a food poverty line.

3. We calculated the average per-capita consumption of each food item in the second quintile, measured in units of consumption (e.g., grams, ml, or "pieces"), assuming zero consumption of food items for which the households did not report any value. We then scaled the resulting average bundle down (by multiplying by $2100 \div 2161.441$) to create a synthetic bundle with calorie content of 2100 calories per day. Multiplying the median prices calculated above by this

Table 5: Calories consumed per capita per day, by quintile. Tanzania 2000/01

Quintile	Mean	Std. Dev.
1	1539.32	751.85
2	2161.44	885.36
3	2617.46	1093.92
4	2995.38	1274.01
5	3733.57	1925.68

vector of standardized average consumption we arrived at the *food poverty line* of 170.7 Tanzanian Shilling (TSH) a day, or 62,306.5 TSH's a year (in 2000/01 TSH's).

4. The non-food expenditure allowance was calculated as follows. Within each household in the reference quintile we calculated the daily per-capita non-food expenditure by dividing the total non-food expenditure of the household (as reported in the data source) by the number of members of the household. The resulting average per-capita non-food expenditure was rescaled (by multiplying by $2100 \div 2161.441$), in the same manner as we did for the food poverty line, to arrive at a non-food expenditure allowance of 49.48 TSH a day, or 18058.5 TSH's a year (in 2000/01 TSH's).

5. The *general poverty line* is the result of adding the food poverty line (from 3) to the non-food expenditure allowance (from 4), which is: 80,365.1 Tanzanian Shillings a year.

4.2 Tanzanian Poverty Estimates

Having defined a capability-based poverty line, we were able to produce resulting poverty estimates. We provide a summary of the results based on our capability-based poverty line and on the \$1 and \$2 PPP per day poverty lines. We used both the general CPI and a food CPI to convert the IPL from local currency units in the base year in which it is defined to the local currency units of the survey year.[17] Since the HBS was administered over a whole period of year, from mid 2000 to mid 2001, we used the geometric means of the price indices pertaining to the relevant years.

As mentioned above, we calculate the poverty estimates pertaining to the capability-based poverty line and compare those to other poverty estimates. The comparison was done with the poverty estimates corresponding to different poverty lines: the \$1 PPP per day and \$2 PPP per day poverty lines adjusted by the consumer price

[17] Sources as discussed above in relation to the methodology of the Nicaragua assessment.

Table 6: General Annual Poverty Lines, Tanzanian Shillings 2000/01

$1/day General CPI	147,613.5
$2/day General CPI	295,227
$1/day Food CPI	158,410.83
$2/day Food CPI	316,821.66
Capability Based	80,365.1

indexes or the food price indexes. The poverty lines are presented in Table (6).

Our capability-based estimate of the headcount ratio is 40.13 percent. This is higher than the head count estimated in the 2000/01 HBS Final Report (35.7 percent). However that estimation used a poverty line anchored in a different calorie standard, 2200 calories per person per day. Also, their methodology to compute the poverty line was different: it was based on the consumption pattern of the poorest fifty percent of the population rather than that of the quintile with mean calorie consumption closest to the calorie anchor. Further, it used adult-equivalents rather than the population of the household to calculate the per capita expenditures.

We calculated the bootstrapped standard errors for every poverty statistic to facilitate comparisons between the statistics related to different poverty lines concepts and to different countries. The bootstrap estimation relied on 1000 iterations for every poverty statistic estimated. This large number of iterations guaranteed in most, if not all, cases a very high confidence level in the calculation of the standard errors: a 5% significance level and about 4.5 percent deviation in magnitude from the limiting standard deviation. In evaluating the bootstrap accuracy performance we followed the methodology of Andrews and Buchinsky (2000).

