HOW *NOT* TO COUNT THE POOR

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Version 6.2 [3]

October 29th, 2005

Abstract:

The World Bank's approach to estimating the extent, distribution and trend of global income poverty is neither meaningful nor reliable. The Bank uses an arbitrary international poverty line that is not adequately anchored in any specification of the real requirements of human beings. Moreover, it employs a concept of purchasing power "equivalence" that is neither well defined nor appropriate for poverty assessment. These difficulties are inherent in the Bank's "money-metric" approach and cannot be credibly overcome without dispensing with this approach altogether. In addition, the Bank extrapolates incorrectly from limited data and thereby creates an appearance of precision that masks the high probable error of its estimates. It is difficult to judge the nature and extent of the errors in global poverty estimates that these three flaws produce. However, there is reason to believe that the Bank's approach may have led it to understate the extent of global income poverty and to infer without adequate justification that global income poverty has steeply declined in the recent period. A new methodology of global poverty assessment, focused directly on what is needed to achieve elementary human requirements, is feasible and necessary. A practical approach to implementing an alternative is described.

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[3] The latest version of this paper, along with a précis in non-technical form and other materials related to controversies about global income poverty estimates are available on www.socialanalysis.org.

Contents:

1.0 *Introduction:*

How many poor people are there in the world?[4] This simple question is surprisingly difficult to answer at present.

Building on earlier exercises undertaken as early as the late 1970s,[5] the World Bank (henceforth Bank) has in the 1990 and 2000/01 World Development Reports (henceforth WDR) presented comprehensive estimates of the extent of poverty in the world and in particular regions and countries for different years. These estimates have been widely accepted and employed in a range of policy analyses and assessments. They have been used to describe the world, to determine resource allocation priorities, and to judge which policies and programs are most poverty reducing. Recently, they have played a central role in monitoring the first Millennium Development Goal, which calls for the halving of global poverty as defined by the Bank's estimates.

Among the questions that the Bank's global income poverty estimates have been used to answer is whether the world is "on the right track" in terms of poverty reduction strategy. The Bank's recent estimates have led many to conclude that the world is indeed on the right track. The Bank's last President, James D. Wolfensohn, for example, stated:

> "Over the past few years, [these] better policies have contributed to more rapid growth in developing countries' per capita incomes than at any point since the mid-1970s. And faster growth has meant poverty reduction: the proportion of people worldwide living in absolute poverty has dropped steadily in recent decades, from 29% in 1990 to a record low of 23% in 1998. After increasing steadily over the past two centuries, since 1980 the total number of people living in poverty worldwide has fallen by an estimated 200 million – even as the world's population grew by 1.6 billion."[6]

Barely two years earlier, the Bank had painted a strikingly different picture: "the absolute number of those living on \$1 per day or less continues to increase. The worldwide total

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[4] Our thanks are due to Sudhir Anand, Christian Barry, Andre Burgstaller, Don Davis, David Ellerman, Greg Garratt, Julia Harrington, Richard Jolly, Stephan Klasen, Howard Nye, Benjamin Plener, D. S. Prasada Rao, Lisa C. Smith, S. Subramanian, Ling Tong, Robert Wade, Michael Ward and many individual correspondents for helpful suggestions. Useful comments were also received from participants in seminars of the University of Basel, the Carnegie Council for Ethics and International Affairs, Columbia University, the Ford Foundation, the Center for Population and Development Studies and the John F. Kennedy School of Government at Harvard University, the Institute for Development Studies (Sussex), the Institute for Policy Dialogue, the Centre for Development and the Environment (SUM, Oslo), Oxfam (Brazil), the University of Florence, the University of Michigan, the New School University, the University of Pavia, the United Nations Development Programme, the United Nations Statistics Division, and conferences of the International Association for Research in Income and Wealth and the International Statistical Institute. We would also like to thank Yonas Biru, Shaohua Chen, Branko Milanovic, Martin Ravallion, and other staff of the World Bank for their assistance with our queries.

[5] See e.g. Ahluwalia, Carter and Chenery (1979).

[6] Remarks to the G-20 Finance Ministers and Central Governors, Ottawa, November 17, 2001, previously available on www.worldbank.org/html/extdr/extme/jdwsp111701.htm. Wolfensohn is relying on how the number of persons living below \$1 per day is said to have evolved in World Bank 2002, 8. Not long after his speech, the World Bank revised this estimate, affirming that the number of those living below \$1 per day had declined by "almost 400 million" between 1981 and 2001 (Chen and Ravallion 2004, 141).

rose from 1.2 billion in 1987 to 1.5 billion today."[7]

Global poverty estimates also influence assessments of the seriousness of the problem of world poverty, the scale of resources that should be devoted to reducing it, and the regions to which these resources should be directed. WDR 2000/01 argues, for example, that the largest number of the world's poor are now in Africa rather than in South Asia. The questions of how many poor people there are in the world, how poor they are, where they live, and how these facts are changing over time are clearly very important ones. The Bank's answers to these questions have been highly influential in part because, until quite recently, there were no other estimates.[8] Alternative estimates that have been produced recently adopt in central respects the same methodology as does the Bank.

This paper argues that the Bank's estimates of the level, distribution and trend of global poverty should not be readily accepted. Due to three serious problems, these estimates cannot identify with any reasonable accuracy the level, distribution or trend of global poverty. The first problem is that the Bank uses an arbitrary international poverty line that is not adequately anchored in any specification of the real requirements of human beings. The second problem is that it employs a concept of purchasing power "equivalence" that is neither well defined nor appropriate for poverty assessment. These difficulties are inherent in the Bank's "money-metric" approach and cannot be credibly overcome without dispensing with this approach altogether. The third problem is that the Bank extrapolates incorrectly from limited data and thereby creates an appearance of precision that masks the high probable error of its estimates. It is difficult to judge the nature and extent of the errors in global poverty estimates that arise from these three flaws. It will be argued below, however, that there is some reason to believe that the Bank's approach may have led it to understate the extent of global income poverty and to infer without adequate justification that global income poverty has steeply declined in the recent period.

It is possible to describe a practicable methodology for assessing global income poverty that would be more reliable. The current income poverty estimates should no longer be employed, and new ones corresponding to a defensible methodology should be generated.

2.0 *A Meaningless Poverty Line*

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[7] See WDR 1999/2000, 25. This is the very period for which the Bank later shows the steepest decline in the global poverty headcount (World Bank 2002, 8).

[8] In two recent unpublished papers, "The Disturbing 'Rise' of Global Income Inequality" and "The World Distribution of Income (estimated from Individual Country Distributions)" Xavier Sala-i-Martin (see www.columbia.edu/~xs23/papers/GlobalIncomeInequality.htm and www.columbia.edu/~xs23/papers/WorldDistribution.htm) has produced a set of estimates of global income poverty. His methodology, however, involves applying the World Bank's $1 (and $2) a day poverty lines at 1985 PPPs to a world income distribution profile generated using country GDP data converted at PPPs, and is therefore subject to all of the objections we make to the World Bank's estimates of global poverty, as well as to others that we do not state here but develop elsewhere [see Reddy and Minou (forthcoming)]. The alternative estimates provided in Bhalla (2002) are subject to similar concerns.

A procedure frequently used in national poverty assessment exercises is to define a poverty line in terms of the cost of achieving certain ends. These ends are most often elementary capabilities (such as the ability to be adequately nourished). The commodities that are deemed necessary for an individual to achieve a set of elementary capabilities can be allowed to vary across groups of persons (defined for instance by age, gender, and other relevant criteria) if that is thought appropriate. Procedures of this kind have the advantage that, once established, they offer a consistent basis for determining the level of the poverty line in different years and locations. They also result in a poverty line that has a meaningful and relevant interpretation in terms of access to resources that are sufficient for achieving basic human requirements. For this reason, many countries have used such procedures in their domestic poverty estimates.

In contrast to this human requirements centered approach, the Bank has adopted what can be referred to as a "money-metric" methodology that does not directly refer to such requirements but rather to a relatively arbitrary international poverty line (IPL) defined in abstract money units and to local currency amounts that it deems to be "equivalent." In 1990, the Bank constructed an IPL from a set of domestic poverty lines (some from governmental, others from non-governmental sources[9]) for thirty-three countries during the mid 1980s. These domestic poverty lines were scaled upward or downward according to changes in the national consumer price index (CPI) to determine their "equivalent" in 1985 national currency units. These 1985 national currency amounts were then converted into a common unit of "real purchasing power" equivalence using the 1985 PPP conversion factors for consumption (expressed in local currency units per "international dollar"[10]) calculated by Summers and Heston (1988a). An IPL of $31 per month was chosen. The reason provided is that the domestic poverty lines of eight of the poorer countries in the sample, converted into dollars in this way, were very close to this IPL, which was thus deemed to reflect a poverty line that was "most typical" for poor countries.[11] This poverty line was "$1 (PPP 1985) a day" (actually $1.02 PPP 1985) and was applied in WDR 1990. In the Bank's later poverty measurement work (starting with Chen et al. 1994), this IPL was revised downward, without explanation, to $30.42 per month or $1 per day PPP 1985 (Chen and Ravallion 2001, 285 n. 7).

This IPL was then converted into the national currency units of different countries using the Penn World Tables (Summers and Heston 1988a) PPP conversion factors for 1985. The resulting national poverty lines were then inflated in proportion to changes in the national CPI (as reported in the IMF International Financial Statistics) and applied to estimates of per capita household consumption from household survey data to derive the number of poor persons in a particular country and year.

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[9] A large proportion of the 33 poverty lines employed are from non-governmental sources including World Bank country reports.

[10] The international dollar is a notional currency unit deemed to possess the same purchasing power at notional "international prices" as one U.S. dollar possesses in the United States.

[11] "A...representative, absolute poverty line for low income countries is $31, which (to the nearest dollar) is shared by six of the countries in our sample, namely Indonesia, Bangladesh, Nepal, Kenya, Tanzania, and Morocco, and two other countries are close to this figure (Philippines and Pakistan)" [Ravallion, Datt and van de Walle (1991)].

For the 2000 poverty estimation exercise and more recent ones, the Bank established a new IPL. For the same list of 33 countries it had used earlier, it identified the ten countries whose domestic poverty lines — converted into 1993 national currency units and then, via 1993 general-consumption PPPs, into 1993 international dollars — were the lowest. The Bank then chose the median of these (so converted) domestic poverty lines — $32.74/month or $1.08/day 1993 — as its new IPL. No justification has been offered for this change in approach. One reason may be that when 1993 PPPs are used to convert the list of 33 poverty lines into international dollars a cluster of poverty lines that may be deemed 'most typical' no longer appears. Table 1 lists the 33 countries with their 1985 and 1993 domestic poverty lines as converted by the Bank into international dollars of 1985 and 1993, respectively.

Is the new IPL "higher" or "lower" than the old one? This question is impossible to answer, as PPP dollars from different years are not comparable (as will be discussed below). The Bank claims that "This [new $1.08/day PPP 1993] line has a similar purchasing power to the $1 a day line in 1985 PPP prices, in terms of the command over domestic goods" (WDR 2000/01, 17).[12] However, as PPP units in different years are non-comparable, this statement has no meaning. Chen and Ravallion (2001) offer as justification for this claim the observation that the global poverty headcount is approximately the same for the most recent common year (1993) in which both methodologies were applied.[13] In offering this fact as a justification for the ostensible "equivalence" of the new IPL with the old they make a serious error in reasoning. It is obvious that, when employing *any* method of poverty assessment, one can define an IPL that is just high enough to yield whatever rate of poverty incidence one wishes to match (because it had resulted from a method previously used). There will *necessarily* be *some* level of the IPL defined in terms of the new method at which the aggregate number of poor people will be equal to the number previously estimated by the old method. Such coinciding results are easily achievable between *any* pair of methods whatever and therefore do not show two methods to have any particular consistency with each other,

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[12] In describing the relationship between the two IPLs, the Bank's note entitled "Details on the methodology for global income poverty estimates" [posted in 2003 on its PovertyNet website] declared "This year, the same lines [as used in 1990] were converted in [sic] 1993 PPP prices, and the new line was obtained as the average [the median was actually used] of the ten lowest poverty lines. …The line obtained is $1.08 per day in 1993 PPP terms...This methodology maintains the purchasing power of the line constant [sic] while changing the reference prices." As argued below, this statement has no basis whatsoever, as there is no well-defined procedure for "converting" between PPP dollars of two different years.

[13] The authors baldly state that their preferred way "to compare the two poverty lines is to compare the implied aggregate poverty rates for the same year" (Chen and Ravallion 2001, 288). Making this comparison, they are at ease: "When we compare the most recent common year (1993) we get approximately the same poverty rate as we found in Ravallion and Chen (1997) using $1/day at 1985 PPP; the old poverty rate for 1993 was 29.4% versus 28.2% using the new poverty line for 1993" (ibid. 290; these percentages refer to the total number of persons in the developing countries, which in 1993 was 4,633 million). However, note that the purely methodological poverty reduction here admitted is not trivial. It reduces the 1993 poverty headcount by 4.25% or 58 million (the cited figure of 28.2% is rounded up from 28.15% — Chen and Ravallion 2000, Table 2; WDR 2000/2001, 23). This is rather a substantial achievement compared to the reported *actual* reduction in the number of very poor people: Over the entire 1987-98 period, the number of persons living on less than $1.08/day PPP 1993 reportedly declined by 8 million — from 1183.19 to 1175.14 million (ibid.)!

nor do they provide *any* reason to believe that either method is appropriate for assessing the purchasing power of the poor.

An alternative approach to judging the Bank's claim that the new IPL maintains "a similar purchasing power...in terms of the command over domestic goods" involves using each country's CPI to transform its 1985 national poverty line (equivalent to $1/day PPP 1985) into 1993 national currency units and then comparing the result with this country's 1993 national poverty line (deemed equivalent to $1.08/day PPP 1993). It is informative to undertake this exercise for the Bank's chosen base country, the United States. The US CPI increased by 34.3 percent in the 1985-93 period (www.bls.gov/cpi/home.htm). However, the change in the Bank's definition of its IPL entails a nominal increase of not even 8 percent (from $30.42 per person per month for 1985 to $32.74 for 1993). Since the Bank uses national CPIs to convert each country's national poverty line from the base-year amount into "equivalent" amounts for other years, the Bank's change in IPL can be inferred to have lowered US national poverty lines uniformly for all years by fully 20 percent.

Chen and Ravallion (2004, 167 n. 5) respond that, in this critique, we "ignore the fact that there has been (in effect) a PPP devaluation of poor countries relative to the United States since the switch from the 1985- to 1993-based PPPs, reflecting both the new ICP price data and differences in methods of measuring the PPP rate." This claim is difficult to interpret. It is unclear what "a PPP devaluation of poor countries relative to the United States" is supposed to be. The authors' point is, presumably, that IPLs should be appraised and compared by reference to the poor countries rather than by reference to the United States, where virtually no one is living below the IPL on either definition. Let us therefore examine the impact elsewhere of the Bank's IPL revision. We present the result of this exercise in Table 5, which shows 1985 national poverty lines updated to 1993 through a country's CPI to be as much as 30 percent lower (for Nigeria) and as much as 157 percent higher (for Mauritania) than the 1993 poverty line for the same country. Since national CPIs are used to convert each country's national poverty line from the base-year amount into equivalent amounts for other years, the Bank's change in IPL has raised Nigeria's national poverty lines uniformly for all years, and dramatically lowered Mauritania's national poverty lines uniformly for all years. Changes of this kind can potentially affect estimates of the trend as well as the level of poverty in each country.

Such large revisions in national poverty lines, up and down, cannot be reconciled with the claim of Chen and Ravallion (2001) that the new IPL maintains the "same" real level of purchasing power as the old. These revisions entail huge revisions in estimates of the poverty headcount for any given year, substantially increasing poverty estimates for some countries and dramatically lowering poverty estimates for others. In 1999, applying its method with the old ($1/day PPP 1985) IPL, the Bank reported very similar poverty rates for Nigeria and Mauritania of 31.1% and 31.4% respectively. In 2000, applying its method with the new ($1.08/day PPP 1993) IPL, the Bank reported poverty rates for Nigeria and Mauritania of 70.2% and 3.8% respectively. Depending on which PPP base year is used, Nigeria's poverty rate is either slightly lower or 18 times higher than Mauritania's!

Chen and Ravallion (2001, 291) concede that the Bank's IPL revision has produced a

substantial shift in the geographical distribution of poverty. This shift is illustrated in Table 4, which focuses on the three years (1987, 1990, 1993) for which the Bank has successively evaluated the same income and consumption data relative to two different IPLs. Table 4 shows that the IPL revision has greatly increased the reported incidence of poverty in Sub-Saharan Africa (raising the poverty headcount ratio reported for 1993, for instance, from 39.1% to 49.7%) and has greatly reduced the reported incidence of poverty in Latin America (lowering the poverty headcount ratio reported for 1993 from 23.5% to 15.3%). The choice of PPP base year has an even greater impact on the incidence of poverty reported for individual countries, as demonstrated in Tables 2 and 3, which list countries for which both estimates (employing old and new methodologies) are available. Table 2 lists the 17 countries for which an exact comparison is possible because both methodologies were applied to data from the same household survey. Here any changes in the calculated poverty headcount ratio can be referred to as *purely methodological poverty revisions*. Table 3 lists 38 additional countries for which we can only compare poverty estimates based on an earlier survey and the old IPL with poverty estimates based on a somewhat later survey and the new IPL. Here large differences in the estimated poverty headcount ratios are only *suggestive* (though often strongly so) of the magnitude of methodological poverty revisions, as the possibility of significant real changes in the economic circumstances of the poor between the two survey dates, or of apparent changes having arisen due to sampling variations and errors, cannot be ruled out. However, given their magnitude, it is unlikely that the variations in reported national poverty headcount ratios are due to actual changes in the circumstances of the poor during the (often quite brief) periods between survey dates. The Bank's revision of its IPL appears to have produced substantial changes in its poverty estimates (for countries, regions, and the world as a whole), suggesting that the Bank's underlying methodology is unreliable.

The Bank's method is unreliable because its results are excessively dependent on the chosen PPP base year, which is entirely arbitrary. In order to see why, it is helpful to examine how the Bank compares the consumption expenditure of a person in one country and year with that of another person from another country and year. This comparison is made by the Bank in two steps. First, national CPIs are used to deflate or inflate the two national currency amounts into "equivalent" amounts of a common base year. Second, PPPs for this base year are then used to compare the resulting national-currency amounts. The problem with this method is that the PPPs of different base years and the CPIs of different countries each weigh prices of underlying commodities differently, as they reflect distinct global and national consumption patterns. As a result, comparisons over space and time together are path dependent: if they are undertaken in different ways they may lead to different results. In particular, such comparisons are highly dependent on the arbitrary choice of base year for the PPPs used to undertake the spatial component of these comparisons.

Does consumption expenditure at a level deemed equivalent to the Bank's IPLs suffice for human beings to acquire the resources they need to achieve elementary requirements? We can begin to investigate this question by asking what it costs to achieve particular elementary requirements in particular countries, for example, to be adequately nourished in the United States. The Thrifty Food Plan, produced by the US Department of Agriculture as a guide for low income households and government agencies, offers one

answer to this question (see USDA 1999). Adopting a thorough and careful analytical methodology, the Plan estimates that the least cost of meeting a minimal calorie constraint (varying between 1600 and 2800 calories depending on age and gender) and a set of other minimal nutrient constraints (while minimizing the deviation from the existing pattern of consumption of low-income Americans) is $98.40 (1999) per week for a reference family consisting of a male and female ages 20 to 50, and two children ages 6 to 8 and 9 to 11 (ibid., ES-1). This least cost amounts to $3.51 (1999) per day per person in the reference family. Adjusting by the US CPI, this is equivalent to $3.05 (1993) or $2.27 (1985). Estimates in a similar range are garnered from other available exercises that have sought to establish the least cost of being adequately nourished in the United States.[14] This comparison serves to make the point that, even if we allow that the USDA provides a generous estimate of the cost of being adequately nourished, the $1/day IPLs would seem to be rather insufficient for meeting the nutritional requirements of human beings (let alone their other basic requirements). This implies that (if we assume that there are no additional distortions associated with PPPs) an IPL set so as to be adequate for human beings to achieve a set of elementary capabilities would have to be substantially higher.

3.0 *Poorly Defined and Inappropriate Measures of Purchasing Power "Equivalence"*

At the heart of the money-metric approach to inter-country poverty comparison and aggregation is the translation of the IPL from the abstract money units (international dollars) in which it is defined into the local currency units actually used by persons in different countries. For this purpose, measures of purchasing power equivalence or *purchasing power parities* (PPPs) are used. These are defined in terms of a number of units of a country's currency that are deemed equivalent to a unit of the currency of a base country. PPPs for a given base year are typically interpreted as describing the number of units of a country's currency necessary to purchase the "same amount" of commodities as can be purchased for one unit of the base country's currency at the base country's prices.[15]

How can appropriate PPPs, suitable for deriving the amount of local currency that is "equivalent" in purchasing power to the IPL, be determined?[16] This question is difficult

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[14] In 1963, the USDA estimates that the cost of three minimally adequate meals a day for a typical family of two adults and two children would be $2.736 (1963), or $0.684 (1963) per person. Adjusting the figure by the U.S. CPI results in an estimate of $2.41 (1985) or $3.24 (1993) per person. See Schiller (2001).

[15] The following statement is illustrative: "PPPs measure the relative purchasing power of different currencies over equivalent goods and services. They are international price indexes that allow comparisons of the real value of consumption expenditures between countries in the same way that consumer price indexes allow comparisons of real values over time within countries…The resulting PPP indexes measure the purchasing power of national currencies in 'international dollars' that have the same purchasing power over GDP as the US dollar has in the United States" [Notes to Table 4.10, World Bank World Development Indicators 1998].

[16] Two short, thoughtful research notes in the IDS Bulletin by Michael Lipton and Shahin Yaqub contain a

because price ratios between any two countries vary from commodity to commodity. The PPP importantly depends on the weights assigned, explicitly or implicitly, to the various commodities. Allowing such weights to be determined by actual consumption patterns does not avoid arbitrariness: Consumption patterns vary from country to country for reasons of tastes. As importantly, actual consumption patterns are strongly influenced by prices and by the existing income distribution. For example, the fact that only a very small fraction of consumption expenditure in a country goes for medicines does not show that the price of medicines is of minor importance for gauging the standard of living of its inhabitants. On the contrary, the price of medicines may be greatly important to them, perhaps explaining why many of them cannot afford to buy the medicines they urgently need.

Ultimately, the concept of an "equivalent" amount of currency is only substantively meaningful in relation to an *achievement* concept. One amount of currency at a point in time and space can be deemed "equivalent" to another amount of currency at another point in time and space if both quantities are just sufficient to achieve a common end.[17] In order to be meaningful, a measure of purchasing power equivalence must be definable in relation to some end. Since amounts that are equivalent in relation to one end may not be equivalent in relation to another, the end must be carefully specified and justified so that it generates cost comparisons that are appropriate for the purpose at hand. Very different cost comparisons (and PPPs) may apply to comparisons of the cost to governments of achieving a given level of military capability, the costs to corporate executives of achieving an accustomed standard of living, or the costs to persons of avoiding extreme poverty.

One obvious way of specifying the end in relation to which a set of PPPs is defined is to fix a reference bundle of commodities. The least cost of purchasing this reference bundle in different countries in national currency units at the prevailing local prices establishes a set of PPPs.[18] A generalization of this approach specifies the end as some final achievement (for example the attainment of a specified degree of subjective preference satisfaction – utility – or the possession of a specified set of capabilities) which is dependent on the ability to obtain commodities. In this case, the least cost (in national currency units at the prevailing local prices) of bringing about this final achievement in different countries establishes a set of PPPs. In order to conduct such an exercise, it is necessary to specify a transformation function which specifies the manner in which command over commodities is transformed into final achievements. This transformation function can be held to be common across countries or be informed by subjective preferences and relevant contextual features (such as environmental or cultural conditions). Since persons can vary in their ability to transform commodities into final

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few of the insights we have developed further here regarding the importance of PPPs in global poverty assessment. See Lipton (1996) and Yaqub (1996). The issue is also noted although not fully explored by Deaton (2000).

[17] For a fuller discussion of the conceptual relation between index numbers expressing money "equivalence" and concepts of achievement invariance see Reddy and Plener (2005).

[18] An example is the *Economist*'s so-called "Big Mac" PPP index, which assesses the purchasing power of all national currencies in relation to a single commodity by valuing each currency in inverse proportion to the retail price of a Big Mac.

attainments, more fine-grained index numbers (specific to persons within countries as well as to individual countries) can also in principle be constructed. It is unavoidable, however, to specify an invariant level of achievement (in some achievement space) to which the PPPs refer, if they are to be deemed to characterize "equivalent" levels of purchasing power.

It is obvious that there cannot be one set of PPPs that is appropriate for all purposes. Rogoff (1996) is one of many to note: "Ultimately, there is no 'right' PPP measure; the appropriate variation of PPP depends on the application." More fundamentally, the appropriate PPP is determined by the underlying achievement concept in relation to which equivalence is specified. To be meaningful and relevant to their purpose, cost of living adjustments for corporate executives, the conversion factors used to translate poverty lines across countries, and those used to determine the relative size of military expenditures must each be grounded in distinct achievement concepts. It is an empirical question whether the PPPs that are associated with distinct achievement concepts are sufficiently different in magnitude to make it necessary to adopt different PPPs for each purpose.

In practice, distinct PPPs are rarely used for distinct purposes. The dominant motivation for producing PPPs to date has been to undertake broad comparisons of the quantity of real national income and its components and of relative prices. These "broad-gauge" PPPs have been used to compare living standards or to permit comparative assessments of poverty and income distribution despite the possibility that they may be inappropriate for these purposes. Considerations of whether PPP calculation methods permit consistent inter-country orderings (obeying such properties as base-country invariance and 'fixity' of rank orderings[19]) have been of greater interest than considerations of whether they permit a meaningful and appropriate basis for comparison of individuals' living standards and of the cost of achieving specific ends such as the avoidance of deprivation.

We explore in the remainder of this section the implications of using inappropriate PPPs in inter-country poverty comparison and aggregation. We will ultimately suggest, however, that the problems inherent in the money-metric approach cannot be overcome simply by substituting PPPs that are more appropriate. There is no fully satisfactory way to undertake such a substitution within the money-metric approach.

We consider in detail below the reasons that existing "broad-gauge" PPPs are inappropriate for use in inter-country poverty comparison and aggregation. Ultimately, these problems arise from a single source: the lack of anchoring of these PPPs in any clear achievement concept and in particular one that is appropriate to the task of poverty assessment.

3.1 *Inappropriate Informational Bases and Methods of Aggregation:*

Existing "broad-gauge" PPPs are inappropriate for use in poverty assessment as they *lack appropriate focus* in their informational base. The problem of an inappropriately focused

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[19] This refers to the property that rank orderings of countries are maintained when the procedure for PPP estimation is applied only to a proper subset of the countries.

informational base is compounded by the fact that the information used is *aggregated* in a manner that compounds the distortions inherent in the use of inappropriate information. Current PPPs are inappropriate for measuring absolute poverty because they draw *too much* on information that is irrelevant and *too little* on information that is relevant to this particular task.

The problems that arise from using PPPs derived from current methods in inter-country poverty comparison and aggregation may be classified as follows:

Vague Referent: Available PPPs do not refer clearly to any achievement concept. Rather, as will be discussed in detail below, they aggregate information on quantities consumed and prevailing prices of a wide variety of commodities in order to produce broad measures of the "average" price level in each country.

Inappropriate Referent: The measure of average prices constructed in existing PPPs is quite inappropriate for poverty assessment. Again, this is because existing methods for calculating PPPs involve aggregating information on the quantities of a wide variety of commodities demanded in different countries and the (explicit or implicit) prices at which these commodities are exchanged. As such, PPPs from existing methods reflect quantities and prices that have no relevance to absolute poverty assessment. PPPs from existing methods are influenced by *irrelevant* information in the following ways, among others:

(i)   Commodity Irrelevance: They are influenced by information about the prices and quantities of commodities consumed disproportionately (both in relation to their incomes and in relation to the total demand for commodities) by the *non*-poor, both within the same country and in other countries. In principle, the price of *some* such commodities *could* be relevant to determining the cost of avoiding absolute poverty. In particular, this will be true of commodities that are essential to maintaining an adequate level of well-being and unaffordable for many poor people. However, most commodities consumed disproportionately by the non-poor do not have this feature.

Country Irrelevance: PPPs that are meant to reflect how much currency in one country is required to purchase the "same" amount of goods and services as can be bought with one unit of the currency of a base country are influenced by information about prices and quantities of commodities consumed in *third* countries. There are reasons why this sensitivity to third country information may be appropriate in the multilateral comparison of aggregate levels of real national income.[20] However, this sensitivity is quite inappropriate in the case of absolute poverty assessment. Sensitivity to third country information will imply that a poverty line in a country (calculated by converting an IPL expressed in a base country's currency using a PPP conversion factor) will fluctuate simply because of changes in prices in a third country, even though *nothing* has changed either in the country in which poverty is being measured or in the base country. Whether a household in India lives in absolute poverty by the $1 PPP per day standard cannot

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[20] See Plener and Reddy (2005) and Reddy and Plener (2005).

reasonably depend on information about Japanese real estate prices, but under the current methodology of poverty assessment it may. How serious the impact of such "country irrelevance" is in practice is difficult to judge.

Both country and commodity irrelevance are instances of the violation of a principle of independence of irrelevant alternatives: *poverty estimates for a country should not change simply because other countries' consumption patterns or price levels have changed, nor because the consumption pattern or price level of goods that are not needed to avoid poverty have changed.* A method of measurement that fails to satisfy this requirement is flawed.

The problem of dependence on irrelevant alternatives can be avoided straightforwardly by starting from an *appropriate* achievement concept and constructing PPPs which accurately reflect the relative costs of attaining this achievement in different countries.

Changing Referent: Existing PPPs of different base years are not comparable. They are designed to provide spatial rather than spatio-temporal comparisons. The changing structure of the global and national economies over time gives rise to substantial changes in PPPs. Because of the lack of a clear and invariant achievement concept to which the PPPs refer, it is difficult to adjudicate among inter-country comparisons that invoke PPPs from different base years. Moreover, such adjudication is necessary since spatio-temporal comparisons relying on the spatial comparisons undertaken in one base year can give rise to substantially different results than spatio-temporal comparisons relying on the spatial comparisons undertaken in a different base year. Table 5 shows that poverty lines in individual countries are greatly influenced by the base year chosen. Since different countries' poverty lines are influenced differently by the choice of base-year, this problem cannot be remedied by adjusting the levels of the IPLs associated with different PPP base years. [For example, raising the level of the Bank's new IPL to $1.343 per day PPP 1993 would achieve a perfect fit with the old IPL ($1 per day PPP 1985) for the US, would improve the fit with the old IPL for Mauritania, and would worsen the fit for Nigeria.][21] Nor can the problem be avoided by using the PPPs of one base year in perpetuity, because the choice of this base year would still be arbitrary. It would still be true that very different results would have been obtained if a different PPP base year had been chosen instead.

National poverty headcounts and hence also the geographical distribution of poverty are greatly influenced by the choice of base year. As our tables, and indeed the Bank's own tables (comparing Table 4 of WDR 1999/2000 with Table 4 of WDR 2000/2001) document, these variations are intolerably large. This is a problem that is inherent to the money-metric approach and the use of existing PPPs. [See Pogge and Reddy (2003) for a full exposition and some dramatic examples]. It is unknown at this point to what extent these variation can be reduced by combining the money-metric approach with more appropriate PPPs that better reflect the basic requirements and/or empirical consumption patterns of those deemed very poor.

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[21] The underlying problem is that the vector of PPPs for 1993 is not a scalar multiple of the vector of PPPs for 1985.

This problem gives rise to substantial uncertainties, which make it effectively impossible to "track" the depth and incidence of poverty over time. Assertions of the existence of poverty "trends" derived from methods that rely on these PPPs are therefore highly questionable..

A dilemma arises when attempting to use existing PPPs to estimate the value of any aggregate (including the extent of severe poverty) over time. One option is to commit to some PPP base year once and for all, and then to use the resulting PPPs for the comparison and conversion of household consumption data generated in all subsequent years. This option has the advantage that it provides a stable basis of comparison. However, this first option has two important drawbacks: The global consumption pattern will shift and is likely over time increasingly to diverge from the original pattern that once prevailed in the chosen PPP base year. It becomes increasingly difficult to justify the application of the previously fixed PPPs to the assessment of poverty in the most recent years; the PPPs used do not refer to the relative costs of purchasing goods and services in the most recent years. National CPIs must be used to connect national data in an assessment year with the base year in which PPPs are defined and spatial comparisons are undertaken. However, this link becomes ever more tenuous due to changes in national and world consumption patterns over time. The use of PPPs from a distant base year leads not only to arbitrary results but to inappropriate ones. The second option is the one the Bank has chosen. Here the previously chosen PPP base year is periodically replaced by a later one, thus avoiding use of PPPs that reflect a starkly outdated consumption pattern. However, this second option also has its drawbacks: each time a PPP base year is abandoned, all the previous estimates of the extent and trend of poverty calculated via these PPPs must be discarded too. This may undermine public understanding of and confidence in the exercise. The deeper drawback of the second option mirrors those of the first: While the substituted PPPs of the later base year are more appropriate for assessing present and recent poverty, they will be less appropriate for assessing poverty experiences long past. Thus, using 1993 PPPs rather than 1985 PPPs does not provide any obvious gain for assessing the 1980-2001 global poverty trend: The 1993 PPPs are based on a world consumption pattern more reflective of that in 2001, and are from this perspective more appropriate for assessing the global poverty situation in 2001. Moreover, the length of time over which it is required to update the IPL using national CPIs is shorter, reducing the error that can arise from this source. However, the 1993 PPPs are also less reflective of the 1980 global consumption pattern from this perspective less appropriate than 1985 PPPs for assessing poverty in 1980. Moreover, the length of time over which it is necessary to translate the IPL in time using national CPIs is longer, increasing the error that can arise from this source.[22] There is no

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[22] One may think that this uncomfortable choice may be avoided by using PPPs from different base years in single time-space comparison. This is not possible, however, because international dollars of different years cannot be meaningfully compared and converted into one another. A 1985 international dollar may be "worth more" than a 1993 international dollar when both are converted into Nigerian currency and then compared via the Nigerian CPI, and the same 1985 international dollar may be worth less than a 1993 international dollar when both are converted into Mauritanian currency and then compared via the Mauritanian CPI. The Bank suggests the contrary through its use of the language of 'updating': "The 1990 calculations of the international poverty line had to be updated using 1993 price data and the 1993 price estimates" (WDR 2000/01, 17). The claim here suggested -- that 1.08 is the equivalent, in 1993 international dollars, to one 1985 international dollar is false, since the number of 1993 international dollars

solution to this problem within the money-metric approach. This problem would not arise if an explicit achievement concept were adopted, since in that case there would be no need to specify a base year to arrive at a set of index numbers. This procedure provides a consistent and robust basis for inter-temporal as well as inter-spatial comparisons.

As noted, each of the above problems besets in some measure all of the currently favored methods of constructing PPPs. In the two sections below we explain more fully how they affect two particular methods that are in common use and have been employed in the World Bank's global poverty assessments. Subsequently, we address the empirical evidence that the use of existing PPPs within the money-metric approach has indeed resulted in substantial distortions to estimates of the true pattern and extent of absolute poverty in the world.

3.2 *The Example of the EKS System of Calculating PPPs:*

The EKS (Eltetö-Köves and Szulc) method of calculating purchasing power parities has been one of the two most widely used methods for calculating PPPs. It is employed by the World Bank to calculate (from International Comparison Program data) the PPPs for consumption used in the World Bank's recent global poverty assessments.

The basic information upon which it relies consists of the observed or inferred prices $\{p\}$ and quantities $\{q\}$ of commodities, belonging to a list common to all countries, sold in each country.

In particular, the EKS method[23] defines the PPP prevailing between country i and country j [interpreted as the number of units of country j currency "equal" in purchasing power to that of country i] as:

$$PPP_{ij} = [(f_{ij})^2 \ (\Pi_{(k \neq i, j)} f_{ik} f_{kj})]^{1/n} \hspace{3cm} (1)$$

where f_{ij} is the Fisher 'ideal' price index of country i relative to country j, defined in turn as:

$$f_{ij} = ([(\ p_i \circ q_j\ )/(\ p_j \circ q_j\ )] \ [(\ p_i \circ q_i\ )/(\ p_j \circ q_i\ )])^{1/2} \hspace{2cm} (2)$$

where p and q represent the local prices prevailing and quantities observed to be consumed in each country, where k represents a third country, where n is the total number of countries, and where o represents the inner product (i.e. $p_i \circ q_j$ represents the

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that is 'equivalent' to a 1985 international dollar varies from country to country.

[23] See for instance Kurabayashi and Sakuma (1990) and Ward (1985).

cost the basket of commodities q_j at the prices p_i). Let us suppose for simplicity that country j is the 'base country'.

The core idea of the EKS method is simple. A PPP estimate generated by the EKS method is nothing more than the geometric mean of a set of price indices between country i and country j. However, these price indices take the form of both direct and indirect comparisons of prices between the two countries. The "indirect" comparisons result from comparing the price level of country i and that of *every* third country, k, and multiplying the resulting price index in turn by that which results from comparing the price level of country k and country j. Finally, the type of price index used for every comparison of price levels between countries is the Fisher ideal price index, which takes the geometric mean of the relative price levels of the countries calculated when using in turn as weights the quantities of commodities consumed in the countries being compared.

The EKS method of calculating PPPs has a number of advantages over other methods. Among these are that the resulting PPPs are invariant to the base country chosen, that they lead to a consistent (or transitive) relation among the price levels of countries, and that by taking into account the pattern of consumption in each country but not the scale of consumption as such, they can be interpreted as referring to a bundle that is equally "characteristic" (or, as we shall argue below, uncharacteristic!) of consumption in all countries. However, the invariance of the EKS procedure to the scale of demand in a particular country masks a number of more subtle but pernicious biases through which the EKS method gives undue and excessive weight to the consumption of rich countries.

Rich countries vary from poor countries in the *pattern* of the commodities consumed, as well as in the sheer *quantity*. Although the EKS system does not directly take note of the quantity of commodities consumed in a country it does pay heed to the pattern of consumption.

The problems arising from the use of EKS PPPs in inter-country poverty comparison and aggregation may be classified as follows:

Vague Referent:

PPPs derived by the EKS method do not possess a fixed achievement interpretation and do not reliably possess any achievement interpretation at all. It may be impossible to find a basket of commodities or any standard of achievement with respect to which the EKS PPPs define a set of relative prices. However, since the EKS PPPs are a mean of directly and indirectly calculated relative price levels determined with respect to different quantity bases, they do certainly convey *some* real information about 'average' relative prices across countries, measured across all goods and services consumed in those countries. The averaging process employed by the method weights individual *commodities* unequally according to the pattern prevailing in each country, although it weights each of the *patterns* of consumption found in different countries equally. The 'relative price level' between any two countries reflects the pattern of consumption in both countries. However, it does not have a ready interpretation in terms of the prices and patterns of consumption in those two countries alone, because the patterns of consumption in *all* countries enter into *each* bilateral calculation of relative price level.

The resulting PPPs are the consequence of a process of aggregation of prices in each country but do not refer directly to an achievement concept, as would be necessary in order for them to be fully meaningful as indices of cost of living.

Inappropriate Referent:

EKS derived PPPs can understate the cost in poor countries of acquiring commodities necessary to avoid poverty. To see why, suppose that in the expression (1) that defines PPP_{ij} country i is a poor country, and country j (consider it to be the base country with respect to which all relative prices are measured) is a rich country. Now, examine the direct Fisher ideal relative price index for the two countries whose price levels are being compared:

$$f_{ij} = ([(p_i o q_j)/(p_j o q_j)] [(p_i o q_i)/(p_j o q_i)])^{1/2}$$

$$= \left(\frac{\sum_{k=1}^{l} p_i^k q_j^k}{\sum_{k=1}^{l} p_j^k q_j^k} \right) \left(\frac{\sum_{k=1}^{l} p_i^k q_i^k}{\sum_{k=1}^{l} p_j^k q_i^k} \right) \tag{3}$$

where each superscript k represents a particular commodity. Consider now the impact of a change in the consumption of a single commodity (without loss of generality, call it commodity 1) in either country. It is straightforward to show by simple differentiation that

$$\frac{df_{ij}}{dq_j^1} < 0 \quad \text{iff} \quad \left(\frac{p_i^1}{\sum_{k=2}^{l} p_i^k q_j^k} \right) < \left(\frac{p_j^1}{\sum_{k=2}^{l} p_j^k q_j^k} \right) \tag{4}$$

and, analogously,

$$\frac{df_{ij}}{dq_i^1} < 0 \quad \text{iff} \quad \left(\frac{p_i^1}{\sum_{k=2}^{l} p_i^k q_i^k} \right) < \left(\frac{p_j^1}{\sum_{k=2}^{l} p_j^k q_i^k} \right)$$

In other words, an increase in the consumption of a commodity in either country decreases the price index if and only if the price of the good relative to the average price of all other commodities is lower in country i (the 'poor country') than in country j (the 'rich country'), with the weight for each good used in calculating the average prices corresponding to the level of demand for that good in the country where the change was experienced.

This result is relevant to understanding why PPPs derived from this method may be inappropriate for poverty assessment:

(1) The calculated PPP (and thus the apparent price level) in the poor country will be lower the higher is the demand in either country for commodities that are more expensive in the rich country than in the poor country relative to other commodities. For example, if services are relatively more expensive in rich countries (as is generally the case) then an increase in the consumption of services in the rich country will lead to a lower PPP (and thus a lower reported price level, a lower IPL-based national poverty line, and a lower poverty headcount) in the poor country. Similarly, the larger is the size of the service sector in either country, the lower will be the PPP (and hence the reported price level, the national poverty line, and the poverty headcount) in the poor country. Such dependence is inappropriate since information on the composition of aggregate demand is irrelevant to determining the cost of avoiding poverty in each country.

(2) The higher is the demand in either country for commodities that are relatively less expensive compared to other commodities in the rich country the higher will be the calculated PPPs, (and thus the apparent price level) in the poor country. An example of such a commodity is food. Relative prices of food are higher in poor countries [strong evidence that this is so is provided in section 5 below as well as by Heston and Summers (1995)]. Similarly, this dependence is inappropriate since information on the composition of aggregate demand is irrelevant to determining the cost of avoiding poverty in each country.

(3) The lower is the demand in either country for a good that is more expensive relative to other commodities in the rich country than in the poor country (such as services) the higher will be calculated PPPs, (and thus the apparent price level) in the poor country.

(4) The lower is the demand in either country for a good that is less expensive relative to other commodities in the rich country than in the poor country (such as food) the lower will be calculated PPPs, (and thus the apparent price level) in the poor country.

All of the analysis above has been about the direct component of the EKS price comparison between a poor country and the (rich) base country. However, the logic described here carries over to the indirect price comparisons and therefore to the EKS method as a whole.

To summarize, PPPs *may* be inflated either by high consumption in either country of poverty-irrelevant commodities that, relative to the others, are more expensive in the poor countries (case 2) *or* by (possibly poverty-induced) low consumption in either country of poverty-relevant commodities that, relative to the others, are less expensive in the poor countries (case 4). Obversely, PPPs may be inappropriately *deflated* either by high consumption of poverty-irrelevant commodities (such as services) that, relative to the others, are less expensive in poor countries (case 1) *or* by low consumption of poverty-relevant commodities (such as basic foodstuffs) that, relative to the others, are more expensive in poor countries (case 3). Such deflation is inappropriate insofar as the poor need food, and not services, to achieve elementary human requirements (such as adequate nourishment).

We can consider also the impact of a change in the price of a commodity. It is straightforward to show that an increase in the price of any commodity consumed in country *j* will decrease PPP_{ij} and an increase in the price of any commodity consumed in country *i* will increase it. Although this is reasonable for an index intended to create an average measure of relative prices in two countries, it is not appropriate within a poverty assessment exercise: The assessed standard of living of the poor should not be sensitive to the domestic or foreign prices of commodities that the poor do not need and do not consume. With the EKS method, however, the assessed standard of living of the poor rises with any decrease in the domestic price of any luxury product and also with any increase in the price of a luxury product abroad (which lowers the PPP of the country in which they reside and therefore the poverty line deemed "equivalent" to the IPL).

The key lesson to emerge from the analysis above is that existing PPPs derived from the EKS method are based on the aggregation of a great deal of information that is irrelevant to poverty assessment – information about the prices and consumed quantities of poverty-irrelevant goods and services. As a consequence, national poverty lines derived from an IPL via EKS PPPs may substantially misstate, and quite possibly understate, the amount poor people must spend in order to have the same standard of living that the IPL affords in the base country (i.e. in order to avoid poverty). The sensitivity of EKS PPPs to clearly irrelevant information can lead to erroneous conclusions concerning the trend as well as the extent of poverty.

Changing Referent:

PPPs derived by the EKS method depend on the prices and quantities of commodities consumed in all countries during any one time period. They do not refer to any fixed achievement concept. Rather, they produce a measure of "average" relative prices that reflects the pattern of consumption of commodities throughout the world, which shifts over time. Moreover, there is a systematic dimension to these shifts. As development occurs, the rising proportion of consumption (in both poor and rich countries) accounted for by commodities (such as services) that are relatively less expensive (compared to other commodities) in poor than in rich countries will lead to lower PPPs for poor countries calculated by the EKS method, and therefore to lower "equivalent" poverty lines. If PPPs calculated on the basis of later data were applied to a poverty line defined in constant terms in a rich country's currency, as a way of "updating" a poverty

assessment, the net effect would be to *lower* poverty lines and therefore poverty estimates in developing countries. This would be true even if structural change along these lines had taken place only in rich countries, without *any* change in poor countries.   If PPPs from different base years are combined in a single assessment (which should not be done) the appearance that poverty is falling may arise as a consequence of development in rich countries, even if *no* development in poor countries actually takes place. If a single base year's PPPs are used to undertake spatial comparisons, then a dilemma arises as to which base year to use. Each choice can give rise to potential distortions, and spatiotemporal comparisons conducted using the PPPs of one base year can give rise to very different conclusions than do such comparisons conducted using the PPPs of a different base year. In these circumstances, the exercise of "updating" poverty lines through the adoption of PPPs based on newer data is meaningless at best.