5 Inter-Country Poverty Comparison and Aggregation: Results

The results of the poverty estimates for the different country-years (Vietnam in 1993 and 1998, Nicaragua in 1998 and Tanzania in 2000/01) and poverty identification concepts considered (capability-based, $1/day and $2/day money-metric IPLs) are provided below in Tables (11)–(16), along with associated standard errors. We may immediately ask questions of three kinds regarding these estimates. The first concerns whether for a single country-year the extent of poverty depends on the specific poverty-identification concept used. The second concerns whether the ordinal and cardinal comparison among country-years depends on the specific poverty identification concept used. The third concerns the extent to which aggregate poverty and the contribution of a specific country to aggregate poverty is influenced by the identification concept used.

Does the extent of poverty in a single country-year depend on the specific poverty identification concept used? In Tanzania, it can be concluded with a high degree of confidence that the use of the capability-based approach leads to consistently and considerably lower poverty estimates than under either of the money-metric IPLs. The same is true in Nicaragua although the extent of reduction in the poverty estimate due to the use of the nutritional standard is smaller than in Tanzania. in Vietnam, in contrast, the use of the capability-based approach leads to consistently and considerably *higher* poverty estimates than under the $1 per day money-metric IPL and to poverty estimates that are in the range of those produced by the $2 per day money-metric IPL (and which cannot be concluded to be different with a high degree of confidence). These results are too few in number with which to form any meaningful and reliable conclusions on the differences that are likely to be found in a wider study. They are also likely to be greatly influenced by the details of poverty-line construction survey design and analysis. The important inference that can be drawn is that it *can* make a difference whether a capability-based approach is used in poverty assessment, and that the direction of this difference may not readily be predicted in advance.

Do ordinal and cardinal comparisons among country-years depends on the specific poverty identification concept used? As shown in Table (10), in the specific four country-year case considered the ordering of country-years according to the extent of their poverty are often robust to the choice of identification concept. In Table (10), dominance relations judged at the 95 percent level of confidence (according to *both* methods that we apply to calculate standard errors, unless explicitly noted) are represented by a vertical hierarchy (with country-years possessing greater poverty being placed in a tier that is vertically above county-years with lesser poverty and countries which do not stand in any dominance relation to one another being placed in the same tier). It may be seen that Tanzania (2000/01) is "almost always" is judged to possess a larger extent of poverty than does Nicaragua in 1998. This relationship breaks down only for the most distribution sensitive FGT indices, and for specific methods of calculating standard errors. Similarly, it is "almost always" the case that Vietnam in 1993 is estimated to have greater poverty than does Vietnam in 1998. The money-metric IPL based poverty estimates "almost always" suggest that the extent of poverty is greatest in Tanzania (2000/01), second greatest in Nicaragua (1998), third greatest in Vietnam (1993) and fourth greatest in Vietnam (1998). In sharp contrast, the capability-based estimates suggest that poverty was "almost always" highest in Vietnam in 1993. However, it is ambiguous whether it was lowest in Vietnam in 1998 or in Nicaragua in 1998. Intersection partial-ordering based assessments of this kind can be deeply instructive about the robustness of poverty comparisons to the choice of methodology. Analysis based on intersection partial-ordering suggests that in this case the capability-based approach leads to

Table 7: Synthetic World A (Vietnam 1998, Tanzania 2000, Nicaragua 1998). World Population=115027080

PL	$1/Day	$2/Day	Capabilities
World Head Count (HC)	31529871.55	67851421.34	42252195.8
World HC Ratio	27%	59%	37%
Nicaragua's Share of World HC	7%	6%	3%
Tanzania's Share of World HC	81%	47%	32%
Vietnam's Share of World HC	13%	47%	65%

Table 8: Synthetic World B (Vietnam 1993, Tanzania 2000, Nicaragua 1998). World Population=108855380

PL	$1/Day	$2/Day	Capabilities
World Head Count (HC)	36955134.83	80554709.27	55901134.61
World HC Ratio	34%	74%	51%
Nicaragua's Share of World HC	6%	5%	3%
Tanzania's Share of World HC	69%	40%	24%
Vietnam's Share of World HC	25%	56%	73%

potentially different ordinal and cardinal comparisons than does the money-metric IPL approach, although there are also areas of agreement.