3.3 *The Example of the Geary-Khamis System of Calculating PPPs:*

A second method used widely in the construction of PPPs (most prominently, by the Penn World Tables) and adopted in poverty assessment (as for example in the methodology for measuring global poverty employed in WDR 1990) is the so-called Geary-Khamis (henceforth G-K) method [see e.g. Kurabayashi and Sakuma (1990)]. It consists in the imposition of three requirements (forming a full-rank linear equation system) concerning the relation between the derived PPPs and observed data (commodity demand and prices) in the countries of the world. Together, these three requirements allow the calculation of a determinate set of PPPs:

$$\Pi_k = \sum_{i=1}^{n} \frac{p_i^k}{PPP_i} \left[\frac{q_i^k}{\sum_{i=1}^{n} q_i^k} \right] \qquad (k = 1,...m) \qquad\qquad (1)$$

$$PPP_i = \frac{\sum_{k=1}^{m} p_i^k q_i^k}{\sum_{k=1}^{m} \Pi_k q_i^k} \qquad (i = 1,..n) \qquad\qquad (2)$$

$$PPP_1 = 1 \qquad\qquad (3)$$

The first expression defines a set of purely notional *international prices* for each good (k=1,..m) in terms of an equally notional *international currency*, by imposing a requirement that the *international price*, Π_k for any good should be the weighted

average of the prices that actually prevail for that good in different countries (i=1,..n) in national currency units deflated by a measure of the 'relative inflatedness' of a country's price level, identified here with the country's PPP (taken to represent the number of units of its national currency that "correspond" in real terms to one unit of international currency). Thus, the PPP serves the function of an exchange rate between national currency and international currency. The application of this "exchange rate" to national prices from different countries enables them to be converted to a common unit of measurement (namely international currency) and then averaged. The weights correspond in the standard G-K system to each country's share of world consumption of the good, as measured in physical units. These weights are modified in variants of the standard system but the principle involved is similar.

The second expression imposes the requirement that each country's PPP be equal to the ratio of the value of its national income as evaluated in national currency units at actually prevailing national prices, and the value of its national income as evaluated at the notional international prices. In this sense, each country's PPP represents its relative price level, interpreted in terms of the 'cost' at international prices of its own GDP. However, the international prices at which this relative price level is determined are notional international average prices that are not observable.

The third expression requires simply that there exist a base country for which the PPP is one (i.e. the national income of the base country evaluated in notional international currency at international prices and in its own currency at its own prices have the same magnitude). In global comparisons of real prices and product, the base country chosen has been the United States.

We now consider in more detail the reasons that PPPs derived from the Geary-Khamis method can be inappropriate for use in inter-country poverty comparison and aggregation.

Vague Referent:

PPPs calculated by the G-K method do not possess a fixed achievement interpretation, and do not reliably possess any achievement interpretation at all.[24] What meaning if any do G-K PPPs have? Since notional international prices are not faced by any actual actor, the exchange rate that they represent between actual currencies and the notional international dollar is of no direct interest.

Inappropriate Referent:

PPPs resulting from the standard G-K method are likely to lead to distorted estimates of the 'true' cost of avoiding poverty because, by construction, the standard G-K method gives greater weight in the determination of notional international prices to countries that account for a larger share of total world demand. Consider services, which tend to be (relative to other commodities) expensive in rich countries and cheap in poor ones. The

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[24] See Reddy and Plener 2005.

more money is spent (notably in the rich countries) on services, the stronger an impact prices for services have on calculated PPPs. In this way, high prices for, and high consumption of, services in the rich countries lower the calculated PPP of the currency of all poor countries, thereby lowering their apparent price levels, national poverty lines, and poverty headcounts.

There is a conceptual and an empirical point to be made here. The conceptual point is that as a result of equations (1) and (2) of the G-K system, countries' PPPs — and therefore national poverty lines derived from an IPL via these PPPs — will vary simply as a consequence of variations in *other* countries' prices and shares in world output. This violates the basic 'independence of irrelevant alternatives' requirement noted above: poverty estimates for a country should not change merely because of changes in other countries' consumption levels or price levels.

The allied empirical point is that a great deal of money is spent, especially in the richer countries, on nontradables and that such nontradables are indeed much more expensive (relative to tradables) there than in poorer countries.[25] In the G-K system of equations, these expenditures on nontradables have the effect of lowering the calculated PPPs of poor countries and raising those of rich countries. Within the context of a poverty measurement exercise, this effect is distorting, because nontradables are, with very minor exceptions, poverty-irrelevant commodities. The access of poor-country residents to basic human requirements, their ability to avoid real poverty, is not enhanced by the fact that nontradables are heavily consumed in the rich countries and more expensive (relative to tradables) there than in poorer countries. By using broad-gauge PPPs calculated in the G-K system of equations, one systematically overestimates the command that residents of poor countries have over basic necessities. This distortion inappropriately lowers national poverty lines and poverty headcounts in the poorer countries.

Changing Referent:

G-K PPPs from different base years are not comparable. The fundamental reason is that each set of G-K PPPs derives from the entire global pattern of demand and prices that prevails in some specific year, rather than from the relative cost of achieving a fixed level of achievement in an appropriate space. G-K PPPs do not then refer to a specific conception of purchasing power in any sense that is consistent over time. As a result, inter-temporal comparability can be achieved only by confining oneself to the use of PPPs derived from one particular base year. However, this procedure gives rise to the accustomed problems: The results realized depend greatly on a specific choice of some base year, which cannot easily be justified over another such choice. Furthermore, the PPPs employed either become increasingly out of date, referring to an ever more outdated pattern of demand and prices, in which case the claim that they capture the present relative cost in different countries of commanding commodities is questionable *or* they do capture the present relative cost in different countries of commanding commodities but do not capture their past relative cost.

Any switch to a new, later base year may change the degree of distortion that sensitivity

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[25] There is substantial evidence for this relationship, known as the Balassa-Samuelson effect..

to the prices of poverty-irrelevant nontradables introduces into any poverty measurement exercise that relies on broad-gauge PPPs calculated through the G-K system of equations. In particular, this underestimation of real poverty may be aggravated by three kinds of shift in the global pattern of consumption expenditure and price vectors. First, any shift in consumption — in either rich or poor countries — from tradables to nontradables reduces the PPPs of the poor countries, and hence their apparent price levels, national poverty lines, and poverty headcounts. Second, any shift (through growth differentials) in global consumption from poor countries to rich countries tends to increase the influence of nontradables prices, because nontradables account for a larger proportion of consumption expenditure in richer countries than in poorer ones. Third, any increase in the relative cheapness of nontradables in poor countries — that is, any increase in the price ratio of nontradables to tradables in rich countries relative to the same ratio in poor countries — also increases the degree to which calculated G-K PPPs overstate the command that residents of poor countries have over tradables such as food and clothing. Insofar as any or all of these shifts take place — and the first one does so continuously — any new set of PPPs (reflecting a later base year) brings *increasing* disadvantage to residents of poor countries relative to residents of rich countries living on a supposedly equivalent amount of money in respect to their access to basic necessities.

4.0 *False Precision and Mistaken Inferences*

In addition to errors resulting from the conceptual problems described above, the Bank's estimates of global poverty involve errors due to measurement problems associated with the data used under the Bank's preferred approach. It is entirely probable that these errors — not explicitly identified or quantified by the Bank — are large. Some of these errors can be significantly diminished. Others cannot be, but can at the least be more explicitly identified. We describe below some issues of this kind.

4.1 *Probable Error*

The Bank's estimates of global poverty are point estimates. They present estimates of the total number of the absolutely poor, in specific countries, regions and the world. However, the estimates are based on data that is infected with measurement errors. For this reason, final totals based on these data will also be similarly infected. How high is the probable error arising from underlying data uncertainties? There is reason to think that it is very high. Nonetheless, poverty headcounts are reported with six-digit "precision."[26] Kakwani (1993) noted, "No …tests [of the statistical significance of estimates] have been devised for poverty measures because of their complex nature." Since then, it has become possible to construct estimates of standard errors associated with sampling through various procedures (both through assessing the theoretical properties of survey designs and poverty measures and through atheoretical procedures

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[26] Chen and Ravallion 2001, 290. There is more modest five-digit precision in WDR 2000/01, 23, and Chen and Ravallion 2004.

such as "bootstrapping"). However, this can be a difficult exercise when sampling designs are complex. In addition, sampling error is only one source of the errors likely to be present in global poverty estimates. However, these are not reasons to avoid providing at least a gross indication of the possible errors involved and their sources. Suggestions of false precision can be avoided even in the absence of well-developed statistical tests.

In section 2.0 above we showed that large fluctuations in the level of headcount poverty in particular countries and regions were caused simply by the choice of PPP conversion factors associated with one base year rather than another. These massive fluctuations reveal the sensitivity of aggregate poverty estimates to the PPP factors chosen.

Uncertainties additionally emerge as a result of the fact that PPPs for a very large number of countries are based on judgments or fitted values rather than on actual observations of prices and quantities of goods consumed in that country. For example, 63 countries participated in the International Comparison Program Phase V Benchmark Study in 1985.[27] Relative prices levels for the remaining countries were determined purely through regression estimates, which predicted real per capita income (and thereby PPPs) on the basis of exchange rate incomes, secondary school enrolment ratios, and "post adjustments," which are derived from data about the costs of living of expatriates living in capital cities collected by the International Civil Service Commission and by private sector consultants (Ahmad, 1992). There are, of course, errors associated with a procedure of this kind.

The errors associated with the PPP estimates for countries containing potentially large numbers of poor persons may have especially important implications. India participated in the 1985 ICP benchmark survey but not in the 1993 ICP benchmark survey or subsequent ones. China participated in neither. Thus, PPPs for these two vast and heterogeneous countries with significant shares of world poverty are based entirely on "educated" guesses. The consumption PPP reported by the World Bank for India in 1993 is based on the updating of its assumed international price level in 1985 by domestic inflation, with some adjustment made for changes in post adjustments and other data. The consumption PPP reported by the World Bank for China is based primarily on an estimate of China's PPP in 1986 produced by academic authors (Ruouen and Kai 1995) through a bilateral comparison of prices in China and the United States. China's PPP was thus derived in an entirely different way than were PPPs assigned to other countries, and is now quite dated. Since the state statistical bureau did not report national average prices for many items, the authors undertook price surveys in a mere ten cities with no coverage of rural areas. Finally, their PPP estimates are quite different from those made by others. PPPs proposed for China vary by a factor of *more than two*, reflected in per capita GDP estimates for 1990 spanning the range from $1300 (IMF), $1600 (Ruoen), and $1950 (World Bank) to $2695 (Penn World Tables).[28] Ruoen and Kai (1995) report that, even when they confine themselves to their favored methodology, reasonable estimates for China's PPP per capita income in 1991 still vary from $1227 to $1663. Given such large variation of estimates for China's PPP, the choice of estimate will have a large impact on

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[27] We have not been able to find any public enumeration of the countries that participated in the 1993 benchmark survey.

[28] These different estimates and their differences are discussed in Heston, n.d.

the level of China's national poverty line and thereby on its reported poverty headcount. The estimated level and trend of global poverty would be consequently affected. This extraordinarily important issue is never once mentioned in the Bank's presentation of its global poverty estimates. Reddy and Minoiu (2005a) present alternative poverty estimates for China associated with the World Bank's IPL and distinct specifications of China's PPP and other parameters. They show that estimates of the extent of poverty in China in 1990 and subsequently are greatly influenced by these choices. Reddy and Minoiu (2005b) show that estimates of the extent and trend of East Asian and world poverty are in turn greatly influenced by the assumptions used in assessing poverty in China.

Countries that participate in ICP price surveys also differ greatly in the quality of the price observations they collect. There is reason to believe that price and quantity observations in specific regions (for example sub-Saharan Africa) are of poor quality. Quantity observations are typically inferred by dividing estimates of total expenditure on specific commodities (taken from the national income and product accounts) with price data from surveys. Uncertainties about the quality of the national income and product accounts therefore also infect the ultimate results. Missing observations are often replaced through regression methods (using the so-called country-product-dummy method) with associated uncertainties.

A further issue is that purchasing power parity estimates derive not from a single global application of a PPP calculation method to data on prices prevailing and quantities of commodities consumed in countries but rather from regional comparisons that are then "linked" together using bridge countries that participate in more than one regional price comparison, so as to establish price parities between the relative prices of countries in the different regions. This procedure is however sensitive to the choice of bridge country. An alternative choice of bridge countries could produce a very different set of global relative price levels (and hence of poverty lines). Although the bridge country approach has been an understandable response to resource limitations, it is also a source of error in estimates of global poverty and must be recognized as such.

When household surveys for countries are lacking, as they often are, the Bank assumes that income distributions in these countries are similar to those in neighboring countries. Chen and Ravallion (2004) note that their global poverty estimates are based on data from only 97 countries. Of these, 12 have only a single survey in the 1981-2001 period and 20 more have only two surveys (ibid., 163-6). The implications of this lack of data for the interpretation of trends are discussed further in section 4.3 below. It is clear that this lack of data also entails that a high probable error is associated with estimates of poverty at any one moment in time. This fact could be more explicitly recognized. Where data is available only in grouped form (which is the case for many countries, including some of the most important, such as China) poverty estimates are produced by interpolation methods, rather than through direct calculation from household information. It is likely that significant errors are associated with these interpolation methods.[29]

Finally, the Bank's global poverty assessments use data on individual consumption from

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[29] Indeed, preliminary monte carlo studies suggest that the Povcal program used by the Bank systematically understates poverty in specific cases. See Reddy and Minoiu (forthcoming).

household surveys. It is well known however that there are very large discrepancies between consumption reported in household surveys and consumption reported in the national income accounts. Which of these sources is more accurate? There is considerable reason to believe that household surveys are a much more accurate source of private consumption data. Nevertheless, as noted by Karshenas (2002), "the discrepancy in average consumption between the household survey and national accounts data, apart from definitional discrepancies between the two concepts, is due to possible errors in both sources of data."

4.2 *The Poor May Face Different Prices than the Non-Poor*

The benchmark surveys of the International Comparison Program collect data on prices paid by consumers for specified items at specified points of sale in countries throughout the world. These are typically formal sector enterprises in urban centers.

An important issue is that the poor may face different prices than the non-poor for the goods they consume, for instance because of where they buy (for example in semi-peripheral and rural areas with potentially less-competitive retail market structures), because of the quantities in which they buy (typically smaller than for the non-poor, because of cash-in-hand, credit, and storage limitations), or because of who they are (social marginalization, which may permit adverse retail market discrimination against the poor, or monopolistic price discrimination which may segment the retail market according to consumer income). There is some evidence that the poor pay more for the goods they purchase. For example, Biru (1999) finds that lower income groups pay more for the same commodities in Zambia, and that the differences in the prices paid by the different income groups are greatest in the poorest regions. Similar results are reported by Rao (2000) for rural South India. The use of PPPs based on prices observed to be paid by the non-poor may then be misleading insofar as the poor tend to pay different prices for these same commodities than their non-poor compatriots do.

4.3 *Automatic Poverty "Reduction"?*

The method adopted by the Bank to deal with the fact that household survey data are available only on an occasional basis builds in a tendency for poverty to *appear* to fall (when national incomes are rising) or rise(when national incomes are falling) when it may not be doing so. This tendency for an apparent reduction in poverty to arise when economic growth is taking place is an *inherent* feature of the Bank's methodology. Why? In the absence of up-to-date survey based data on the distribution of consumption, the procedure adopted by the Bank is to "estimate measures for each reference year by applying the growth rate in real private consumption per person from the national accounts to the survey mean – assuming in other words that the Lorenz curve for that country does not change" (Chen and Ravallion 2001, 289). This procedure inadvertently *ensures* a reduction in poverty, as long as the relevant growth rate is positive — and an increase in poverty where this growth rate is negative for an obvious reason: While a new household survey would offer a new 'snapshot' of household incomes (*both* their level and distribution), the procedure adopted by Chen and Ravallion updates only *half*

the picture -- mean consumption -- without updating the other half, distribution. This approach may be defended on the ground that it is reasonable to update estimates in this way in the absence of fresh data concerning distribution, taking advantage of that information which *is* available. However, the procedure is only reasonable if there is not reason to think that a widening of the income distribution has taken place.

The procedure yields merely apparent poverty reductions in countries in which both real private consumption per capita and the inequality in its distribution have increased. This double-increase case seems to be quite common in the 1990s. How much of the vaunted reduction in global poverty is due to the assumption that national Lorenz curves have not changed since the last survey? This is difficult to tell without additional information. But it is quite possible that 7-percent reduction in global $1/day poverty that the Bank has calculated for the 1987-2001 period (Chen and Ravallion 2004, 153) is entirely due to that empirical assumption built into its measurement approach. Table A.1 in Chen and Ravallion (2004, 163-6) reports the survey dates for each of the countries for which they estimated poverty and for which surveys were available. It is readily observed that for many of the countries involved, especially in Africa, the latest survey date lies quite a few years back. The assumption of unchanged national Lorenz curves adds further confusion to an already muddy picture, making it even more difficult to discern the truth about global poverty.

5.0 *Erroneous Estimates: Some Empirical Evidence*

In section 2.0 above and in Tables 2, 3 and 4, we offer empirical evidence that the methodological shift in global poverty assessment from the methodology employed in WDR 1990 through WDR 1999 to that employed in WDR 2000/01 and subsequently entailed significant changes in the extent of poverty deemed to exist in many countries and regions. The Bank notes that the total number of poor persons under the two methodologies is roughly the same for the year 1993. However, in view of the magnitude of the shift in the regional composition of poverty caused by the change in methodology, there is no reason to expect that the total would continue to be similar for subsequent years, and indeed it is not.

In this section, we offer some empirical evidence that the use of an inappropriate PPP concept has led to error (and specifically understatement) in estimates of the level of global poverty. First, we consider the lower IPL used by the World Bank, taken to have been already defined exogenously in international dollars. We show that it makes an enormous difference which PPP concept is used for the conversion of the IPL into local currency "equivalents." In particular, the present use of "broad-gauge" general consumption PPPs leads to substantially lower national poverty lines and headcounts than would result from using an appropriately narrower PPP concept. Second, we show that this conclusion also holds when the Bank's IPL is understood as *endogenously* generated in the sense that the IPL is not taken as given but rather is constructed from underlying domestic poverty lines by employing the procedure currently used by the Bank. We show that the Bank's reliance on general consumption PPPs leads to lower poverty lines (and therefore poverty headcounts) than would result from employing an appropriately

narrower PPP concept in most countries. Third, we estimate the increased headcount that would arise in specific countries as a result of employing less inappropriate PPPs. Fourth, we show that the supposedly close fit between the IPL and official domestic poverty lines for the poorest countries — used by the Bank to motivate the choice of its IPL — breaks down when less inappropriate PPPs are used. We conclude that the use of general consumption PPPs distorts global poverty assessments. Replacing these with PPPs that are related as closely and *explicitly* as possible to the consumption needs of the poor would constitute an improvement of the money-metric approach. However, we shall argue below that this is an inadequate solution and that a more comprehensive alternative is required.

5.1 *Inappropriate PPPs and the Understatement of Local "Equivalents" (with a Fixed International Poverty Line)*

One way to judge the extent of distortion resulting from the use of inappropriate PPPs is to compare the values of the PPPs for general consumption, used by the Bank to translate a given IPL (fixed in international dollars) into national currency "equivalents," to the values of the PPPs linked to a narrower range of consumption data. For a limited but still substantial range of countries, PPPs for narrower categories relevant to poverty assessment (in particular "all-food" and "bread-and-cereals" sub-aggregates) are available. These PPPs are calculated from price and quantity data for various items collected in specific "benchmark" years by the International Comparison Program (ICP) under its "basic headings" (comprising internationally comparable product categories). The PPPs for "all foods" and for "bread and cereals" — henceforth "food-based" PPPs — derive from applying the EKS aggregation procedure to the price and quantity data for commodities at the even more detailed "basic heading" level belonging to these sub-aggregate classifications.

Food expenditure plays a significant role in the overall cost of avoiding absolute poverty. Bread-and-cereals PPPs are likely to be especially relevant for poverty assessment, as bread and cereals are likely to play an important role in meeting basic food needs. Other sub-categories making up the ICP "foods" category as a whole in 1985 were "meat," "fish," "milk, cheese and eggs," "oils and fats," "fruits, vegetables and potatoes," and "other food." Although these other categories of foods are also likely to play a role in a balanced diet, they may figure minimally in the most absolutist conception of basic requirements. Using ICP data, Regmi et al. (2001) report that the income elasticities of demand for staple foods (including cereals) are lower than those for non-staple foods in all countries and that this phenomenon is especially marked for the poorest countries. The poor cannot substitute away from staple foods to anything else. Expenditures on these foods play an important role in the actual consumption of the poor, and are also likely to play an important role in the cost of avoiding of poverty.

Table 6A shows how food-based PPPs and those for general consumption differed for all the countries for which these data were available in the 1985 benchmark year. A figure greater than one in the last two columns for each country shows that prices of "all foods" or "bread and cereals" respectively are higher than suggested by the PPP conversion factor for general consumption. This is hardly surprising as general consumption PPPs

incorporate the cost of nontradables that are likely to be relatively inexpensive in poor countries. The summary statistics that follow the table show this to be true for most countries, including *all* countries in the low-income category. For these low-income countries, food prices are on average 67 percent higher (40 percent higher when countries' prices are weighted by their populations) than consumer prices in general, and bread-and-cereals prices are on average 111 percent higher (34 percent higher when countries' prices are weighted by their populations). Table 6B collates analogous figures for the 1993 benchmark year. In the vast majority of low income countries, food prices are again higher than consumer prices in general — 27 percent higher on average (31 percent higher when weighted by population). Bread-and-cereals prices are on average 51 percent higher (40 percent higher when weighted by population) than consumer prices in general. By any reasonable judgment, these magnitudes are very substantial, suggesting that using a more appropriate PPP concept would greatly increase the estimated extent of severe income poverty worldwide, even if the money-metric approach as a whole were to be retained.

The distortion arising from the use of PPPs for general consumption rather than food-based PPPs is greater for the poorer countries. This is again as would be expected based on prior economic reasoning. This is shown dramatically by the summary statistics grouped by income class for Tables 6A and 6B and by the regressions in Tables 9.1A and 9.1B. The regressions show (for the 1985 and 1993 data respectively) that whatever measure of disadvantage is used (per capita GDP measured at exchange rates or at PPP, infant mortality rate or under-5 mortality rate) the gap between poverty lines based on food-based PPPs and poverty lines based on general consumption PPPs increases as national disadvantage increases. The results involving the PPP measure most closely related to the needs of the poor (bread and cereals) show coefficients of the highest magnitude, at a very high level of statistical significance. We conclude that general consumption PPPs underestimate the costs in national currency of purchasing basic foodstuffs equivalent to those that can be purchased in the United States and that this underestimate is larger for the poorer countries.