Is the extent of aggregate poverty and the contribution of a specific country to aggregate poverty influenced by the criterion used to identify the poor used? As shown in Tables (7) and (8), both the extent of aggregate poverty and the contributions of each country to aggregate poverty do indeed vary significantly according to the criterion used to identify the poor. Figures are provided for two different artificial aggregates; a synthetic world consisting of Vietnam in 1998, Tanzania in 2000 and Nicaragua in 1998 and a synthetic world consisting of Vietnam in 1993, Tanzania in 2000 and Nicaragua in 1998. It may be seen that in both instances a capability based analysis leads to a worldwide headcount ratio which is substantially at variance with those generated by the $1/day and the $2/day identification criteria, and which lies between them. The contribution of individual countries to global poverty varies dramatically depending on the identification criterion used. For example, in the first artificial aggregate considered, Vietnam's "share" of world poverty rises from 13 percent (using the $1/day identification criterion) to 65 percent (using the capability-based identification criterion).

As shown in Table (9) the rate of reduction in poverty in Vietnam (the one country for which we have two observations) is also influenced substantially by the poverty identification concept employed.

Table 9: Vietnam Head Count Ratio (HCR) Improvement

	1993 HCR	1998 HCR	1998 HCR/1993 HCR
$1/Day	13%	5%	0.38462
$2/Day	64%	42%	0.65625
Capability-Based	58%	36%	0.62069

6 Conclusions

Inter-country comparison and aggregation of poverty must be based on the application of a uniform criterion for identifying the poor and the extent of their poverty. A capability-based identification criterion gives rise to an approach to international poverty comparison and aggregation that is both coherent and meaningful, unlike existing "money-metric" approaches. A pilot study involving three countries from three continents (Nicaragua, Tanzania and Vietnam) establishes that it is possible to produce internationally comparable capability-based poverty estimates. Standard errors were constructed and intersection partial ordering techniques were employed to establish which pair-wise inter-country poverty comparisons are robust to the choice of identification criterion and which are not. It was found that in the specific case examined, ordinal comparisons are to a significant extent invariant to the choice of identification criterion although cardinal comparisons are not. The pilot-study demonstrates the desirability of undertaking international coordination of survey design and poverty line construction methods so as to facilitate large-scale application of capability-based international poverty comparison and aggregation. An effort of this kind must identify relevant capabilities (such the ability to be adequately nourished) and the characteristics of the commodities that promote them (such as calories). Although there may be almost universal agreement on some such capabilities and the characteristics of commodities that promote them, others may be more controversial. That is no reason for failing to pursue a capability-based approach, but is rather a reason to seek consensus, to be careful in the specification of relevant elementary capabilities, and to create room for alternative specifications to be operationalized.

The approach proposed will both strengthen national poverty statistics and make them comparable across countries. The UN's System of National Accounts testifies to the possibility of successful international coordination in the production of statistics. A new such effort is necessary in order to make available for the first time regional and global poverty estimates that are both coherent and meaningful.

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Table 10: Ordering of Countries for Different Poverty Measures and Poverty Lines (Countries in Descending Order of Extent of Poverty)

PL[18]	$1 General CPI	$1 Food PI	$2 General CPI	$2 Food PI	Capability
HCR	T	T	T	T	V93
	N	N	N	N	T,V98
	V93	V93	V93	V93	N
	V98	V98	V98	V98	
IGR	T	T	T	T	V93,T,N
	N	N	N	N	V98
	V93 V98	V93 V98	V93	V93	
			V98	V98	
PGR	T	T	T	T	V93
	N	N	N	N	T
	V93	V93	V93	V93	V98,N
	V98	V98	V98	V98	
Sen	T	T	T	T	V93
	N	N	N	N	T
	V93	V93	V93	V93	V98,N
	V98	V98	V98	V98	
FGT(1.5)	T	T	T	T	V93
	N	N	N	N	T
	V93	V93	V93	V93	V98,N
	V98	V98	V98	V98	
FGT(2, 2.5, 3)	T	T	T	T	V93
	N	N	N	N	T[19]
	V93	V93	V93	V93	N
	V98	V98	V98	V98	V98
FGT(3.5)	T	T	T	T	V93, T[20]
	N	N	N	N	N
	V93	V93	V93	V93	V98
	V98	V98	V98	V98	
FGT(4)	T	T	T	T	V93, T[20]
	N	N	N	N	N
	V93	V93[21]	V93	V93	V98
	V98	V98	V98	V98	