Food is the most important consumption requirement of the poor (typically composing sixty to eighty percent of total expenditure of households deemed poor). However, it is important to note that the pattern arising when non-food requirements of the poor are considered is often similar. Table 11A shows the ratio of the average PPP for various sub-categories of commodities and the PPP for general consumption for a range of developing countries in the last year for which substantial such data was available (1985). The relative cost of rent in poor countries appears to be substantially understated by general consumption PPPs. On the other hand, it appears that the relative cost of clothing and medical care may be overstated. The latter findings should be treated with caution, as difficulties with quality adjustment and with observing prices in comparable "price points" are likely to be significant in each of these areas.

A more detailed examination of even more detailed sub-categories of goods suggests that relative prices of the goods most likely to be required by the poor are higher in poor countries than general consumption PPPs would suggest. In particular, the cost of drugs and medical supplies is higher in poor countries than suggested by general consumption PPPs, although the costs of hospital care, services of medical professionals, and

therapeutic appliances is lower (see Table 11B). Once again, difficulties with quality adjustment may account for the latter results. Similarly, the cost of men's clothing and children's clothing is higher in poor countries than suggested by general consumption PPPs, although the cost of women' s clothing is lower, as is that of "clothing materials and accessories" and "repair and maintenance" (see Table 11C). These results must be interpreted with extreme caution. The PPPs within these categories (both at the level of sub-aggregates such as "medical care" and at the more detailed sub-category level) use price data that is not weighted by the share of different goods in consumption. Moreover, they represent broad averages over the relative costs of different items, including many which are consumed by the non-poor, and play a limited role in poverty avoidance. Only detailed studies can clarify what are the real costs of the non-food requirements of poor people in specific contexts.

5.2 *Inappropriate PPPs and the Understatement of Local "Equivalents" (with an Endogenous International Poverty Line)*

An obvious objection to the assessment in the preceding section of the distortions arising from the use of inappropriate PPPs is that the IPL cannot be taken as given. If the PPP concept in use is changed (for example, from one pertaining to general consumption to a food-based one) then the IPL must also change, since it was "derived" from domestic poverty lines. The Bank's IPL has itself been calculated by using general consumption PPPs to convert the official domestic poverty lines of a set of countries into US dollars. The median of the bottom 10 among the resulting US dollar amounts was chosen as the IPL. It would be inconsistent to use one PPP concept to construct the IPL and another to translate it into national currency equivalents.[30]

To meet this concern, we have examined the effect of adopting food-based PPPs *both* in the construction of an IPL *and* in its subsequent translation into national currency equivalents. We first followed the Bank's procedure of defining the IPL as the median of the 10 lowest official domestic poverty lines (as ranked when the chosen PPP concept is used to convert from national currencies to international dollars), using all of the countries for which we have comprehensive data (i.e. both food-based PPPs and general consumption PPPs) from the same list of official domestic poverty lines (for 33 countries) used by the Bank.   We call this method A. The IPL constructed by the method is *endogenous* in the sense that it varies according to the PPP concept used. We then converted the resulting IPL into national currencies, using the same PPP concept as was used in its construction. Table 8A lists the IPL and its national currency equivalents constructed in this fashion for each of three distinct PPP concepts ("all consumption," "all food" and "bread and cereals") for which data is available for 1993. (We do not undertake this exercise for 1985 because the Bank used a less transparent procedure – identifying the IPL with a "cluster" of countries rather than the median of the bottom ten – in calculating its IPL for that year.) In the final columns in each row we examine

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[30] Implicit in this objection is the idea that the adoption of food-based PPPs does not simply lead to the adjustment of the entire list of general consumption PPPs by a single scalar multiplicative factor, but rather by factors that vary from country to country. If the former were true, the endogenous procedure would give rise to the same result as the exogenous procedure.

whether the resulting national poverty lines are higher when food-based PPPs are used than when general consumption PPPs are used for both construction and conversion of the IPL. As shown by the summary statistics following the table, this is overwhelmingly the case in low-income countries — and more so when bread-and-cereals PPPs, likely to be most closely related to the requirements of poverty avoidance, are used. For these poorest countries, the use of bread-and-cereals PPPs rather than general consumption PPPs for both the construction and conversion of the IPL raises "equivalent" national poverty lines by 36 percent on average (by 26 percent when weighted by population). Once again, these magnitudes are quite substantial, suggesting that the choice of an alternative PPP concept more reflective of the consumption requirements of avoiding poverty would greatly increase the estimated extent of severe income poverty worldwide.

A possible objection to this procedure is that by choosing the IPL as the median of the bottom 10 poverty lines of that set of countries for which all three PPPs were available, we have introduced a systematic selection bias. In particular, our endogenous poverty line for all consumption of $1.22 per day differs from the $1.08 of the Bank due to the loss of eleven countries in the sample for which data on food-based PPPs was not available. To deal with this concern to the extent possible, we construct a second set of endogenous IPLs interpreting the Bank's methodology as involving choosing the median of the bottom 30.3 percent of countries' domestic poverty lines when the chosen PPP concept is employed to convert these into international dollars. Here we use the median of the bottom 7 out of 22 usable domestic poverty lines to mirror the Bank's use of the bottom 10 out of 33 usable domestic poverty lines. This second method (which we call method B) is also endogenous, as the IPL depends on the PPP concept employed. When general consumption PPPs are used, this method results in an IPL of $1.10 in 1993 international dollars (very close to the Bank's $1.08).

The IPLs constructed both through method A and method B along with the values of the official domestic poverty lines for which all three PPPs are available (converted into international dollars using the respective PPP concepts) are exhibited in Table 7. In Table 8B we report the national poverty lines "equivalent" to the endogenous IPL arising from the alternative PPP concepts (calculated through method B). Once again, it is evident that the use of food-based PPP concepts leads to higher national poverty lines than when general consumption PPPs are used both to calculate the IPL and its national currency equivalents. For the low income countries, the use of bread and cereals PPPs leads to national poverty lines that are on average 42 percent higher (31 percent when weighted by population). Once again, these magnitudes are quite substantial, suggesting that the choice of an alternative PPP concept less inappropriate for poverty assessment would increase the estimated extent of severe income poverty worldwide.

The distortion arising from the use of general-consumption PPPs instead of all-food or bread-and-cereals PPPs is greater for the poorer countries, even when the IPL varies endogenously. This is shown in the summary statistics grouped by income class that follow Tables 8A and 8B and by the regressions in Tables 9.2A and 9.2B. The regressions show that whatever measure of disadvantage is used (per capita GDP measured at exchange rates or at PPP, infant mortality rate or under-5 mortality rate) the extent to which poverty lines based on food-based PPPs are higher than poverty lines based on general consumption PPPs increases as disadvantage increases. The results

involving the PPP measure most closely related to the requirements of poverty avoidance (bread and cereals PPPs) show coefficients of the highest magnitude and at a very high level of statistical significance. The result of section 5.1 thus turns out to be stable to the employment of an endogenous method of IPL construction within the money-metric approach. By using general consumption PPPs, the Bank grossly underestimates the costs in national currency of purchasing a quantity of food equivalent to that which can be purchased in the United States. If the Bank maintains its money-metric methodology of global poverty assessment but substitutes less inappropriate PPPs this can be expected to raise national poverty lines and associated poverty headcounts. We shall ultimately argue, however, that there is a better alternative still.

5.3 *The Effect of PPP-Influenced Variation in National Poverty Lines on Poverty Headcounts*

What is the effect of employing inappropriate PPPs on the apparent incidence of poverty? We answer this question for the set of poor countries for which we have both broad-gauge general consumption PPPs and food-based PPPs as well as household survey based data about the size and distribution of income. For these countries, we estimate the headcount poverty associated with different PPP concepts using the POVCAL software program designed and distributed by the Bank. We report all cases for which the necessary data was available and for which the program generated theoretically consistent results.

A Fixed International Poverty Line

We find that the impact of using food based PPPs rather than general consumption PPPs to translate an exogenously fixed IPL of $1.08 PPP 1993 is to raise poverty headcount ratios substantially. For our set of poor countries, as shown in Table 10.1, on average a 1-percent increase in the national equivalent of the IPL due to the use of all-food PPPs rather than general-consumption PPPs is associated with a 1.03 percent increase in the poverty headcount ratio.   On average, a 1-percent increase in the poverty line due to the use of bread-and-cereals PPPs rather than general-consumption PPPs is also associated with a 1.03 percent increase in the poverty headcount ratio. The effect of using all-food rather than general-consumption PPPs is to raise the average headcount ratio substantially from 32.84 to 44.66 percent. The effect of using bread-and-cereals rather than general-consumption PPPs is to raise the average headcount ratio substantially from 32.84 to 59.34 percent.

An Endogenous Poverty Line

We repeated the same exercise using the endogenously generated IPLs (varying with the PPP concept used) calculated in section 5.2 above. We find that using food-based PPPs rather than general-consumption PPPs both to construct and to convert an IPL into local currency units raises poverty headcount ratios substantially. For the set of countries for which we have a complete set of data, on average, as shown in Tables 10.2A and 10.2B, a

1-percent increase in the poverty line due to the use of all-food PPPs rather than general-consumption PPPs is associated with a 0.96 percent increase (method A) and a 0.95 percent increase (method B) in the poverty headcount ratio. Similarly, on average, as shown in the tables, a 1-percent increase in the poverty line due to the use of bread and cereals PPPs rather than general consumption PPPs is associated with a 0.96 percent increase (method A) and a 1.02 percent increase (method B) in the poverty headcount ratio. Roughly, then, a 1-percent increase in the poverty line is associated with a 1 percent increase in the poverty headcount ratio. The effect of using all-food rather than general-consumption PPPs is to raise the average headcount ratio from 39.85 to 44.66 percent (method A) and from 33.88 to 35.59 percent (method B). The effect of using bread-and-cereals rather than general-consumption PPPs is much more dramatic. It raises the average headcount ratio from 39.85 to 60.31 percent (method A) and from 33.88 to 56.81 percent (method B).

5.4 *How "Representative" are the Bank's International Poverty Lines?*

A justification offered by the authors of the Bank's poverty measurement methodology for the IPLs they employ is that the domestic poverty lines of several poor countries are close to its lower ($1/day) IPL when the former are converted into international dollars using general-consumption PPPs. Chen and Ravallion (2001) and Ravallion (1998) report regressions attempting to establish this and state, "The poverty rate on this basis must thus be deemed a conservative estimate, whereby aggregate poverty in the developing world is defined by perceptions of poverty found in the poorest countries" (Chen and Ravallion 2001, 288). We show in Figure 1, which represents the relation between domestic poverty lines as converted to international dollars using various PPP concepts and consumption per capita, that this statement is not necessarily robust to the choice of PPP concept. In that figure, we replicate their core result that there is a (to visual appearances) relatively 'flat' cluster of poor countries whose official domestic poverty lines are close to one another if they are converted into international dollars using general-consumption PPPs. [Our result is not numerically identical to the Chen and Ravallion (2001) result since we use data on consumption per capita from national income accounts rather than the household survey data they use, due to our lack of access to the latter for all countries]. It should be clarified that the purportedly 'flat' relationship is not especially flat, since the poverty lines in question vary for the poorest fourteen countries between around 26 and around 87 international dollars (1993) per month.

When these same official domestic poverty lines are converted into international dollars using food-based PPPs, the relationship between consumption and the domestic poverty line is similar, with the highest poverty line for the poorest fourteen countries being around $67 and the lowest poverty line being around $18 international dollars (1993) per month. When bread-and-cereals PPPs rather than general-consumption PPPs are used, a still steeper relationship between consumption and the domestic poverty line becomes evident, with the poverty lines for the poorest fourteen countries varying between around 12 and around 67 international dollars (1993) per month. The elasticity of domestic poverty lines with respect to per capita income *doubles* for the poorest countries composing the cluster when bread and cereals PPPs rather than all consumption PPPs are used.

It is not obvious that the IPL chosen by the Bank is innocuous because it matches closely the official domestic poverty lines of a wide range of poor countries. The validity of this claim appears to depend on the use of the very PPP concept that is being challenged, and indeed it is not obvious that it is true even when general consumption PPPs are employed: The domestic poverty lines employed by the Bank in its "inductive" procedure for constructing an IPL are fixed by officials of governmental and intergovernmental agencies (in many cases by authors of the Bank's own country documents). Influenced by political and other considerations, such domestic poverty lines may be a poor reflection of "perceptions of poverty found in the poorest countries" (Chen and Ravallion 2001, 288). It has also already been noted that both the lower and the upper IPL are substantially lower than the cost of meeting basic human requirements in the base country (the United States) in relation to whose currency the IPL is defined, which should not be the case if PPPs used are appropriate and the IPL employed corresponds to the cost of attaining basic human requirements.

Comparison of domestic poverty lines in poor countries and the $1 and $2 per day IPLs is possible, by inferring the relative values of these poverty lines from the national headcount estimates associated with these different lines for the same survey-years and countries. We have undertaken a detailed study of this kind,[31] using headcount estimates from online databases and World Development Reports in the 1990s. The conclusion that can be drawn is that for the majority of country-years, the $1 per day line (1993 PPP) is notably lower than the domestic poverty line and the $2/day line (1993 PPP) is higher than the domestic poverty line. This conclusion suggests that, even to the extent that domestic poverty lines are accepted as indicating "perceptions of poverty" in poor countries, neither IPL really captures these perceptions, although the upper and lower IPL together may offer a better picture of poverty than does either independently.

It is interesting to note that for a large number of "spells" in which poverty estimates are available for the same country and two distinct years, the trends of poverty identified according to the Bank's higher or lower IPL are different in direction than those identified according to national poverty lines. This discrepancy is deeply concerning, and points to the poor state of poverty monitoring worldwide.

For countries in Latin America, the influential poverty estimation methodology of the Economic Commission for Latin America (ECLA), developed by Oscar Altimir in 1979, provides another comparator to the poverty estimates of the World Bank. The ECLA methodology makes an attempt to set poverty lines that account for nutritional and non-nutritional requirements. Although there are some reasons to doubt the adequacy of this methodology (in particular its implicit assumption that all households have the structure of a nationally representative household) it seems likely that its poverty estimates are more appropriate for Latin America than those produced by the World Bank. It is interesting to note that ECLA estimates of the poverty headcount ratio for its lower poverty line are substantially higher than those of the Bank for its lower ($1.08 1993) IPL.[32] ECLA estimates of the poverty headcount ratio for its higher poverty line are also substantially higher than those of the Bank for its higher ($2.15 1993) IPL. These

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[31] A spreadsheet with these comparisons is available from the authors on request.

[32] See e.g. Appendix E in Reddy and Minoiu (2005b).

discrepancies suggest the need for caution in accepting the claim that the IPL captures "perceptions of poverty" in poor countries.

6.0 *Can the Money-Metric Approach be Saved?*

In response to the criticisms of the Bank's approach offered by us in early versions of this paper as well as by other authors, a number of proposals have emerged as to how to save the "money-metric" approach to poverty assessment from the difficulties it faces. We discuss three of these proposals here.

The first proposal, initiated by the World Bank in the aftermath of initial circulations of the criticisms in this paper, is the so-called PPPP (or poverty-related PPP) project of the World Bank (in its capacity as host of the International Comparison Program). The proposal is to maintain the Bank's present approach but to introduce new 'poverty-related' PPPs focused more directly on commodities likely to be required to avoid poverty.

In our view, although this proposal constitutes an improvement over the current approach, it is inadequate for a number of reasons. First, it does not address the difficulty of the meaninglessness of the present IPLs, but merely seeks to reduce problems associated with their translation into local currency units. Second, it is impossible to define poverty-related PPPs without having a clear conception of the commodities required to avoid poverty, which in turn requires an achievement based poverty concept. However, if such a concept exists, then PPPs are not needed at all. Rather, as discussed further in the next section, poverty lines corresponding to this concept can be directly constructed in each country. Existing proposals for the construction of poverty-related PPPs propose that quantity and price data be collected for specific commodities, reflecting the pattern of consumption of lower quantiles of the income distribution in different countries. This proposal is highly unsatisfactory, since the same quantiles of the income distribution have very different real incomes in different countries. In addition, the empirical pattern of their actual consumption, reflecting adaptive preferences and endogenous adjustments to duress, offers an inadequate guide to the costs of poverty avoidance. Third, although PPPPs can diminish the problem of commodity irrelevance in the calculation of PPPs, they do nothing to address the problem of country irrelevance.

The second proposal, presented by Angus Deaton [2000, 2003] recommends the following five step formula: "1. start from the $1993 PPP poverty lines in Chen and Ravallion (2001); 2. ask UNDP and World Bank country offices to check these lines; 3. modify the lines to correct serious errors revealed at the country level; 4. update the lines over time using domestic price indexes, without further reference to PPP exchange rates; 5. if step 4 is carried out on an annual basis, as is warranted by the importance of the counts, then major improvements to PPP exchange rates could be incorporated infrequently, no more than once a decade."

It is not clear what Deaton means by checking for "serious errors." Presumably, he has in mind that the poverty lines employed should not reflect a money-metric approach at all but rather reflect an achievement-based conception of some kind. If so, would it not be

better to begin with such a conception? As it stands, it is unclear what Deaton's proposed approach achieves other than to arrive at a set of more acceptable poverty lines (one for each country) reflecting potentially very different levels of real income (since there is no requirement to coordinate the process of "checking" the poverty lines in relation to a common achievement-based conception) and misleadingly bearing the common label of "$1 per day" or "$2 per day." This proposal solves the underlying problems of the money-metric approach only by substituting a set of national poverty lines, which possess no common interpretation but bear a common flag, apparently for public relations purposes.

The third approach, presented by Nanak Kakwani, recommends the following six step procedure as we understand it. First, a reference group deemed appropriate in one or more reference countries deemed appropriate (for example, the bottom quintile of the consumption distribution in Bangladesh) should be identified. For the average food consumption pattern of that reference group the average cost of calories (i.e. the number of calories in the average food consumption basket of the reference group divided by the cost of that basket) in international dollars should be identified. The PPPs used should preferably be ones based on relative international prices of commodities figuring significantly in the consumption pattern of those deemed poor. Call the resulting international dollar amount the international dollar reference cost of calories. Second, translate this international dollar reference cost of calories into local currency amounts in each country by employing PPPs. The resulting "equivalent" local currency value in each country may be called the local currency reference cost of calories. This amount may also be translated into the local currency value of a given survey year through the use of an appropriate and available CPI. Third, a per capita calorie norm should be identified. This calorie norm can if thought appropriate be permitted to vary with type of household (as defined by age and gender composition) and country. Fourth, the per capita cost to each household of achieving this calorie norm, given the average cost of calories identified earlier in each country (i.e. this cost of calories times the per capita calorie norm) should be identified. This amount may be referred to as the food poverty line for each household. Fifth, the cost of achieving the non-food requirement for each household in each country should be identified. This should be done as follows. Identify the households in each country whose value of per capita food consumption is the same as the food poverty line for the household. These are households whose local currency average cost of calories is the same as the local currency reference cost of calories. Interpret these households in all countries as consisting of individuals possessing the same level of subjective preference satisfaction. Identify the average per capita local currency value of the total consumption of these households in each country. Subtract the food poverty line from this average per capita local currency value. Identify the resulting remainder as the non-food poverty line for households of each type in each country, making further ad hoc adjustments as thought appropriate in order to capture non-food requirements in each country. Sixth, identify a household as poor if its per-capita consumption falls beneath the total poverty line defined by summing the food poverty line calculated in step four and the non-food poverty line calculated in step five.

There are at least three central problems with this approach. The first problem is that the choice of a reference group and an associated reference consumption basket involves circularity: it cannot be determined what is an appropriate reference group without first

resolving the problem that we are attempting to solve – the identification of the poor and the requirements of poverty avoidance. The second problem is that the approach relies on the existence of appropriate PPPs which may be used to determine the international dollar reference cost of calories and its local currency "equivalent." As such, it is subject to all of the problems of country and commodity irrelevance identified above. There is a circularity here too: it cannot be known what the appropriate PPPs to employ are without having first identified an invariance concept in relation to which the PPPs are defined, and no such invariance concept is identified here. The third problem is that the interpretation attached to households possessing the same average cost of calories – that they possess a common level of subjective preference satisfaction -- can neither be readily justified, nor serve as the basis for the construction of a non-food poverty line. It cannot be readily justified because it relies on strong assumptions regarding the uniformity of the preferences of individuals and of the manner in which they transform commodities into final subjective preference satisfactions regardless of the diverse contexts in which they live, and concerning the interpersonal comparability of subjective preference satisfactions. It cannot serve as the basis for the construction of a non-food poverty line because the level of expenditure empirically undertaken by households possessing the same average cost of calories may be insufficient to achieve non-nutritional requirements of members of such households, even if they possess a common level of subjective preference satisfaction.

7.0 *Conclusion and an Alternative*

Income poverty is, as we have noted above, only one aspect of poverty, and other poverty estimates, based on under-nutrition, infant mortality, access to health services, and other indicators can continue to inform us even in the absence of usable figures concerning global income poverty. International development targets should appropriately continue to focus on these measures of deprivation in the world, which are not to the same extent subject to the concerns we have outlined above, while a new procedure for the global assessment of income poverty is developed and implemented.

A new procedure is urgently needed. There are strong reasons to doubt the validity and meaningfulness of the estimates of the level, distribution and trend of global income poverty provided by the Bank in recent years. These reasons for doubt revolve around the lack of a well-defined IPL that permits of meaningful and reliable inter-temporal and inter-spatial comparisons, the use of an inappropriate measure of purchasing power equivalence, the reporting of falsely precise results and inadequately justified inferences. All of these flaws are likely systematically to distort estimates of the level and trend of global income poverty. There is some reason to think that the distortion is in the direction of understating the extent of income poverty.[33] Whether this is so cannot be

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[33] If equivalence scales establishing distinct poverty lines for households with distinct age and sex compositions were employed in the global poverty estimates (which they currently are not) this may have a directional impact on poverty estimates that is not obvious in advance. Children may have lower commodity requirements than adults, and poor households in poor countries often have a large proportion of children.

known with confidence in the absence of better founded estimates. Statements that global income poverty is decreasing have no evidential justification in light of the uncertainties associated with present and past estimates of its extent. The problems are avoidable, although their avoidance would require a fundamental change in the methodology of global poverty assessment. The '$1 per day' poverty estimates regularly calculated and published by the Bank cannot adequately serve the purposes they are intended to serve. In particular, the monitoring of world poverty, necessary to assess whether the Millennium Development Goals are being achieved, cannot reliably be undertaken at present.