[18] **PL** stands for Poverty-Line, **PI** for Price-Index, **T** for Tanzania 2000-01, **N** for Nicaragua 1998, **V93** for Vietnam-1993, and **V98** for Vietnam-1998.

[19] For FGT(3) T is not significantly different from N using bootstrap error.

[20] FGT(3.5) and FGT(4) of Tanzania can be deemed to be larger than corresponding measures for Nicaragua only at the 10% significance level.

[21] V93 is not significantly different from V98 using Sepov error

Table 11: Poverty Statistics and Standard Errors, Vietnam 1993

Poverty Line	$1= 629.3411 (1000) Dongs a year			$2=1258.6822 (1000)			Capability Based=1160.363 (1000)		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.1336941	.0128625	.0127002	.6371759	.018836	.0174983	.5814666	.0192161	.0178539
IGR	.21119028		.0172952	.34223677		.0084592	.31783731		.0085259
APG	423586.48		64844.71	6542924		297257.4	5112029.1		257938.4
PGR	.0282349	.0045189	.0043295	.218065	.0099094	.0095341	.1848118	.0093539	.0090516
Sen	.04038789		.0062519	.28669956		.0120125	.24635633		.0116921
FGT(1.5)	.0159158	.0032118	.003051	.1425399	.0077459	.0075133	.1178676	.0071701	.0069805
FGT(2)	.0097644	.0024099	.0022784	.097221	.0062272	.0060571	.0787598	.0056914	.0055427
FGT(2.5)	.0063945	.0018743	.0017688	.0684977	.0051209	.0049777	.0545359	.0046387	.0045049
FGT(3)	.0044108	.0014955	.0014118	.0495437	.0042896	.0041585	.0388711	.0038596	.0037325
FGT(3.5)	.0031728	.0012164	.0011505	.0366364	.003648	.0035239	.0283937	.0032643	.0031427
FGT(4)	.0023615	.0010043	.0009526	.0276177	.0031413	.0030229	.021189	.0027976	.0026822

(1) Robust standard errors, using 'SEPOV' command.

(2) Bootstrap standard errors, 1000 iterations. 5% significance level, and about 4.5 Percent Deviation from B infinity (PDB) (See Andrews and Buchinsky (2000) for details).

(3) Primary Sampling Unit (PSU) is 'commune'. Strata is 'reg7'. Self weighted sample.

Table 12: Poverty Statistics and Standard Errors, Vietnam 1998

Poverty Line	$1=953.794 (1000) Dongs a year			$2=1907.588 (1000)			Capability Based=1758.581 (1000)		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.0520111	.0073504	.007097	.419772	.0160645	.0162632	.3561977	.0166017	.0167152
IGR	.17146691		.0154635	.27127555		.0091529	.25425413		.0092289
APG	6.448e+08		1.21e+08	1.647e+10		1.15e+09	1.207e+10		9.50e+08
PGR	.0089182	.0017673	.0016623	.1138739	.0073266	.0073438	.0905647	.0066921	.0066924
Sen	.01300923		.0023723	.15560139		.0095122	.12496451		.0087987
FGT(1.5)	.0046379	.0010545	.0009877	.0686672	.0052283	.0052081	.0534176	.004612	.0045771
FGT(2)	.0026279	.000666	.0006231	.0437774	.0038199	.0037787	.0334425	.0032826	.0032307
FGT(2.5)	.0015833	.0004368	.0004088	.0291002	.0028511	.0027998	.0218896	.002402	.0023443
FGT(3)	.0009984	.0002945	.0002759	.0199913	.0021698	.0021154	.0148368	.0018002	.0017432
FGT(3.5)	.000652	.0002028	.0001904	.0141075	.0016802	.001627	.0103461	.0013771	.0013242
FGT(4)	.0004375	.0001421	.0001337	.0101818	.0013213	.0012716	.0073879	.0010718	.0010245