Our rejection of the Bank's procedure does not support the skeptical conclusion that the attempt to provide a standard of income poverty comparable across time and space is doomed to fail. There exists a much better procedure which can be easily implemented. This alternative procedure would construct poverty lines in each country that possess a *common* achievement interpretation. Each poverty line would refer to the local cost requirements of achieving a specific set of ends. These ends should be specified at the global level and can include elementary human capabilities such as the ability to be adequately nourished. Each poverty line should reflect the cost of purchasing commodities containing relevant characteristics (for example, calorie content) that enable individuals to achieve the desired ends (such as specified elementary capabilities).[34] Poverty lines defined in this way would have a common meaning across space and time, offering a consistent framework for identifying the poor. As a result, they would permit of meaningful and consistent inter-country comparison and aggregation. The proposed procedure focuses not on whether the incomes of poor people are sufficient in relation to an abstract IPL but rather on whether they are sufficient to achieve a set of elementary requirements. In effect, it does away with the need for an IPL, by focusing instead on a common poverty concept to be applied in all countries. As such, the proposed procedure altogether eliminates the need for PPPs (which are central to the existing money-metric approach) and avoids the many problems associated with these.

To be sure, income poverty statistics based on the procedure we suggest cannot be objective and precise in the way of measurements of physical distance. There are differences of opinion about the relative significance of various elementary human requirements, about the relevance of interpersonal variations in such requirements, about the quantity and quality of commodities needed to achieve these basic requirements, and about the appropriate degree of deference to local circumstances. Such disagreements can often be narrowed through reasonable collective reflection and debate to a sufficient degree to create a framework for action. If that is not possible, multiple frameworks (for example concerning the relevant elementary capabilities) can be retained. In the context of assessing severe poverty (rather than living standards more generally) such differences will in any case be relatively narrow.

Although approximations will necessarily be involved in an alternative exercise of global poverty measurement (as in any empirical estimation exercise), it will at least be possible

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[34] We do not believe that it is necessary finally to resolve here the issue of whether these needs should be conceptualized in terms of elementary capabilities or in some other manner. An adequately operational approach to global poverty assessment need not require final agreement on this issue.

to interpret the resulting errors in estimation in a transparent, consistent and meaningful way. Until and unless the task of counting the global poor is better conducted, we will simply not know very much about the extent of income poverty and its evolution over time. Such ignorance also makes it challenging to determine whether and to what extent the current world order is benefiting or harming the global poor.

The heart of an alternative (and more credible) approach to measuring global poverty is to carry out on a world scale an equivalent of the poverty measurement exercises conducted regularly by national governments, in which poverty lines that possess an explicit achievement interpretation are developed. In many large federal countries in which there are significant internal variations in tastes and in prices, workable means for accommodating internal differences within a consistent aggregate poverty assessment exercise have been implemented. Today a similar approach is needed at the global level. It should begin with a transparent and consultative process of identifying at the global level a core conception of poverty defined in terms of an achievement interpretation. This achievement interpretation can focus on a set of elementary capabilities (e.g. the ability to be adequately nourished) and the characteristics of commodities (e.g. nutritional content) necessary to achieve them. This core conception should be used to define poverty lines. These poverty lines can then be applied to available survey data so as to identify the poor. Such a procedure, and such a procedure alone, can produce consistent estimates of poverty that are comparable across space and time.[35] A national poverty commission, supported by international funds, should be empowered in each country to construct and update poverty lines over time, drawing on national and international expertise, undertaking periodic and meaningful public consultations, and presenting its reasoning and conclusions to public scrutiny. Such a commission should strive to maintain an invariant relation between the poverty lines established and the fixed achievement interpretation required to be given to these poverty lines worldwide.

Reddy, Visaria and Asali (2005) show that inter-country comparisons of poverty based on the construction of poverty lines related to a common achievement concept is possible, even employing existing surveys that were not designed to support such comparison. They adopt a nutritional norm and construct poverty estimates for three countries in three continents (Nicaragua, Tanzania, and Vietnam). They show that both ordinal and cardinal comparisons of poverty can be influenced by whether the money-metric approach or a capability-based approach of this type is used.

Improvement and coordination in survey protocols, so as to create an improved basis for such analysis are also required. A new international effort to create common protocols for survey design and analysis, and for poverty line construction, is necessary. Such an effort is complementary to, and can substantially strengthen, national poverty assessment exercises. The UN's historic achievement in promoting a common statistical protocol in the form of the System of National Accounts - an achievement which could not have been dreamed of before the Second World War - testifies to the important role of international coordination in such a process. It is necessary today to launch the equivalent of this effort in the area of poverty estimation.

We are surprised that the Bank has been publishing regular income poverty statistics for

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[35] See Reddy and Plener (2005)

fifteen years now — which are reported with six-digit precision and widely used in academic research, policy analyses, and popular media all over the world — without even a hint of public recognition of the deep flaws in their construction. It is hard not to see this fact as indicative of the low priority that has hitherto been attached to the global problem of persistent severe poverty.

8.0 *References*

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9.0 *Tables*

Table 1

**List of the Official Domestic Poverty Lines in $ Per Month Per Person
(Converted at PPPs for All Consumption)
Used as Data by the World Bank in Construction of its International Poverty Line**

Country	1985 Domestic Poverty Line (intl $/month/person; Converted at 1985 PPPs for All Consumption)	1993 Domestic Poverty Line (intl $/month/person; Converted at 1993 PPPs for All Consumption)
Australia	265.75	423.44
Bangladesh	31	36.23
Belgium	183.58	243.16
Burundi	24.85	52.98
Brazil	42.42	68.70
Canada	290.19	353.25
China	24.88	24.48
Costa Rica	50.75	78.90
Dominican Republic	48.38	85.41
Egypt	25.5	52.06
India	23	26.97
Indonesia	31.25	32.03
Jamaica	71.23	86.78
Japan	129.91	192.60
Kenya	30.63	47.09
Malaysia	58.04	57.21
Morocco	31.33	54.02
Nepal	30.7	33.60
Pakistan	34.25	45.61
Philippines	32.25	72.04
Poland	74.92	136.63
South Africa	88.46	112.83
Sri Lanka	51.78	50.26
Taiwan	57.45	.
Tanzania 91	30.96	26.07
Thailand	41.06	33.45
Tunisia	24.2	38.29
Turkey	46.22	63.80
U.K.	163.33	223.32
USA	246.67	328.21
W. Germany	251.03	349.88
Venezuela	53.48	84.61
Zambia	18.33	26.81

Notes to Table 1:

The World Bank has provided us with these figures. It also reports that "The poverty lines chosen are the lowest available (most often for rural areas), and on a per capita basis for the average household size. CPIs from the International Financial Statistics are used to inflate or deflate to 1985 levels unless otherwise noted. Consumption is private consumption per capita from the National Accounts (BESD) for 1985."

Table 2

Pure Methodological Poverty Revision

Country	Survey Year	Poverty Headcount Ratio in 1st survey year (%)(Methodology 1)	Poverty Headcount Ratio in 2nd survey year (%)(Methodology 2)	Revision from Methodology (% Change from Methodology 1 Poverty Headcount Ratio)
Algeria	1995	<2	<2	0
Botswana	1985-6	33.0	33.3	+1
Czech Rep.	1993	3.1	<2	- 35.5
Guatemala	1989	53.3	39.8	- 25.3
Hungary	1993	<2	<2	0
Madagascar	1993	72.3	60.2	-16.7
Moldova	1992	6.8	7.3	+7.4
Morocco	1990-1	<2	<2	0
Nepal	1995	50.3	37.7	-25.0
Poland	1993	6.8	5.4	-20.6
Rwanda	1983-5	45.7	35.7	-22.0
Slovak Republic	1992	12.8	<2	-84.4
Slovenia	1993	<2	<2	0
South Africa	1993	23.7	11.5	-51.48
Tunisia	1990	3.9	<2	-48.7
Turkmenistan	1993	4.9	20.9	+326.5
Zimbabwe	1990-1	41.0	36.0	-12.2

Notes to Table 2:

All numbers in the third column are from Table 4, 'Poverty', in WDR 1999/2000, 236-37. All numbers in the fourth column are from Table 4, 'Poverty', in WDR 2000/2001, 280-81.

Table 3

Poverty Changes: Possible Role of Methodological Revision

Country	Survey Year	Poverty Headcount Ratio in 1st Survey Year (%) as reported in WDR 1999/2000	Poverty Headcount Ratio in 2nd Survey Year (%) as reported in WDR 2000/2001	Possible Revision from Methodology (% Change from Methodology 1 Poverty Headcount Ratio)
Belarus	1993 v. 1998	<2	<2	n/a
Brazil	1995 v. 1997	23.6	5.1	-78
Bulgaria	1992 v. 1995	2.6	<2	-23
Chile	1992 v. 1994	15.0	4.2	-72
China	1995 v. 1998	22.2	18.5	-17
Colombia	1991 v. 1996	7.4	11.0	+49
Costa Rica	1989 v. 1996	18.9	9.6	-49
Côte d'Ivoire	1988 v. 1995	17.7	12.3	-31
Dominican	1989 v. 1996	19.9	3.2	-84
Ecuador	1994 v. 1995	30.4	20.2	-44
Egypt	1990-1 v. 1995	7.6	3.1	-59
Estonia	1993 v. 1995	6.0	4.9	-18
Ethiopia	1981/2 v. 1995	46.0	31.3	-32
Honduras	1992 v. 1996	46.9	40.5	-14
India	1994 v. 1997	47.0	44.2	-6
Indonesia	1996 v. 1999	7.7	15.2	+97
Jamaica	1993 v. 1996	4.3	3.2	-26
Jordan	1992 v. 1997	2.5	<2	-20
Kazakhstan	1993 v. 1996	<2	1.5	n/a
Kenya	1992 v. 1994	50.2	26.5	-47
Latvia	1993 v. 1998	<2	<2	n/a
Lesotho	1986/7 v. 1993	48.8	43.1	-12
Lithuania	1993 v. 1996	<2	<2	n/a
Mauritania	1988 v. 1995	31.4	3.8	-89
Mexico	1992 v. 1995	14.9	17.9	+20
Niger	1992 v. 1995	61.5	61.4	0
Nigeria	1992-3 v. 1997	31.1	70.2	+126
Pakistan	1991 v. 1996	11.6	31.0	+167
Panama	1989 v. 1997	25.6	10.3	-60
Romania	1992 v. 1994	17.7	2.8	-84
Russian	1993 v. 1998	<2	7.1	+255
Senegal	1991-2 v.1995	54.0	26.3	-51
Sri Lanka	1990 v. 1995	4.0	6.6	+65
Thailand	1992 v. 1998	<2	<2	n/a
Uganda	1989-90 v.	69.3	36.7	-47
Ukraine	1992 v. 1996	<2	<2	n/a
Venezuela	1991 v. 1996	11.8	14.7	+25
Zambia	1993 v. 1996	84.6	72.6	-14

Notes to Table 3:

All numbers in the third column are from Table 4, 'Poverty', in WDR 1999/2000, 236-37. All numbers in the fourth column are from Table 4, 'Poverty', in WDR 2000/2001, 280-81.

Table 4

Changes in Estimates of the Prevalence and Regional Distribution of Poverty Due to Methodological Revision

Region	Headcount Ratio for 1985 PPP Poverty Line (% of population living below $1.00 a day at 1985 PPP)			Headcount Ratio for 1993 PPP Poverty Line (% of population living below $1.08 a day at 1993 PPP)			% Change in headcount Ratio from 1985 to 1993 PPP Poverty Lines		
	1987	1990	1993	1987	1990	1993	1987	1990	1993
East Asia	29.7	28.5	26	26.6	27.58	25.24	-10.44%	-3.23%	-2.92%
Eastern Europe & Central Asia	0.6	.	3.6	0.24	1.56	3.95	-60.00%	.	9.72%
Latin America & Caribbean	22	23	23.5	15.33	16.8	15.31	-30.32%	-26.96%	-34.85%
Middle East & North Africa	4.7	4.3	4.1	4.3	2.39	1.93	-8.51%	-44.42%	-52.93%
South Asia	45.4	43	43.1	44.94	44.01	42.39	-1.01%	2.35%	-1.65%
Sub-Saharan Africa	38.5	39.3	39.1	46.61	47.67	49.68	21.06%	21.30%	27.06%
Total	30.7	.	29.4	28.31	28.95	28.15	-7.79%	.	-4.25%

Notes to Table 4:

The estimates relative to the $1/day PPP 1985 IPL of the prevalence and distribution of global poverty in the years 1987, 1990, and 1993 are from Table 5 of Ravallion and Chen 1997 (cf. also WDR 1999/2000, 25). The corresponding estimates relative to the $1.08/day PPP 1993 IPL are from Table 2 of Ravallion and Chen 2000 (cf. also WDR 2000/2001, 23). The variations between these sets of estimates are also discussed in Chen and Ravallion 2001, 290-93.

Table 5

**1985 World Bank Poverty Line Updated by CPI vs. 1993 WB Poverty Line at PPP
(National Currency Units)**

Country	CPI Updated Old Poverty Line (1.00*PPP85*CPI)	New Poverty Line (1.08*PPP93)	Ratio, Updated Old PL / New PL	Country	CPI Updated Old Poverty Line (1.00*PPP85*CPI)	New Poverty Line (1.08*PPP93)	Ratio, Updated Old PL / New PL
Algeria	15.08	11.94	1.26	Luxembourg	48.13	39.71	1.21
Australia	2.13	1.43	1.49	Madagascar	665.13	567.64	1.17
Austria	18.22	14.84	1.23	Malawi	2.75	1.63	1.69
Bahrain	0.29	0.28	1.01	Malaysia	1.56	1.69	0.92
Bangladesh	10.90	13.59	0.80	Malta	0.25	0.26	0.98
Barbados	2.03	1.19	1.70	Mauritania	93.28	36.24	2.57
Belgium	48.76	39.40	1.24	Mauritius	12.98	7.41	1.75
Botswana	1.54	1.49	1.04	Morocco	5.31	3.30	1.61
Burkina Faso	160.95	110.66	1.45	Mozambique	631.85	864.85	0.73
Burundi	120.05	60.27	1.99	Nepal	10.10	9.89	1.02
Cameroon	341.47	152.42	2.24	Netherlands	2.77	2.20	1.26
Canada	1.56	1.37	1.14	New Zealand	2.45	1.61	1.52
Central Afr. Rep.	198.10	116.14	1.71	Niger	175.61	107.70	1.63
Chad	156.82	94.94	1.65	Nigeria	8.68	12.33	0.70
Chile	257.70	222.71	1.16	Norway	11.25	9.84	1.14
China	1.59	1.52	1.05	Pakistan	8.12	8.85	0.92
Colombia	317.76	214.39	1.48	Panama	0.74	0.48	1.55
Congo	376.58	219.11	1.72	Paraguay	1018.92	801.80	1.27
Costa Rica	84.02	57.85	1.45	Philippines	13.94	6.68	2.09
Denmark	11.66	9.88	1.18	Portugal	182.30	124.98	1.46
Dominican Rep.	7.37	4.47	1.65	Rwanda	106.04	58.69	1.81
Ecuador	1107.22	890.63	1.24	Saudi Arabia	4.80	2.52	1.90
Egypt, Arab Rep.	2.38	1.25	1.91	Senegal	210.63	136.64	1.54
El Salvador	9.52	4.78	1.99	Sierra Leone	281.97	250.47	1.13
Ethiopia	1.14	1.39	0.82	Singapore	1.53	1.71	0.90
Fiji	0.95	0.90	1.06	South Africa	2.13	1.79	1.19
Finland	8.52	6.93	1.23	Spain	151.55	125.72	1.21
France	8.36	7.05	1.18	Sri Lanka	12.47	13.75	0.91
Gabon	470.04	326.38	1.44	Sudan	77.28	50.89	1.52
Gambia, The	6.24	2.62	2.38	Swaziland	1.66	1.29	1.28
Germany	2.83	2.17	1.30	Sweden	14.35	10.80	1.33
Ghana	292.17	191.51	1.53	Switzerland	3.25	2.36	1.38
Greece	257.75	194.31	1.33	Syria	9.95	11.48	0.87
Guatemala	2.92	1.98	1.48	Tanzania	99.47	126.44	0.79
Haiti	5.60	2.60	2.15	Thailand	10.96	14.40	0.76
Honduras	3.63	2.08	1.74	Togo	189.00	95.93	1.97
India	8.23	7.51	1.10	Trinidad&Tobago	3.66	3.50	1.05
Indonesia	651.49	680.38	0.96	Tunisia	0.55	0.37	1.48
Iran, Islamic Rep.	257.73	275.01	0.94	Turkey	8190.38	6351.30	1.29
Ireland	0.91	0.71	1.27	United Kingdom	0.86	0.68	1.28
Italy	1983.72	1600.92	1.24	United States	1.34	1.08	1.24
Jamaica	14.39	12.64	1.14	Venezuela, RB	60.17	40.70	1.48
Japan	277.70	200.49	1.39	Zambia	326.81	239.14	1.37
Jordan	0.34	0.32	1.05	Zimbabwe	3.24	2.45	1.32
Kenya	23.70	12.60	1.88				
Korea, Rep.	736.56	743.48	0.99				
Kuwait	0.31	0.25	1.24				
Lesotho	1.67	1.20	1.39				

Table 5 Summary:

Number of Countries	92
Number of Countries With Ratio > 1	77
Number of Countries With Ratio < 1	15
Geometric Mean Ratio of Old PL to New PL (unweighted)	1.31
Percentage of Sample Population for Whom Ratio > 1 (1985 Population)	81.62%
Geometric Mean Ratio of Old PL to New PL (weighted by 1985 population)	1.12

Notes to Table 5:

We calculate the "CPI Updated Old Poverty Line" by multiplying the $1.00 (1985 PPP) US poverty line by the 1985 PPP conversion factor (for all consumption) for each country and updating this figure to 1993 by multiplying by the ratio of the 1993 CPI to the 1985 CPI for the country in question. We calculate the "New Poverty Line" by multiplying the $1.08 US poverty line for 1993 PPPs by the 1993 PPP conversion factor (for all consumption) for each country. In accordance with the procedure followed by the World Bank, we draw the PPP conversion factors for 1985 from Table 3 of Summers and Heston's "A New Set of International Comparisons of Real Product and Price Levels Estimates for 130 Countries, 1950 – 1985" (1988) (by multiplying PC by XR to obtain the PPP for all consumption). China's PPP for 1985 is drawn from the on-line Penn World Tables 5.7 as it is not available in Summers and Heston (1988). Similarly in accordance with the World Bank's procedure, we draw the PPP conversion factors for 1993 from the table "World Bank 1993 Consumption PPP" from the "Global Poverty Monitoring" section of the World Bank's website at http://www.worldbank.org/research/povmonitor/PPP1993.htm). Because the PPP conversion factors reported for 1993 are not normalized to US = 1 (the conversion factor for the US is given as 1.009), we normalize by dividing the 1993 PPP conversion factor for each country by the PPP conversion factor for the US. We draw the country-specific CPI data from the 1998 WDI ("Consumer price index (1987 = 100)", series code: FP.CPI.TOTL). Data for a small number of countries was dropped due to wildly improbable differences between the 1993 poverty lines calculated according to the two methods. We confirmed through examination of Economist Intelligence Unit country reports that in each of these cases a hyperinflation or change of currency was experienced.

Table 6A

1985 Relative Prices of Food vs. General Consumption

Country	PPP for Food	PPP for Bread and Cereals	PPP for All Consumption	Ratio PPP Food / PPP All Consumption	Ratio PPP Bread & Cereals / PPP All Consumption	Country	PPP for Food	PPP for Bread and Cereals	PPP for All Consumption	Ratio PPP Food / PPP All Consumption	Ratio PPP Bread & Cereals / PPP All Consumption
Australia	0.98	0.91	1.23	0.80	0.74	Spain	118.43	97.03	92.46	1.28	1.05
Austria	18.47	15.77	17.29	1.07	0.91	Sri Lanka	8.64	6.43	6.35	1.36	1.01
Bangladesh	8.49	6.91	5.93	1.43	1.16	Swaziland	1.07	1.63	0.52	2.05	3.12
Belgium	48.51	38.50	45.58	1.06	0.84	Sweden	10.89	10.06	8.18	1.33	1.23
Benin	171.56	213.42	87.50	1.96	2.44	Thailand	8.01	4.60	7.25	1.11	0.63
Botswana	1.02	1.04	0.48	2.13	2.17	Tunisia	0.37	0.52	0.24	1.51	2.14
Cameroon	259.50	396.60	129.10	2.01	3.07	Turkey	181.80	101.40	176.80	1.03	0.57
Canada	1.27	1.24	1.23	1.03	1.01	Tanzania	26.38	20.05	13.52	1.95	1.48
Congo	313.60	477.50	160.80	1.95	2.97	U.K.	0.57	0.42	0.57	0.996	0.74
Côte d'Ivoire	236.10	355.60	152.80	1.55	2.33	USA	1.00	1.00	1.00	1.00	1.00
Denmark	10.74	8.85	10.22	1.05	0.87	Yugoslavia	129.30	76.80	103.20	1.25	0.74
Egypt	0.45	0.30	0.24	1.91	1.26	Zambia	2.17	3.49	0.86	2.52	4.06
Ethiopia	1.30	3.08	0.74	1.77	4.17	Zimbabwe	0.82	0.69	0.46	1.78	1.51
Finland	7.74	7.39	6.38	1.21	1.16						
France	7.42	7.08	7.39	1.003	0.96						
Germany	2.42	2.10	2.54	0.95	0.83						
Greece	89.32	72.18	78.16	1.14	0.92						
Hong Kong	4.45	3.14	4.11	1.08	0.76						
Hungary	20.51	11.45	17.02	1.21	0.67						
India	5.42	4.81	4.07	1.33	1.18						
Iran	83.24	63.21	61.55	1.35	1.03						
Ireland	0.77	0.62	0.75	1.03	0.83						
Italy	1450.00	1237.00	1304.00	1.11	0.95						
Japan	296.90	260.10	212.90	1.39	1.22						
Kenya	7.83	8.38	4.18	1.87	2.01						
Korea	625.60	470.90	428.10	1.46	1.10						
Luxembourg	46.85	37.89	43.54	1.08	0.87						
Madagascar	429.20	572.50	234.00	1.83	2.45						
Malawi	0.58	0.83	0.41	1.42	2.05						
Mali	292.70	336.30	169.60	1.73	1.98						
Mauritius	6.08	6.46	2.24	2.71	2.88						
Morocco	3.49	3.55	2.10	1.66	1.69						
Netherlands	2.55	1.99	2.50	1.02	0.79						
New Zealand	1.20	1.19	1.30	0.92	0.91						
Nigeria	1.47	1.98	0.86	1.71	2.30						
Norway	11.18	9.39	9.19	1.22	1.02						
Pakistan	4.69	3.89	3.73	1.26	1.04						
Philippines	7.01	5.24	5.62	1.25	0.93						
Poland	106.63	50.61	73.26	1.46	0.69						
Portugal	104.60	93.53	70.38	1.49	1.33						
Rwanda	53.34	120.49	34.93	1.53	3.45						
Senegal	227.30	408.00	130.20	1.75	3.13						
Sierra Leone	3.27	9.55	1.88	1.74	5.09						

Table 6A Summary:	Full Sample (All Available Countries)	No High Income Countries	No High or High Middle Income Countries	Low Income Countries Only
Number of Countries	56	36	30	15
Number of Countries With Ratio > 1 for Food	51	36	30	15
Number of Countries With Ratio > 1 for Bread &Cereals	35	29	26	15
Number of Countries With Ratio < 1 for Food	4	0	0	0
Number of Countries With Ratio < 1 for Bread &Cereals	20	7	4	0
Arithmetic Mean Ratio, PPP Food / PPP All Consumption (unweighted)	1.44	1.64	1.71	1.69
Geometric Mean Ratio, PPP Food / PPP All Consumption (unweighted)	1.39	1.60	1.67	1.67
Arithmetic Mean Ratio, PPP Bread & Cereals / PPP All Consumption (unweighted)	1.60	1.97	2.17	2.39
Geometric Mean Ratio, PPP Bread & Cereals / PPP All Consumption (unweighted)	1.35	1.67	1.87	2.11
Percentage of Sample Population for Whom Ratio of PPP Food / PPP All Consumption > 1 (1985 population)	83.53%	100.00%	100.00%	100.00%
Percentage of Sample Population for Whom Ratio of PPP Bread & Cereals / PPP All Consumption > 1 (1985 population)	67.45%	86.21%	87.08%	100.00%
Geometric Mean Ratio, PPP Food / PPP All Consumption (weighted by 1985 population)	1.29	1.40	1.40	1.40
Geometric Mean Ratio, PPP Bread & Cereals / PPP All Consumption (weighted by 1985 population)	1.14	1.23	1.25	1.34

Notes to Table 6A:

We draw the PPP conversion factors for all consumption ("final national consumption") andfor 'all food' and for 'bread and cereals' from Table 5 of "World Comparison of Real Gross Domestic Product and Purchasing Power, 1985", Department for Economic and Social Information and Policy Analysis (United Nations, 1994) available on http://unstats.un.org/unsd/methods/icp/gdp/tab0585_1.htm .

Table 6B

1993 Relative Prices of Food vs. General Consumption

Country	PPP for Food	PPP for Bread and Cereals	PPP for All Consumption	Ratio PPP Food / PPP All Consumption	Ratio PPP Bread & Cereals / PPP All Consumption	Country	PPP for Food	PPP for Bread and Cereals	PPP for All Consumption	Ratio PPP Food / PPP All Consumption	Ratio PPP Bread & Cereals / PPP All Consumption
Antigua & Barbuda	2.75	3.04	2.32	1.18	1.31	Nepal	13.39	14.42	9.15	1.46	1.58
Australia	1.16	1.58	1.33	0.87	1.19	Netherlands	2.11	1.97	2.03	1.04	0.97
Austria	15.84	16.32	13.74	1.15	1.19	New Zealand	1.53	1.69	1.49	1.03	1.14
Bahamas	1.17	1.30	1.14	1.02	1.14	Nigeria	19.38	23.89	11.41	1.70	2.09
Bangladesh	21.94	23.53	12.59	1.74	1.87	Norway	12.09	12.71	9.11	1.33	1.40
Belarus	24.15	26.36	14.29	1.69	1.84	Pakistan	10.66	10.28	8.20	1.30	1.25
Belgium	39.01	39.74	36.48	1.07	1.09	Philippines	7.36	9.40	6.19	1.19	1.52
Belize	1.18	1.13	1.16	1.02	0.97	Poland	8.42	8.48	8.26	1.02	1.03
Botswana	1.61	1.89	1.38	1.17	1.38	Portugal	163.33	144.57	115.72	1.41	1.25
Bulgaria	10.86	12.47	7.52	1.44	1.66	Romania	291.68	175.55	194.89	1.50	0.90
Cameroon	138.47	169.80	141.13	0.98	1.20	Russian Fed.	255.51	137.32	184.70	1.38	0.74
Canada	1.38	1.44	1.27	1.08	1.14	Senegal	124.29	184.12	126.52	0.98	1.46
Congo, Rep.	263.36	261.00	202.88	1.30	1.29	Sierra Leone	369.05	543.75	231.92	1.59	2.34
Côte d'Ivoire	180.34	216.94	157.68	1.14	1.38	Singapore	1.20	1.39	1.58	0.76	0.88
Croatia	2.63	2.60	2.00	1.31	1.30	Slovak Republic	9.87	6.68	10.01	0.99	0.67
Czech Rep.	10.96	7.03	9.16	1.20	0.77	Slovenia	90.10	93.58	73.89	1.22	1.27
Denmark	11.14	11.95	9.15	1.22	1.31	Spain	131.27	159.43	116.41	1.13	1.37
Dominica	2.44	2.95	1.93	1.27	1.53	Sri Lanka	17.73	17.04	12.74	1.39	1.34
Egypt	1.15	1.36	1.15	0.999	1.18	St. Kitts & Nevis	2.24	2.74	1.89	1.18	1.45
Fiji	0.94	1.14	0.83	1.13	1.37	St. Lucia	2.31	3.15	1.83	1.26	1.72
Finland	8.78	10.82	6.41	1.37	1.69	St. Vincent & the Grenadines	2.23	2.29	1.50	1.49	1.53
France	7.51	7.57	6.53	1.15	1.16	Swaziland	1.13	1.46	1.20	0.95	1.22
Gabon	503.11	350.37	302.20	1.66	1.16	Sweden	11.61	12.57	10.00	1.16	1.26
Germany	2.05	2.24	2.01	1.02	1.11	Switzerland	2.67	2.57	2.19	1.22	1.17
Greece	211.47	277.42	179.92	1.18	1.54	Thailand	15.97	12.85	13.33	1.20	0.96
Grenada	2.23	2.23	1.65	1.35	1.35	Trinidad & Tobago	3.26	3.87	3.24	1.01	1.19
Guinea	403.71	485.83	336.30	1.20	1.44	Tunisia	0.31	0.26	0.34	0.91	0.75
Hong Kong	6.12	6.86	7.17	0.85	0.96	Turkey	8154.38	7211.75	5880.83	1.39	1.23
Hungary	39.64	44.93	47.27	0.84	0.95	Ukraine	0.01	0.01	0.01	1.63	0.80
Iceland	114.68	112.81	84.59	1.36	1.33	United Kingdom	0.61	0.56	0.63	0.98	0.89
Indonesia	662.75	628.40	629.99	1.05	0.997	United States	1.00	1.00	1.00	1.00	1.00
Iran	302.57	359.26	254.64	1.19	1.41	Vietnam	2235.14	2240.21	1582.26	1.41	1.42
Ireland	0.75	0.72	0.66	1.14	1.10	Zambia	316.02	501.46	221.43	1.43	2.26
Italy	1757.08	1816.78	1482.34	1.19	1.23	Zimbabwe	2.09	2.68	2.26	0.92	1.18
Jamaica	15.71	14.34	11.70	1.34	1.23						
Japan	273.33	306.55	185.64	1.47	1.65						
Kenya	12.01	17.49	11.67	1.03	1.50						
Korea, Rep.	1064.80	1454.73	688.40	1.55	2.11						
Luxembourg	38.86	37.77	36.77	1.06	1.03						
Malawi	1.67	2.01	1.51	1.11	1.33						
Mali	129.14	198.39	123.77	1.04	1.60						
Mauritius	6.29	5.49	6.86	0.92	0.80						
Moldova	0.27	0.29	0.18	1.48	1.56						
Morocco	2.86	2.88	3.05	0.94	0.94						

Table 6B Summary:	Full Sample (All Available Countries)	No High Income Countries	No High or High Middle Income Countries	Low Income Countries Only
Number of Countries	78	54	41	15
Number of Countries With Ratio > 1 for Food	63	44	33	13
Number of Countries With Ratio > 1 for Bread &Cereals	61	42	31	14
Number of Countries With Ratio < 1 for Food	14	10	8	2
Number of Countries With Ratio < 1 for Bread &Cereals	16	12	10	1
Arithmetic Mean Ratio, PPP Food / PPP All Consumption (unweighted)	1.21	1.25	1.25	1.29
Geometric Mean Ratio, PPP Food / PPP All Consumption (unweighted)	1.19	1.23	1.23	1.27
Arithmetic Mean Ratio, PPP Bread & Cereals / PPP All Consumption (unweighted)	1.29	1.34	1.32	1.56
Geometric Mean Ratio, PPP Bread & Cereals / PPP All Consumption (unweighted)	1.25	1.28	1.27	1.51
Percentage of Sample Population for Whom Ratio of PPP Food / PPP All Consumption > 1 (1993 population)	78.87%	90.60%	90.80%	91.37%
Percentage of Sample Population for Whom Ratio of PPP Bread & Cereals / PPP All Consumption > 1 (1993 population)	61.76%	64.01%	62.44%	75.62%
Geometric Mean Ratio, PPP Food / PPP All Consumption (weighted by 1993 population)	1.22	1.29	1.29	1.31
Geometric Mean Ratio, PPP Bread & Cereals / PPP All Consumption (weighted by 1993 population)	1.21	1.24	1.21	1.40

Notes to Table 6B:

We draw the PPP conversion factors for all consumption from the table "World Bank 1993 Consumption PPP" from the "Global Poverty Monitoring" section of the World Bank's website (http://www.worldbank.org/research/povmonitor/PPP1993.htm<dead?>). We draw the PPP conversion factors for 'all food' and for 'bread and cereals' from Table 4.11, "Relative Prices in PPP terms" of the 1998 World Bank World Development Indicators. These data are not normalized to give the US a PPP of 1. To make these data comparable (i.e. for purposes of comparing their effects on a poverty line defined in the two years as US$1.00 and US$1.08), we normalize each series (all consumption, all food, and bread and cereals) to US = 1 by dividing the PPP conversion factor for each country by the PPP conversion factor for the US.

Table 7

**Calculation of 'Endogenous' Food Based International Poverty Lines for 1993
Following the World Bank's Procedure**

Using PPPs for All Consumption		Using PPPs for All Food		Using PPPs for Breads & Cereals	
Countries Ordered Lowest to Highest by Converted Poverty Line	Domestic Poverty Line Converted to $ / day Using 1993 PPPs for all Consumption	Countries Ordered Lowest To Highest by Converted Poverty Line	Domestic Poverty Line Converted to $ / day Using 1993 PPPs for All Food	Countries Ordered Lowest to Highest by Converted Poverty Line	Domestic Poverty Line Converted to $ / Day Using 1993 PPPs for Breads & Cereals
1 Zambia	0.88	Zambia	0.62	Zambia	0.39
2 Indonesia	1.05	Bangladesh	0.68	Bangladesh	0.64
3 Thailand	1.10	Nepal	0.76	Nepal	0.70
4 Nepal	1.10	Thailand	0.92	Kenya	1.03
5 Bangladesh	1.19	Indonesia	1.00	Indonesia	1.06
6 Tunisia	1.26	Pakistan	1.15	Thailand	1.14
7 Pakistan	1.50	Sri Lanka	1.19	Pakistan	1.20
8 Kenya	1.55	Tunisia	1.38	Sri Lanka	1.24
9 Sri Lanka	1.65	Kenya	1.50	Egypt	1.45
10 Egypt	1.71	Turkey	1.51	Philippines	1.56
11 Morocco	1.78	Egypt	1.71	Tunisia	1.67
12 Turkey	2.10	Morocco	1.90	Turkey	1.71
13 Philippines	2.37	Philippines	1.99	Morocco	1.88
14 Jamaica	2.85	Jamaica	2.13	Jamaica	2.33
15 Poland	4.49	Japan	4.30	Japan	3.83
16 Japan	6.33	Poland	4.40	Poland	4.37
17 U.K.	7.34	Belgium	7.48	Belgium	7.34
18 Belgium	7.99	U.K.	7.52	U.K.	8.24
19 USA	10.79	Canada	10.72	Canada	10.23
20 W. Germany	11.50	USA	10.79	W. Germany	10.34
21 Canada	11.61	W. Germany	11.27	USA	10.79
22 Australia	13.92	Australia	15.92	Australia	11.68

Method A: Median of bottom 10

International Poverty Line Using PPPs for All Consumption:	1.22
International Poverty Line Using PPPs for All Food:	1.08
International Poverty Line Using PPPs for Bread & Cereals:	1.10

Method B: Median of bottom 30.3% of countries in sample

International Poverty Line Using PPPs for All Consumption:	1.10
International Poverty Line Using PPPs for All Food:	0.92
International Poverty Line Using PPPs for Bread & Cereals:	1.03

Notes to Table 7:

We compute international poverty lines for 'all food', 'bread and cereals', and 'all consumption' by following the Bank's methodology for computing the international poverty line for 1993 for all countries for which we had comprehensive data on 'all food' PPPs, 'bread and cereals' PPPs, and 'all consumption' PPPs for 1993 (see notes to table 6B for a discussion of our sources for these data). We use official domestic poverty lines in national currency units, which we constructed from the list (Table 1) in US dollars per month of the poverty lines used by the Bank in its own original effort to construct an international poverty line. We recovered the official domestic poverty lines' national currency amounts by converting the official domestic poverty lines expressed in dollars back into national currencies using PPPs for all consumption (as these were the conversion factors used by the Bank originally to construct the reported US dollar 'equivalents' of the official domestic poverty lines). More specifically, we first translate the Bank provided official domestic poverty lines into dollars per day (by multiplying by 12/365), and then translate them back into national currency by multiplying by the PPP conversion factor for all consumption. Once we have these poverty lines in the format of national currency units per day, we divide by the PPP conversion factors for 1993 for 'all food', 'bread and cereals', and 'all consumption' to obtain the 'equivalents' to the official domestic poverty lines in dollars per day as converted by using the PPPs for 'all food', 'bread and cereals', and 'all consumption', respectively. The Bank set the international poverty line at the median of the bottom 10 official domestic poverty lines converted at consumption PPP to obtain the 1993 dollar per day poverty line of $1.08 (see Ravallion and Chen (2000), "How did the World's Poorest Fare in the 1990s?"). We therefore compute the international dollar per day poverty lines using 'all food', 'bread and cereals', and 'all consumption' under two interpretations of the World Bank's methodology for setting the 1993 international poverty line. Under the first, methodology A, we simply order the official domestic poverty lines in dollars per day for all countries for which we have comprehensive data and set the international poverty line at the median of the bottom 10 poverty lines (when ranked according to the chosen PPP concept). (Here our poverty line for all consumption of $1.22 per day differs from the $1.08 of the Bank due to a loss of some countries in the sample for which data on all food PPPs and bread and cereals PPPs were not available). This corresponds to the interpretation of the Bank's methodology as being to set the international poverty line at the median of the bottom 10 official domestic poverty lines for which data is available. However, the Bank took the median of the bottom 10 poverty lines given a sample of 33 countries for which data was available. One could therefore alternatively interpret the Bank's methodology as taking the median of the subset corresponding to the bottom 30.3% of all countries for which data was available. We thus also employ method B, setting the international poverty line at the median of the bottom 30.3% of the official domestic poverty lines for all countries for which we had comprehensive data on 'all food' PPPs, 'bread and cereals' PPPs, and 'all consumption' PPPs for 1993 (22 countries), which corresponds approximately to the median of the bottom 7 countries in our sample. For poverty lines converted at all consumption PPPs, this second method happens also to corresponds to taking the median of the subset (7 countries) for which we have complete data from the 10 countries used by the Bank to construct the 1993 $1.08 poverty line. [The Bank used the median of the converted poverty lines of the following countries to construct its $1.08 1993 PPP poverty line: China, Tanzania, Zambia, India, Indonesia, Thailand, Nepal, Bangladesh, Tunisia, and Pakistan. We lack data on PPP conversions for food and bread and cereals for 1993 for China, Tanzania and India].

Table 8A

**1993 Food Based Poverty Lines vs. General Consumption Based Poverty Line
Using 'Endogenous' Food Based International Poverty Lines Calculated by Method A**

Country	All Food Poverty Line in National Currency ($1.08*PPP Food)	Bread and Cereals Poverty Line in National Currency ($1.10*PPP B&C)	All Consumption Poverty Line in National Currency ($1.22*PPP Consumption)	Ratio, All Food Line / All Consumption Line	Ratio, Bread and Cereals Line / All Consumption Line	Country	All Food Poverty Line in National Currency ($1.08*PPP Food)	Bread and Cereals Poverty Line in National Currency ($1.10*PPP B&C)	All Consumption Poverty Line in National Currency ($1.22*PPP Consumption)	Ratio, All Food Line / All Consumption Line	Ratio, Bread and Cereals Line / All Consumption Line
Antigua & Barbuda	2.97	3.34	2.83	1.05	1.18	Malawi	1.81	2.21	1.84	0.98	1.20
Australia	1.25	1.74	1.62	0.77	1.07	Mali	139.47	218.23	151.00	0.92	1.45
Austria	17.10	17.95	16.76	1.02	1.07	Mauritius	6.79	6.04	8.37	0.81	0.72
Bahamas	1.26	1.43	1.40	0.90	1.03	Moldova	0.29	0.32	0.22	1.31	1.40
Bangladesh	23.69	25.88	15.36	1.54	1.69	Morocco	3.09	3.17	3.73	0.83	0.85
Belarus	26.08	28.99	17.43	1.50	1.66	Nepal	14.46	15.86	11.17	1.29	1.42
Belgium	42.13	43.71	44.51	0.95	0.98	Netherlands	2.28	2.17	2.48	0.92	0.87
Belize	1.27	1.24	1.42	0.90	0.88	New Zealand	1.66	1.86	1.82	0.91	1.02
Botswana	1.74	2.08	1.68	1.04	1.24	Nigeria	20.93	26.28	13.92	1.50	1.89
Bulgaria	11.73	13.71	9.17	1.28	1.49	Norway	13.05	13.98	11.11	1.17	1.26
Cameroon	149.54	186.78	172.18	0.87	1.08	Pakistan	11.51	11.31	10.00	1.15	1.13
Canada	1.49	1.59	1.55	0.96	1.02	Philippines	7.94	10.34	7.55	1.05	1.37
Congo, Rep.	284.43	287.10	247.51	1.15	1.16	Poland	9.10	9.33	10.07	0.90	0.93
Côte d'Ivoire	194.76	238.64	192.37	1.01	1.24	Portugal	176.39	159.03	141.18	1.25	1.13
Croatia	2.84	2.86	2.44	1.16	1.17	Romania	315.01	193.10	237.76	1.32	0.81
Czech Rep.	11.84	7.74	11.17	1.06	0.69	Russian Fed.	275.95	151.05	225.33	1.22	0.67
Denmark	12.03	13.15	11.16	1.08	1.18	Senegal	134.23	202.53	154.35	0.87	1.31
Dominica	2.64	3.24	2.35	1.12	1.38	Sierra Leone	398.58	598.12	282.94	1.41	2.11
Egypt	1.25	1.50	1.41	0.88	1.06	Singapore	1.29	1.53	1.93	0.67	0.79
Fiji	1.01	1.26	1.02	1.00	1.24	Slovak Rep.	10.66	7.35	12.22	0.87	0.60
Finland	9.49	11.90	7.83	1.21	1.52	Slovenia	97.31	102.94	90.15	1.08	1.14
France	8.11	8.32	7.97	1.02	1.04	Spain	141.77	175.37	142.02	1.00	1.23
Gabon	543.36	385.40	368.69	1.47	1.05	Sri Lanka	19.15	18.74	15.54	1.23	1.21
Germany	2.22	2.46	2.46	0.90	1.00	St. Kitts & Nevis	2.42	3.01	2.31	1.05	1.30
Greece	228.39	305.17	219.50	1.04	1.39	St. Lucia	2.50	3.46	2.24	1.11	1.55
Grenada	2.41	2.45	2.01	1.20	1.22	St. Vincent & the Grenadines	2.41	2.52	1.83	1.32	1.38
Guinea	436.01	534.42	410.29	1.06	1.30	Swaziland	1.23	1.61	1.46	0.84	1.10
Hong Kong	6.61	7.55	8.74	0.76	0.86	Sweden	12.54	13.82	12.20	1.03	1.13
Hungary	42.81	49.42	57.67	0.74	0.86	Switzerland	2.89	2.82	2.67	1.08	1.06
Iceland	123.85	124.10	103.20	1.20	1.20	Thailand	17.25	14.13	16.27	1.06	0.87
Indonesia	715.77	691.24	768.58	0.93	0.90	Trinidad & Tobago	3.52	4.26	3.95	0.89	1.08
Iran	326.78	395.18	310.66	1.05	1.27	Tunisia	0.34	0.29	0.42	0.81	0.68
Ireland	0.81	0.79	0.80	1.01	0.99	Turkey	8806.73	7932.93	7174.62	1.23	1.11
Italy	1897.65	1998.46	1808.45	1.05	1.11	Ukraine	0.01	0.01	0.01	1.45	0.72
Jamaica	16.96	15.77	14.28	1.19	1.10	U.K.	0.66	0.61	0.76	0.86	0.80
Japan	295.19	337.21	226.48	1.30	1.49	USA	1.08	1.10	1.22	0.89	0.90
Kenya	12.97	19.24	14.23	0.91	1.35	Vietnam	2413.95	2464.23	1930.36	1.25	1.28
Korea, Rep.	1149.98	1600.21	839.85	1.37	1.91	Zambia	341.31	551.61	270.14	1.26	2.04
Luxembourg	41.97	41.54	44.86	0.94	0.93	Zimbabwe	2.25	2.95	2.76	0.82	1.07

Table 8A Summary	Full Sample	No High Income	No High or High	Low Income
And Analysis:	(All Available	Countries	Middle Income	Countries
	Countries)		Countries	Only
Number of Countries	78	54	41	15
Number of Countries With Ratio > 1 for Food Poverty Line	47	36	26	9
Number of Countries With Ratio > 1 for B&C Poverty Line	57	41	30	14
Number of Countries With Ratio < 1 for Food Poverty Line	31	18	15	6
Number of Countries With Ratio < 1 for B&C Poverty Line	21	13	11	1
Arithmetic Mean Ratio, Food PL / All Consumption PL (unweighted)	1.07	1.10	1.10	1.14
Geometric Mean Ratio, Food PL / All Consumption PL (unweighted)	1.05	1.09	1.09	1.12
Arithmetic Mean Ratio, Bread & Cereals PL / All Consumption PL (unweighted)	1.16	1.20	1.19	1.41
Geometric Mean Ratio, Bread & Cereals PL / All Consumption PL (unweighted)	1.12	1.16	1.14	1.36
Percentage of Sample Population for Whom Ratio of Food PL / All Consumption PL > 1 (1993 population)	59.07%	72.14%	71.20%	61.30%
Percentage of Sample Population for Whom Ratio of Bread & Cereals PL / All Consumption PL > 1 (1993 population)	59.45%	61.41%	59.66%	75.62%
Arithmetic Mean Ratio, Food PL / All Consumption PL (weighted by 1993 population)	1.10	1.17	1.16	1.18
Geometric Mean Ratio, Food PL / All Consumption PL (weighted by 1993 population)	1.08	1.15	1.14	1.16
Arithmetic Mean Ratio, Bread & Cereals PL / All Consumption PL (weighted by 1993 population)	1.13	1.18	1.15	1.31
Geometric Mean Ratio, Bread & Cereals PL / All Consumption PL (weighted by 1993 population)	1.09	1.12	1.09	1.26

Notes to Table 8A:

We use international poverty lines computed for 'all food', 'bread and cereals', and 'all consumption' by following the Method A Interpretation of the Bank's methodology for computing the international poverty line for 1993, applying this to all countries for which we had comprehensive data on 'all food' PPPs, 'bread and cereals' PPPs, and 'all consumption' PPPs for 1993 (see notes to table 6B for a discussion of our sources for these data). The Bank set the international poverty line at the median of the bottom 10 poverty lines converted into US dollars per day using 1993 PPPs for all consumption (see Table 1) to obtain the 1993 dollar per day poverty line of $1.08 [see Chen and Ravallion (2001)]. Thus, under Method 1, we simply repeat this procedure of taking for each PPP concept the median of the bottom 10 poverty lines converted into US dollars per day using that PPP concept ['all food', 'bread and cereals', and 'all consumption' respectively] for all countries for which we have comprehensive data available. (See Table 7 and notes to Table 7 for further details). We used from the WDR 1994 for our classification of high-income, middle-income, and low-income countries.