(1) Robust standard errors. PSU is 'COMMUNE', and Strata is 'REG10O'. Weights are 'HHSIZEWT', which are individual weights.

(2) Bootstrap standard errors, 1000 iterations. Significance level 5% significance level, PDB$\backsimeq$ 4.4

Table 13: Poverty Statistics and Standard Errors, Nicaragua 1998

Poverty Line	$1 General CPI=4017.201 Cordobas a year			$2 General CPI=8034.402			Capability Based=3018.4244		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.4461598	.012855	.013102	.7902546	.0124806	.0126513	.3061469	.0146328	.014637
IGR	.37190895		.0097592	.51795727		.0067845	.31658914		.0083619
APG	3.209e+09		1.46e+08	1.583e+10		5.81e+08	1.409e+09		7.98e+07
PGR	.1659308	.0070253	.0071165	.4093181	.0081666	.0083689	.0969228	.0054944	.0055834
Sen	.22117094		.008615	.51169126		.00959	.13247926		.0074104
FGT(1.5)	.1144391	.0055438	.0056216	.3172618	.007323	.0075319	.0631256	.0039101	.0040132
FGT(2)	.0823809	.0044038	.0044847	.2526994	.0066674	.0068619	.0433183	.0029113	.0030094
FGT(2.5)	.0611932	.0035393	.0036224	.2053718	.0060996	.0062724	.0308725	.0022371	.0023227
FGT(3)	.0465742	.0028827	.0029641	.1695557	.0055846	.005736	.0226476	.00176	.0018311
FGT(3.5)	.0361495	.0023783	.0024546	.1417824	.0051106	.0052438	.0169994	.0014105	.0014676
FGT(4)	.0285175	.0019852	.0020544	.1198226	.0046738	.0047924	.0130014	.0011476	.0011922

(1) Robust Standard Errors.

(2) Bootstrap Standard Errors, 1000 iterations. Significance level 5%, PDB$\backsimeq$ 4.516

Table 14: Poverty Statistics and Standard Errors, Nicaragua 1998, continued.

Poverty Line	$1 Food PI=4119.437 Cordobas a year			$2 Food PI=8238.874			Capability Based=3018.4244		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.4577736	.0127746	.0130952	.799018	.0121703	.0122862	.3061469	.0146328	.014637
IGR	.37798164		.0093419	.52427522		.0066527	.31658914		.0083619
APG	3.432e+09		1.54e+08	1.662e+10		6.07e+08	1.409e+09		7.98e+07
PGR	.17303	.0070983	.0072025	.4189053	.0081973	.0083981	.0969228	.0054944	.0055834
Sen	.22977914		.0087451	.52210445		.0095064	.13247926		.0074104
FGT(1.5)	.1198785	.0056508	.0057337	.3260484	.0073635	.0075723	.0631256	.0039101	.0040132
FGT(2)	.0866517	.0045253	.004607	.2606139	.0067172	.0069138	.0433183	.0029113	.0030094
FGT(2.5)	.0646021	.0036592	.0037421	.2124554	.0061599	.0063363	.0308725	.0022371	.0023227
FGT(3)	.0493307	.0029937	.003075	.1758841	.005655	.0058106	.0226476	.00176	.0018311
FGT(3.5)	.038403	.0024782	.0025551	.1474385	.0051897	.005327	.0169994	.0014105	.0014676
FGT(4)	.0303775	.002074	.0021445	.1248857	.0047597	.004882	.0130014	.0011476	.0011922

(1) Robust Standard Errors.

(2) Bootstrap Standard Errors, 1000 iterations. Significance level 5%, PDB$\leqslant$4.521

Table 15: Poverty Statistics and Standard Errors, Tanzania 2000/01

Poverty Line	$1 General CPI=147613.5 TSH			$2 General CPI=295227			Capability Based=80365.1		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.7539017	.0136354	.0132124	.9475454	.0052825	.0051763	.4013251	.0176332	.0175648
IGR	.45987994		.0085836	.64799942		.0069769	.31446383		.0109218
APG	1.632e+12		9.74e+10	5.782e+12		2.85e+11	3.235e+11		2.78e+10
PGR	.3467043	.0108271	.010769	.6140089	.0085724	.0083792	.1262022	.0080959	.0083521
Sen	.43909494		.0123253	.71548412		.0078061	.17254858		.0106867
FGT(1.5)	.255266	.0094777	.0095318	.5129725	.0091173	.0089665	.0819371	.0060139	.0062424
FGT(2)	.193875	.0082656	.0083833	.4346992	.0092318	.0091296	.0560464	.0045565	.0047427
FGT(2.5)	.1507405	.0072074	.0073573	.3724005	.0090977	.0090424	.0397999	.0035058	.0036517
FGT(3)	.1194009	.0062938	.0064563	.3218407	.0088221	.0088087	.0290758	.0027336	.0028458
FGT(3.5)	.096029	.0055078	.0056711	.2801877	.008469	.0084916	.0217223	.0021574	.0022426
FGT(4)	.0782275	.0048315	.0049888	.2454563	.0080773	.0081298	.0165283	.0017217	.001786

(1) Robust standard errors.

(2) Bootstrap standard errors, 1000 iterations. With 5% significance level, (PDB) < 4.6

(3) PSU is 'PSUID'. Strata is 'STRATUM'. Individual weights are 'INDWT'.

Table 16: Poverty Statistics and Standard Errors, Tanzania 2000/01, continued.

Poverty Line	$1 Food PI=158410.83 TSH 2000/01			$2 Food PI=316821.66			Capability Based=80365.1		
		Standard Error			Standard Error			Standard Error	
	Index	(1)	(2)	Index	(1)	(2)	Index	(1)	(2)
HCR	.7850683	.0125706	.0121821	.9565658	.0040124	.0039036	.4013251	.0176332	.0175648
IGR	.47843882		.0085017	.66597479		.006779	.31446383		.0109218
APG	1.898e+12		1.10e+11	6.438e+12		3.13e+11	3.235e+11		2.78e+10
PGR	.3756072	.0108438	.010755	.6370487	.0082133	.0080258	.1262022	.0080959	.0083521
Sen	.47205933		.0120391	.73641829		.0071317	.17254858		.0106867
FGT(1.5)	.2807204	.0096787	.0097018	.537756	.0088752	.0087191	.0819371	.0060139	.0062424
FGT(2)	.2159442	.0085696	.0086625	.4598744	.0091014	.0089869	.0560464	.0045565	.0047427
FGT(2.5)	.1697623	.0075686	.0077013	.3972162	.0090672	.0089955	.0397999	.0035058	.0036517
FGT(3)	.13578	.0066841	.0068365	.3458729	.0088769	.008845	.0290758	.0027336	.0028458
FGT(3.5)	.1101537	.0059092	.0060685	.3032034	.0085945	.008598	.0217223	.0021574	.0022426
FGT(4)	.0904413	.0052326	.0053906	.2673378	.0082602	.008294	.0165283	.0017217	.001786

(1) Robust standard errors.

(2) Bootstrap standard errors, 1000 iterations. With 5% significance level, (PDB) < 4.6

(3) PSU is 'PSUID'. Strata is 'STRATUM'. Individual weights are 'INDWT'.

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