Table 8B

1993 Food Based Poverty Lines vs. General Consumption Based Poverty Line
Using 'Endogenous' Food Based International Poverty Lines Calculated by Method B

Country	All Food Poverty Line in National Currency ($0.92*PPP Food)	Bread and Cereals Poverty Line in National Currency ($1.03*PPP B&C)	All Consumption Poverty Line in National Currency ($1.10*PPP Consumption)	Ratio, All Food Line / All Consumption Line	Ratio, Bread and Cereals Line / All Consumption Line	Country	All Food Poverty Line in National Currency ($0.92*PPP Food)	Bread and Cereals Poverty Line in National Currency ($1.03*PPP B&C)	All Consumption Poverty Line in National Currency ($1.10*PPP Consumption)	Ratio, All Food Line / All Consumption Line	Ratio, Bread and Cereals Line / All Consumption Line
Antigua & Barbuda	2.53	3.13	2.56	0.99	1.22	Malawi	1.54	2.07	1.66	0.93	1.25
Australia	1.07	1.63	1.46	0.73	1.12	Mali	118.81	204.34	136.15	0.87	1.50
Austria	14.57	16.81	15.12	0.96	1.11	Mauritius	5.78	5.66	7.55	0.77	0.75
Bahamas	1.08	1.34	1.26	0.85	1.07	Moldova	0.25	0.30	0.20	1.24	1.46
Bangladesh	20.18	24.24	13.85	1.46	1.75	Morocco	2.63	2.97	3.36	0.78	0.88
Belarus	22.22	27.15	15.72	1.41	1.73	Nepal	12.32	14.85	10.07	1.22	1.48
Belgium	35.89	40.93	40.13	0.89	1.02	Netherlands	1.94	2.03	2.24	0.87	0.91
Belize	1.08	1.16	1.28	0.85	0.91	New Zealand	1.41	1.74	1.64	0.86	1.06
Botswana	1.48	1.95	1.51	0.98	1.29	Nigeria	17.83	24.60	12.55	1.42	1.96
Bulgaria	9.99	12.84	8.27	1.21	1.55	Norway	11.12	13.09	10.02	1.11	1.31
Cameroon	127.39	174.90	155.24	0.82	1.13	Pakistan	9.81	10.59	9.02	1.09	1.17
Canada	1.27	1.48	1.40	0.91	1.06	Philippines	6.77	9.68	6.80	0.99	1.42
Congo, Rep.	242.29	268.83	223.16	1.09	1.20	Poland	7.75	8.73	9.08	0.85	0.96
Côte d'Ivoire	165.91	223.45	173.45	0.96	1.29	Portugal	150.26	148.91	127.29	1.18	1.17
Croatia	2.42	2.68	2.20	1.10	1.21	Romania	268.34	180.81	214.38	1.25	0.84
Czech Rep.	10.09	7.24	10.07	1.00	0.72	Russian Fed.	235.06	141.44	203.17	1.16	0.70
Denmark	10.25	12.31	10.07	1.02	1.22	Senegal	114.35	189.65	139.17	0.82	1.36
Dominica	2.25	3.04	2.12	1.06	1.43	Sierra Leone	339.53	560.06	255.11	1.33	2.20
Egypt	1.06	1.40	1.27	0.84	1.11	Singapore	1.10	1.43	1.74	0.63	0.82
Fiji	0.86	1.18	0.92	0.94	1.29	Slovak Rep.	9.08	6.88	11.02	0.82	0.62
Finland	8.08	11.14	7.06	1.15	1.58	Slovenia	82.89	96.39	81.28	1.02	1.19
France	6.91	7.79	7.18	0.96	1.08	Spain	120.77	164.21	128.05	0.94	1.28
Gabon	462.86	360.88	332.42	1.39	1.09	Sri Lanka	16.31	17.55	14.01	1.16	1.25
Germany	1.89	2.31	2.21	0.85	1.04	St. Kitts & Nevis	2.06	2.82	2.08	0.99	1.35
Greece	194.56	285.75	197.91	0.98	1.44	St. Lucia	2.13	3.24	2.02	1.05	1.61
Grenada	2.05	2.30	1.82	1.13	1.26	St. Vincent & the Grenadines	2.05	2.36	1.65	1.24	1.43
Guinea	371.42	500.41	369.93	1.00	1.35	Swaziland	1.04	1.51	1.32	0.79	1.14
Hong Kong	5.63	7.07	7.88	0.71	0.90	Sweden	10.68	12.94	11.00	0.97	1.18
Hungary	36.47	46.27	52.00	0.70	0.89	Switzerland	2.46	2.64	2.41	1.02	1.10
Iceland	105.50	116.20	93.05	1.13	1.25	Thailand	14.69	13.23	14.67	1.00	0.90
Indonesia	609.73	647.25	692.98	0.88	0.93	Trinidad & Tobago	3.00	3.99	3.56	0.84	1.12
Iran	278.36	370.04	280.10	0.99	1.32	Tunisia	0.29	0.27	0.38	0.76	0.70
Ireland	0.69	0.74	0.72	0.96	1.03	Turkey	7502.03	7428.11	6468.92	1.16	1.15
Italy	1616.51	1871.28	1630.57	0.99	1.15	Ukraine	0.01	0.01	0.01	1.37	0.75
Jamaica	14.45	14.77	12.87	1.12	1.15	U.K.	0.56	0.57	0.69	0.82	0.83
Japan	251.46	315.75	204.20	1.23	1.55	USA	0.92	1.03	1.10	0.84	0.94
Kenya	11.05	18.02	12.83	0.86	1.40	Vietnam	2056.33	2307.42	1740.49	1.18	1.33
Korea, Rep.	979.62	1498.38	757.24	1.29	1.98	Zambia	290.74	516.50	243.57	1.19	2.12
Luxembourg	35.76	38.90	40.45	0.88	0.96	Zimbabwe	1.92	2.76	2.49	0.77	1.11

Table 8B Summary	Full Sample	No High Income	No High or High	Low Income
And Analysis:	(All Available	Countries	Middle Income	Countries
	Countries)		Countries	Only
Number of Countries	78	54	41	15
Number of Countries With Ratio > 1 for Food Poverty Line	35	29	23	9
Number of Countries With Ratio > 1 for B&C Poverty Line	59	41	30	14
Number of Countries With Ratio < 1 for Food Poverty Line	43	25	18	6
Number of Countries With Ratio < 1 for B&C Poverty Line	19	13	11	1
Arithmetic Mean Ratio, Food PL / All Consumption PL (unweighted)	1.01	1.04	1.04	1.08
Geometric Mean Ratio, Food PL / All Consumption PL (unweighted)	0.99	1.03	1.03	1.06
Arithmetic Mean Ratio, Bread & Cereals PL / All Consumption PL (unweighted)	1.21	1.25	1.24	1.46
Geometric Mean Ratio, Bread & Cereals PL / All Consumption PL (unweighted)	1.17	1.20	1.19	1.42
Percentage of Sample Population for Whom Ratio of Food PL / All Consumption PL > 1 (1993 population)	46.54%	61.96%	61.19%	61.30%
Percentage of Sample Population for Whom Ratio of Bread & Cereals PL / All Consumption PL > 1 (1993 population)	60.05%	61.41%	59.66%	75.62%
Arithmetic Mean Ratio, Food PL / All Consumption PL (weighted by 1993 population)	1.04	1.10	1.10	1.12
Geometric Mean Ratio, Food PL / All Consumption PL (weighted by 1993 population)	1.02	1.08	1.08	1.09
Arithmetic Mean Ratio, Bread & Cereals PL / All Consumption PL (weighted by 1993 population)	1.18	1.22	1.19	1.36
Geometric Mean Ratio, Bread & Cereals PL / All Consumption PL (weighted by 1993 population)	1.13	1.16	1.14	1.31

Notes to Table 8B:

We use international poverty lines computed for 'all food', 'bread and cereals', and 'all consumption' by following the Method B Interpretation of the Bank's methodology for computing the international poverty line for 1993 for all countries for which we had comprehensive data on 'all food' PPPs, 'bread and cereals' PPPs, and 'all consumption' PPPs for 1993 (see notes to table 6B for a discussion of our sources for this data). The Bank has provided us with a list of 33 official domestic poverty lines converted into US dollars per day using 1993 PPPs for all consumption (see Table 1), from which it set the international poverty line at the median of the bottom 10 poverty lines so converted to obtain the 1993 dollar per day poverty line of $1.08 [see Chen and Ravallion (2001)]. One can thus interpret the World Bank's methodology as taking the median of the subset corresponding to the bottom 30.3% of all countries for which data was available. In method B we therefore set the international poverty line at the median of the bottom 30.3% of all countries for which we had comprehensive data on 'all food' PPPs, 'bread and cereals' PPPs, and 'all consumption' PPPs for 1993 (22 countries), which corresponds approximately to the median of the bottom 7 countries in our sample. (See Table 7 and notes to Table 7 for further details). We drew from the WDR 1994 for our classification of high-income, middle-income, and low-income countries.

Table 9

Regressions: Ratios of Poverty Lines Corresponding to Distinct PPP Concepts in Relation to Measures of Living Standards

9.1 Ratios of Poverty Lines for 1985 and 1993, International Poverty Line Exogenously Fixed

9.1 A: 1985 Ratio of Food and 'Bread and Cereals' Poverty Lines to Consumption Poverty Lines ('Equivalent' to an Exogenously Fixed International Poverty Line)

	Dependent Variable: Ratio of 1985 Food PPPs to 1985 All Consumption PPPs				Dependent Variable: Ratio of 1985 Bread and Cereals PPPs to 1985 All Consumption PPPs			
Log Per Capita GDP in constant 1995 US Dollars at Exchange Rates	-0.142*** (0.026) [-5.55]				-0.363*** (0.063) [-5.73]			
Log GDP in US Dollars at PPP		-0.207*** (0.038) [-5.42]				-0.572*** (0.093) [-6.15]		
Log Infant Mortality Rate			0.225*** (0.037) [6.09]				0.579*** (0.090) [6.47]	
Log Under 5 Mortality Rate				0.203*** (0.033) [6.18]				0.530*** (0.079) [6.73]
Number of Observations	52	49	55	55	52	49	55	55
R-squared	0.37	0.38	0.41	0.42	0.40	0.45	0.44	0.46

9.1 B: 1993 Ratio of Food and 'Bread and Cereals' Poverty Lines to Consumption Poverty Lines (Equivalent to an Exogenously Fixed International Poverty Line)

	Dependent Variable: Ratio of 1993 Food PPPs to 1993 All Consumption PPPs				Dependent Variable: Ratio of 1993 Bread and Cereals PPPs to 1993 All Consumption PPPs			
Log Per Capita GDP in constant 1995 US Dollars at Exchange Rates	-0.037** (0.016) [-2.34]				-0.071*** (0.023) [-3.09]			
Log GDP in US Dollars at PPP		-0.050** (0.023) [-2.16]				-0.127*** (0.032) [-3.93]		
Log Infant Mortality Rate			.030 (0.025) [1.20]				0.097*** (0.036) [2.67]	
Log Under 5 Mortality Rate				0.028 (0.022) [1.24]				0.094*** (0.032) [2.90]
Number of Observations	78	78	73	73	78	78	73	73
R-squared	0.07	0.06	0.03	0.02	0.11	0.17	0.09	0.11

9.2 Ratios of Poverty Lines for 1993, International Poverty Line Determined 'Endogenously'

9.2 A: 1993 Ratio of Food and Bread and Cereals Poverty Lines to Consumption Poverty Lines
Using 'Endogenous' Food Based International Poverty Lines Calculated by Method A

	Dependent Variable: Ratio of 1993 Food Poverty Line to 1993 All Consumption Poverty Line				Dependent Variable: Ratio of 1993 Bread and Cereals Poverty Line to 1993 All Consumption Poverty Line			
Log Per Capita GDP in constant 1995 US Dollars at Exchange Rates	-0.032** (0.014) [-2.33]				-0.064*** (0.021) [-3.11]			
Log GDP in US Dollars at PPP		-0.044** (0.020) [-2.15]				-0.116*** (0.029) [-3.95]		
Log Infant Mortality Rate			0.026 (0.022) [1.20]				0.088*** (0.033) [2.70]	
Log Under 5 Mortality Rate				0.025 (0.020) [1.24]				0.085*** (0.029) [2.93]
Number of Observations	78	78	73	73	78	78	73	73
R-squared	0.07	0.06	0.02	0.02	0.11	0.17	0.09	0.11

9.2 B: 1993 Ratio of Food and Bread and Cereals Poverty Lines to Consumption Poverty Lines
Using 'Endogenous' Food Based International Poverty Lines Calculated by Method B

	Dependent Variable: Ratio of 1993 Food Poverty Line to 1993 All Consumption Poverty Line				Dependent Variable: Ratio of 1993 Bread and Cereals Poverty Line to 1993 All Consumption Poverty Line			
Log Per Capita GDP in constant 1995 US Dollars at Exchange Rates	-0.031** (0.013) [-2.36]				-0.067*** (0.021) [-3.10]			
Log GDP in US Dollars at PPP		-0.042** (0.019) [-2.18]				-0.120*** (0.030) [-3.93]		
Log Infant Mortality Rate			0.025 (0.021) [1.22]				0.091*** (0.034) [2.69]	
Log Under 5 Mortality Rate				0.024 (0.019) [1.26]				0.088*** (0.030) [2.91]
Number of Observations	78	78	73	73	78	78	73	73
R-squared	0.07	0.06	0.02	0.02	0.11	0.17	0.09	0.11

Notes to Table 9:

In Table 9.1 A we undertake regressions using as our dependent variable the ratios for 1985 of 'all food' and 'bread and cereals' poverty lines to 'all consumption' poverty lines obtained by using a $ 1 1985 international poverty line and converting this into national currency using PPPs for 'all food', 'bread and cereals', and 'all consumption' respectively. Because the poverty lines cancel out in the course of division, these ratios correspond to those for 'all food' and 'bread and cereals' PPPs to 'all consumption' PPPs reported in Table 6A. Standard errors are reported in parentheses below coefficients and t-statistics are reported in brackets below standard errors. We repeat this procedure in Table 9.1 B using as our dependent variable the ratios for 1993 of 'all food' and 'bread and cereals' poverty lines to 'all consumption' poverty lines (again, because the dollar poverty lines cancel out in the course of division, these ratios corresponds to those for 'all food' and 'bread and cereals' PPPs to 'all consumption' PPPs as reported in Table 6B). (See notes to Tables 6A and 6B for a discussion of our sources for these data). In Table 9.2 A, we regress the ratios (reported in Table 8A) of 1993 'all food' and 'bread and cereals' national poverty lines to 'all consumption' national poverty lines equivalent to an international poverty line, where the international poverty line was obtained by following the method A interpretation of the Bank's procedure of defining the international poverty line as the median dollar value of the bottom 10 official domestic poverty lines for which comprehensive data is available (when converted into dollars using PPPs for 'all food', 'bread and cereals', and 'all consumption' respectively -- see notes to Table 7 and Table 8A for details). In Table 9.2 B, we regress the ratios of 1993 'all food' and 'bread and cereals' poverty lines to 'all consumption' poverty lines reported in Table 8B, obtained by calculating the international poverty line by following the method B interpretation of the Bank's procedure, i.e. by setting the dollar per day poverty line at the median dollar value of the bottom 30.3% of official domestic poverty lines for which we have comprehensive data (converted into dollars using PPPs for 'all food', 'bread and cereals', and 'all consumption' respectively -- see notes to Table 7 and Table 8B for details), which here corresponds to the bottom 7 official domestic poverty lines for each concept. We obtain our data on per capita GDP at market exchange rates in constant 1995 US dollars and our data on per capita GDP converted at PPP from the Bank's 2000 World Development Indicators. Our data on infant mortality rates and under 5 mortality rates were provided by UNICEF.

Table 10

Comparisons of Poverty Lines and Estimates of Poverty Headcounts in Survey Year Selected Countries

10.1: Headcount Estimates from 1993 Food Based Poverty Lines vs. Estimates From 1993 Consumption Poverty Lines (Local Currency Units 'Equivalent' to an Exogenously Fixed International Poverty Line)

Country	Year	Estimate of Head Count Ratio for Consumption Poverty Line (Poverty Line = CPI*1.08*PPP Consumption)	Estimate of Head Count Ratio for All Food Poverty Line (Poverty Line = CPI*1.08*PPP All Food)	Estimate of Head Count Ratio for Bread and Cereals Poverty Line (Poverty Line = CPI*1.08* PPPB&C)	Ratio of Head Count for All Food PL to Head Count for Consumption PL	Ratio of Head Count for Bread & Cereals PL to Head Count for Consumption PL	Ratio of (HC for Food PL / HC for Consumption PL) to (Food PL / Consumption PL)	Ratio of (HC for Bread & Cereals PL / HC for Consumption PL) To (Bread &Cereals PL / Consumption PL)
Bangladesh	1995-96	22.23	63.66	68.39	2.86	3.08	1.64	1.65
Cote d'Ivoire	1995	10.45	15.78	24.69	1.51	2.36	1.32	1.72
Kenya	1994	43.01	44.58	65.17	1.04	1.52	1.01	1.01
Mali	1994	57.92	59.85	77.03	1.03	1.33	0.99	0.83
Nepal	1995-96	25.33	51.29	56.44	2.03	2.23	1.38	1.41
Nigeria	1996-97	75.10	90.36	93.66	1.20	1.25	0.71	0.60
Senegal	1995	11.55	10.94	29.03	0.95	2.51	0.96	1.73
Sierra Leone	1989	57.32	68.53	78.75	1.20	1.37	0.75	0.59
Zambia	1996	60.86	75.99	89.10	1.25	1.46	0.87	0.65
Geometric Mean		32.84	44.66	59.34	1.36	1.81	1.03	1.03

10.2A: Headcount Estimates from 1993 Food Based Poverty Lines vs. Estimates From 1993 Consumption Poverty Lines (Local Currency Units 'Equivalent' to an Endogenous Food Based International Poverty Line Calculated by Method A)

Country	Year	Estimate of Head Count Ratio for Consumption Poverty Line (Poverty Line = CPI*1.22*PPP Consumption)	Estimate of Head Count Ratio for All Food Poverty Line (Poverty Line = CPI*1.08*PPP All Food)	Estimate of Head Count Ratio for Bread and Cereals Poverty Line (Poverty Line = CPI*1.10* PPPB&C)	Ratio of Head Count for All Food PL to Head Count for Consumption PL	Ratio of Head Count for Bread & Cereals PL to Head Count for Consumption PL	Ratio of (HC for Food PL / HC for Consumption PL) to (Food PL / Consumption PL)	Ratio of (HC for B&C PL / HC for Consumption PL) to (B&C PL / Consumption PL)
Bangladesh	1995-96	30.68	63.66	69.56	2.08	2.27	1.35	1.35
Cote d'Ivoire	1995	15.24	15.78	25.66	1.04	1.68	1.02	1.36
Kenya	1994	49.71	44.58	66.12	0.90	1.33	0.98	0.98
Mali	1994	63.39	59.85	77.65	0.94	1.22	1.02	0.85
Nepal	1995-96	33.25	51.29	57.69	1.54	1.73	1.19	1.22
Nigeria	1996-97	79.51	90.36	93.89	1.14	1.18	0.76	0.63
Senegal	1995	16.33	10.94	30.00	0.67	1.84	0.77	1.40
Sierra Leone	1989	60.09	68.53	79.23	1.14	1.32	0.81	0.62
Zambia	1996	66.38	75.99	89.47	1.14	1.35	0.91	0.66
Geometric Mean		39.85	44.66	60.31	1.12	1.51	0.96	0.96

10.2B: Headcount Estimates from 1993 Food Based Poverty Lines vs. Estimates From 1993 Consumption Poverty Lines (NCU 'Equivalent' to an Endogenous Food Based International Poverty Line Calculated by Method B)

Country	Year	Estimate of Head Count Ratio for Consumption Poverty Line (Poverty Line = CPI*1.10*PPP Consumption)	Estimate of Head Count Ratio for All Food Poverty Line (Poverty Line = (CPI*0.92*PPP All Food)	Estimate of Head Count Ratio for Bread and Cereals Poverty Line (Poverty Line = CPI*1.03* PPP B&C)	Ratio of Head Count for All Food PL to Head Count for Consumption PL	Ratio of Head Count For Bread & Cereals PL to Head Count for Consumption PL	Ratio of (HC for Food PL / HC for Consumption PL) to (Food PL / Consumption PL)	Ratio of (HC for Bread & Cereals PL / HC for Consumption PL) to (Bread &Cereals PL / Consumption PL)
Bangladesh	1995-96	23.44	51.72	65.23	2.21	2.78	1.51	1.59
Cote d'Ivoire	1995	11.12	9.55	22.25	0.86	2.00	0.90	1.55
Kenya	1994	44.01	36.09	62.67	0.82	1.42	0.95	1.01
Mali	1994	58.76	52.42	75.4	0.89	1.28	1.02	0.85
Nepal	1995-96	26.47	39.96	53.18	1.51	2.01	1.23	1.36
Nigeria	1996-97	75.8	86.91	93.02	1.15	1.23	0.81	0.63
Senegal	1995	12.21	6.3	26.6	0.52	2.18	0.63	1.60
Sierra Leone	1989	57.73	64.47	77.5	1.12	1.34	0.84	0.61
Zambia	1996	61.71	69.56	88.11	1.13	1.43	0.94	0.67
Geometric Mean		33.88	35.59	56.81	1.05	1.68	0.95	1.02

Notes to Table 10:

We construct our headcount estimates using the World Bank's Povcal Program (see http://www.worldbank.org/LSMS/tools/povcal/ for details and to download the program). This program allows one to construct headcount, poverty gap, and other estimates by entering data on income distribution, average consumption or income, and poverty lines expressed in terms of annual income. We use the percentage shares of population quintiles for countries and survey years reported by the World Bank in the 2000-2001 World Development Report. We calculate average annual consumption per capita by dividing figures on total annual consumption by population in the survey year of the income distribution data. Shaohua Chen of the World Bank has kindly provided us with our data on total national final household consumption expenditure in national currency units (file name: gnp-pri-cons-cur-lcu.xls, received March 11, 2002). We use population data from the World Bank's 2000 World Development Indicators. In Table 10.1, we obtain poverty lines for 'all food', 'bread and cereals', and 'all consumption' by multiplying the $1.08 per day international poverty line by the PPP conversion factors for 1993 (from the World Development Indicators 1998 and from the PovertyNet website of the World Bank) for 'all food', 'bread and cereals', and 'all consumption' respectively, expressing this in annual terms by multiplying by 365, and updating the poverty lines to the survey year by multiplying by the ratio of the national CPI in the survey year to the national CPI in 1993 (this updating procedure is the same methodology used by the World Bank to estimate survey year poverty). We obtain our CPI data from the 2000 WDI (this is a CPI for all consumption, but similar results are obtained by using a national CPI for food, drawn from the U.N. Statistics Division database (http://unstats.un.org/), to update the 'all food' and 'bread and cereals' poverty lines). In Table 10.2 A, we use the poverty lines corresponding to 'all food', 'bread and cereals', and 'all consumption' PPP concepts corresponding to the Method A interpretation of the World Bank's procedure for constructing the international poverty line (i.e. that allows the international poverty lines corresponding to different PPP concepts to be determined endogenously by converting the official domestic currency poverty lines used by the World Bank in their own international poverty line construction exercise into dollars using the PPP conversion factors for 'all food', 'bread and cereals', and 'all consumption' respectively and then setting the international poverty line for each concept at the median of the bottom 10 of the resulting official domestic poverty lines expressed in US dollars, using all the countries for which comprehensive data is available -- See notes to Table 7 and Table 8A for details). In table 10.2 B, we use the poverty lines corresponding to 'all food', 'bread and cereals', and 'all consumption' PPP concepts corresponding to the Method B interpretation of the World Bank's procedure for constructing the international poverty line (analogous to the procedure employed in Method A, except setting the international poverty line at the median of the bottom 30.3% of the resulting official domestic poverty lines expressed in US dollars for which data is available, which in our case corresponds to setting the international poverty line at the median of the bottom 7 domestic poverty lines expressed in US dollars -- See notes to Table 7 and Table 8B for details). Again, in both Table 10.2 A and Table 10.2 B, we multiply our income per day figures by 365 to obtain annual poverty lines and update the poverty lines by multiplying by the ratio of the national CPI in the survey year to the national CPI in 1993. Geometric means for each column are reported at the bottom of each table.[36]

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[36] These are un-weighted or simple means. Results are qualitatively similar for means weighted by country population in the survey year (although these are in general slightly higher for each column due to the large populations of certain countries (relative to that of other countries in the sample) such as Bangladesh, Kenya, and Nepal which saw both relatively greater increases in the poverty head count ratio when food-based poverty lines are used rather than general consumption poverty lines.

Figure 1: Domestic Poverty Lines Converted into Dollars Using PPPs for Food vs. PPPs for General Consumption

All 21 Available Countries
Poorest 14 Countries

Domestic Poverty Lines Converted at PPP Using PPPs for All Consumption
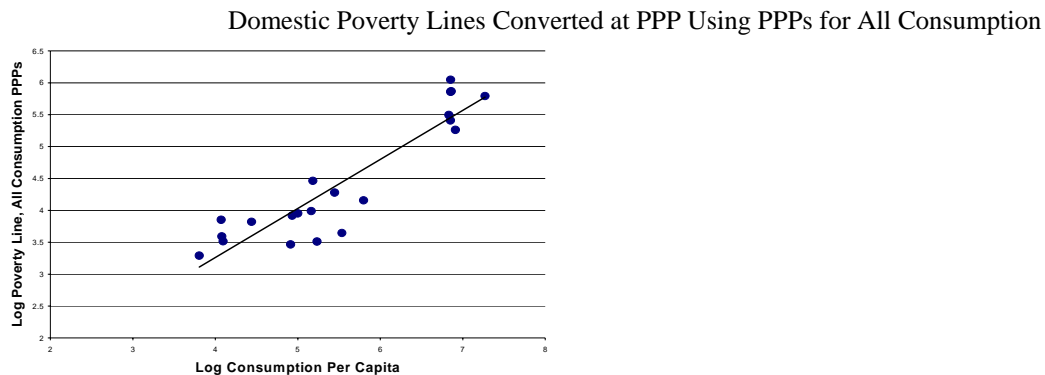
Mean Log Poverty Line: 4.44
Standard Deviation Log Poverty Line: 0.95

$lnz_i = 0.181 + 0.770lny_i + residual_i$
$\quad\quad (0.440)\quad (0.078)$

Domestic Poverty Lines Converted at PPP Using PPPs for All Consumption
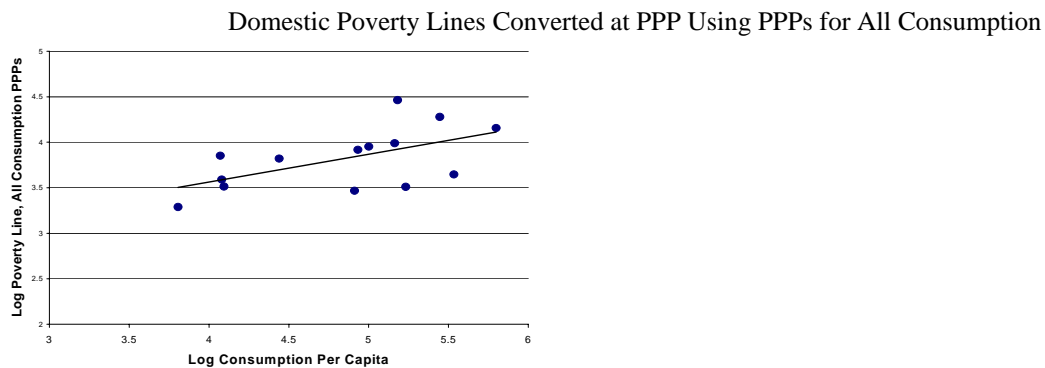
Mean Log Poverty Line: 3.82
Standard Deviation Log Poverty Line: 0.34

$lnz_i = 2.347 + 0.304lny_i + residual_i$
$\quad\quad (0.620)\quad (0.127)$

Domestic Poverty Lines Converted at PPP Using PPPs for All Food
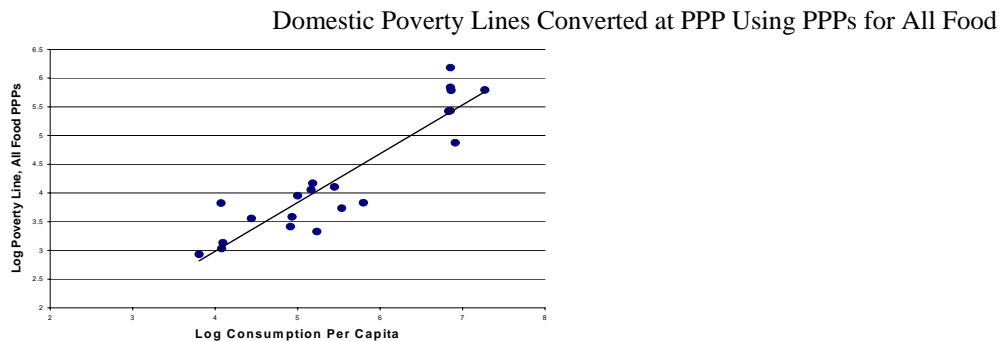
Mean Log Poverty Line: 4.29
Standard Deviation Log Poverty Line: 1.04

$lnz_i = -0.411 + 0.849lny_i + residual_i$
$\quad\quad (0.473)\quad (0.084)$

Domestic Poverty Lines Converted at PPP Using PPPs for All Food
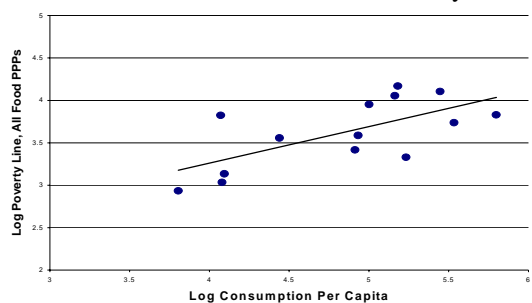
Mean Log Poverty Line: 3.62
Standard Deviation Log Poverty Line: 0.40

$lnz_i = 1.538 + 0.430lny_i + residual_i$
$\quad\quad (0.670)\quad (0.137)$

Domestic Poverty Lines Converted at PPP Using PPPs for Bread and Cereals
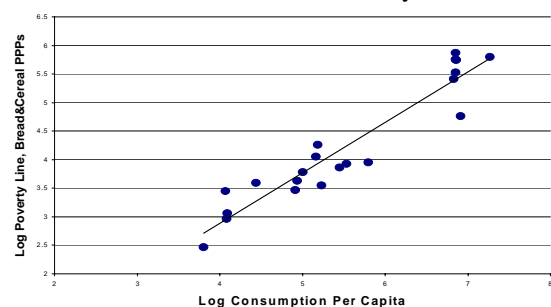
Mean Log Poverty Line: 4.23
Standard Deviation Log Poverty Line: 1.05

$lnz_i = -0.651 + 0.883lny_i + residual_i$
$\quad\quad (0.379)\quad (0.067)$

Domestic Poverty Lines Converted at PPP Using PPPs for Bread and Cereals

Mean Log Poverty Line: 3.57
Standard Deviation Log Poverty Line: 0.48

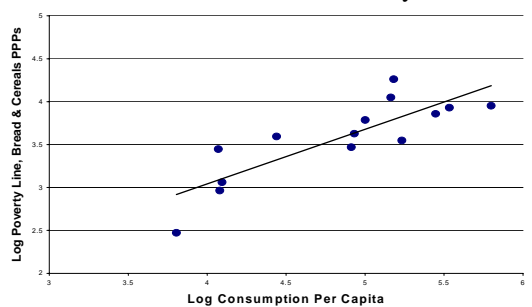$lnz_i = 0.498 + 0.636lny_i + residual_i$
$\quad\quad (0.588)\quad (0.121)$

Table 11A

1985 Non-Food PPPs Relevant to the Consumption of the Poor Relative to PPPs for General Consumption

Country*	PPP for All Consumption	PPP for Clothing	PPP for Gross Rent	PPP for Medical Care	Ratio PPP Clothing / PPP All Consumption	Ratio PPP Rent / PPP All Consumption	Ratio PPP Med Care / PPP All Consumption
Turkey	241.16	295.12	289.54	234.43	1.22	1.20	0.97
Thailand	10.15	13.46	9.42	6.35	1.33	0.93	0.63
India	6.28	10.60	3.59	4.23	1.69	0.57	0.67
Sri Lanka	8.81	10.83	24.53	1.88	1.23	2.79	0.21
Pakistan	5.57	2.69	9.97	1.70	0.48	1.79	0.31
Philippines	8.39	7.91	16.08	5.13	0.94	1.92	0.61
Botswana	0.77	0.72	2.00	0.32	0.94	2.60	0.42
Egypt	0.37	0.29	0.52	0.11	0.81	1.42	0.31
Ethiopia	1.16	0.53	2.32	0.30	0.46	2.00	0.26
Kenya	7.22	6.68	17.43	2.11	0.93	2.41	0.29
Malawi	0.63	0.57	0.92	0.17	0.91	1.46	0.28
Mauritius	4.56	3.77	7.06	2.27	0.83	1.55	0.50
Nigeria	1.16	0.87	1.65	0.55	0.75	1.42	0.48
Sierra Leone	3.29	1.46	4.30	0.78	0.44	1.30	0.24
Swaziland	0.90	0.60	1.10	0.57	0.67	1.22	0.63
Tanzania	18.83	30.20	23.10	4.14	1.60	1.23	0.22
Zambia	1.46	1.39	2.62	0.37	0.95	1.79	0.25
Zimbabwe	0.81	0.92	1.17	0.37	1.14	1.45	0.46
Benin	150.87	103.81	226.18	67.98	0.69	1.50	0.45
Cameroon	207.23	180.88	614.84	130.05	0.87	2.97	0.63
Congo	272.25	145.71	627.96	260.33	0.54	2.31	0.96
Ivory Coast	236.11	221.91	325.94	114.52	0.94	1.38	0.49
Madagascar	341.42	164.32	668.31	91.13	0.48	1.96	0.27
Mali	207.54	151.52	532.63	58.38	0.73	2.57	0.28
Morocco	3.25	2.60	7.65	1.51	0.80	2.36	0.46
Rwanda	55.97	40.30	114.27	26.99	0.72	2.04	0.48
Senegal	197.43	113.10	402.17	114.83	0.57	2.04	0.58
Tunisia	0.37	0.55	0.84	0.17	1.48	2.26	0.45
Poland	88.16	128.37	36.25	62.68	1.46	0.41	0.71
Grenada	2.22	2.86	1.55	2.82	1.29	0.70	1.27
Jamaica	3.07	3.68	2.15	5.28	1.20	0.70	1.72
St. Lucia	1.90	1.63	1.39	2.35	0.86	0.73	1.24
Bangladesh	8.67	8.84	3.65	4.03	1.02	0.42	0.46
Nepal	6.88	7.61	3.31	4.81	1.11	0.48	0.70

	Low and Lower Middle Income Countries	Low Income Countries
Geometric Mean Ratio of PPP for Clothing to PPP for All Consumption	0.89	0.82
Geometric Mean Ratio of PPP for Gross Rent to PPP for All Consumption	1.40	1.41
Geometric Mean Ratio of PPP for Medical Care to PPP for All Consumption	0.48	0.34

* Note: Boldface denotes that a country was classified as "low income" and a normal typeface denotes that a country was classified as "lower-middle income" according to the 1990 WDR.

Table 11B

1985 PPPs of Disaggregated Components of Medical Care Relative to PPPs for General Consumption

Country*	PPP for All Consumption	PPP for Drug, medical pre	PPP for Medical supplies	PPP for Therapeutic appli	PPP for Hospital care	PPP for Svc of physicians	PPP for Svc of dentists	PPP for Svc of nurses	Ratio PPP Drugs/ PPP All Consumption	Ratio PPP Med Sup./ PPP All Consumption	Ratio PPP TA./ PPP All Consumption	Ratio PPP HC./ PPP All Consumption	Ratio PPP SP./ PPP All Consumption	Ratio PPP SD./ PPP All Consumption	Ratio PPP SN./ PPP All Consumption
Turkey	241.16	187.42	229.16	289.96	363.55	243.27	309.74	314.52	0.78	0.95	1.20	1.51	1.01	1.28	1.30
Thailand	10.15	7.32	.	.	2.52	5.94	6.82	7.23	0.72	.	.	0.25	0.59	0.67	0.71
India	6.28	4.13	6.11	.	6.70	2.45	.	4.28	0.66	0.97	.	1.07	0.39	.	0.68
Sri Lanka	8.81	6.11	7.77	17.49	0.61	3.47	2.55	3.81	0.69	0.88	1.99	0.07	0.39	0.29	0.43
Pakistan	5.57	4.56	3.06	.	.	0.63	0.57	2.14	0.82	0.55	.	.	0.11	0.10	0.38
Philippines	8.39	12.35	3.70	.	1.34	6.33	.	5.23	1.47	0.44	.	0.16	0.75	.	0.62
Botswana	0.77	2.04	1.60	0.43	0.29	0.17	0.18	0.50	2.65	2.08	0.56	0.38	0.22	0.23	0.65
Egypt	0.37	0.65	0.72	0.13	0.09	0.08	0.08	0.08	1.78	1.96	0.37	0.25	0.21	0.22	0.21
Ethiopia	1.16	4.66	2.03	0.47	0.28	0.22	0.23	0.96	4.02	1.75	0.41	0.25	0.19	0.20	0.83
Kenya	7.22	18.09	13.16	.	2.01	1.39	.	11.77	2.51	1.82	.	0.28	0.19	.	1.63
Malawi	0.63	1.64	0.99	0.08	0.22	0.11	0.11	0.47	2.63	1.59	0.13	0.34	0.17	0.18	0.75
Mauritius	4.56	12.90	9.29	3.99	1.74	0.98	1.05	8.31	2.83	2.04	0.87	0.38	0.22	0.23	1.82
Nigeria	1.16	3.01	2.11	0.65	0.27	0.22	0.24	0.99	2.59	1.81	0.56	0.23	0.19	0.20	0.86
Sierra Leone	3.29	10.67	5.92	6.52	0.49	0.63	0.67	2.79	3.24	1.80	1.98	0.15	0.19	0.20	0.85
Swaziland	0.90	2.83	1.66	0.26	0.33	0.18	0.19	0.78	3.15	1.85	0.29	0.37	0.20	0.21	0.87
Tanzania	18.83	27.71	.	6.61	2.80	1.48	1.57	6.59	1.47	.	0.35	0.15	0.08	0.08	0.35
Zambia	1.46	3.27	1.69	0.23	0.39	0.18	0.19	0.80	2.23	1.16	0.16	0.26	0.12	0.13	0.55
Zimbabwe	0.81	2.51	1.72	0.57	0.36	0.18	0.19	0.81	3.11	2.13	0.71	0.45	0.22	0.24	1.00
Benin	150.87	404.51	257.21	52.69	43.16	27.20	28.97	88.24	2.68	1.70	0.35	0.29	0.18	0.19	0.58
Cameroon	207.23	474.23	332.30	138.48	66.28	35.14	37.43	156.89	2.29	1.60	0.67	0.32	0.17	0.18	0.76
Congo	272.25	610.02	558.45	.	57.39	59.06	62.90	247.52	2.24	2.05	.	0.21	0.22	0.23	0.91
Ivory Coast	236.11	622.30	524.62	29.11	79.73	55.48	59.09	247.69	2.64	2.22	0.12	0.34	0.23	0.25	1.05
Madagascar	341.42	1036.42	461.49	111.21	72.11	48.80	51.98	217.88	3.04	1.35	0.33	0.21	0.14	0.15	0.64
Mali	207.54	430.07	215.28	88.13	47.02	22.77	24.25	101.64	2.07	1.04	0.42	0.23	0.11	0.12	0.49
Morocco	3.25	8.83	.	0.73	1.07	0.74	0.79	3.30	2.72	.	0.22	0.33	0.23	0.24	1.02
Rwanda	55.97	146.59	41.69	23.54	13.86	4.41	.	14.30	2.62	0.74	0.42	0.25	0.08	.	0.26
Senegal	197.43	463.98	.	.	68.35	44.44	47.33	198.41	2.35	.	.	0.35	0.23	0.24	1.00
Tunisia	0.37	0.56	0.62	0.08	0.15	0.07	0.07	0.30	1.52	1.68	0.23	0.39	0.18	0.19	0.80
Poland	88.16	78.38	29.51	577.19	57.27	77.53	.	.	0.89	0.33	6.55	0.65	0.88	.	.
Grenada	2.22	3.67	2.05	2.00	2.88	3.78	2.74	2.76	1.65	0.93	0.90	1.30	1.70	1.23	1.24
Jamaica	3.07	7.15	4.00	3.90	4.70	7.37	5.34	5.63	2.33	1.30	1.27	1.53	2.40	1.74	1.83
St. Lucia	1.90	3.09	1.74	1.69	2.37	3.19	2.31	2.33	1.62	0.91	0.89	1.24	1.67	1.21	1.22
Bangladesh	8.67	5.17	.	9.29	.	1.92	2.50	5.00	0.60	.	1.07	.	0.22	0.29	0.58
Nepal	6.88	4.03	13.51	.	.	1.49	.	1.54	0.59	1.97	.	.	0.22	.	0.22

	Low and Lower Middle Income Countries	Low Income Countries
Geometric Mean Ratio of PPP for drugs to PPP for All Consumption	1.78	1.68
Geometric Mean Ratio of PPP for medical supplies to PPP for All Consumption	1.30	1.28
Geometric Mean Ratio of PPP for therapeutic appliances to PPP for All Consumption	0.55	0.48
Geometric Mean Ratio of PPP for Hospital Care to PPP for All Consumption	0.34	0.24
Geometric Mean Ratio of PPP for Services of Physicians to PPP for All Consumption	0.27	0.17
Geometric Mean Ratio of PPP for Services of Dentists to PPP for All Consumption	0.26	0.17
Geometric Mean Ratio of PPP for Services of Nurses to PPP for All Consumption	0.72	0.56

* Note: Boldface denotes that a country was classified as "low income" and a normal typeface denotes that a country was classified as "lower-middle income" according to the 1990 WDR.

Table 11C

1985 PPPs of Disaggregated Components of Clothing Relative to PPPs for General Consumption

Country*	PPP for All Consumption	PPP for Men's clothing	PPP for Women's clothing	PPP for Children's clothing	PPP for Cloth. mater&acces	PPP for Repair & mainten	Ratio PPP M. Clothing / PPP All Consumption	Ratio PPP W. Clothing / PPP All Consumption	Ratio PPP C. Clothing / PPP All Consumption	Ratio PPP CMA / PPP All Consumption	Ratio PPP CRM / PPP All Consumption
Turkey	241.16	376.54	351.68	339.84	224.64	260.56	1.56	1.46	1.41	0.93	1.08
Thailand	10.15	15.52	15.90	17.47	11.81	9.49	1.53	1.57	1.72	1.16	0.94
India	6.28	8.55	5.67	13.93	11.39	.	1.36	0.90	2.22	1.81	.
Sri Lanka	8.81	9.83	5.81	11.55	12.59	4.50	1.12	0.66	1.31	1.43	0.51
Pakistan	5.57	6.57	2.95	7.67	2.51	.	1.18	0.53	1.38	0.45	.
Philippines	8.39	10.68	5.57	11.21	8.94	4.49	1.27	0.66	1.34	1.06	0.54
Botswana	0.77	0.97	0.64	0.90	0.33	.	1.26	0.83	1.17	0.43	.
Egypt	0.37	0.61	0.68	0.49	0.23	0.70	1.67	1.85	1.35	0.62	1.92
Ethiopia	1.16	1.91	0.38	0.76	0.32	0.41	1.64	0.33	0.65	0.27	0.35
Kenya	7.22	9.75	6.17	7.78	3.25	5.36	1.35	0.85	1.08	0.45	0.74
Malawi	0.63	0.90	0.66	0.84	0.30	0.23	1.44	1.06	1.34	0.47	0.37
Mauritius	4.56	7.59	5.02	5.58	2.68	4.37	1.67	1.10	1.22	0.59	0.96
Nigeria	1.16	1.55	1.29	1.92	0.58	0.71	1.34	1.11	1.65	0.50	0.61
Sierra Leone	3.29	2.70	2.08	3.22	1.10	0.54	0.82	0.63	0.98	0.33	0.16
Swaziland	0.90	0.98	0.71	0.85	0.35	0.62	1.09	0.79	0.95	0.39	0.69
Tanzania	18.83	39.19	28.99	34.88	13.70	14.20	2.08	1.54	1.85	0.73	0.75
Zambia	1.46	2.01	1.44	1.64	0.69	0.88	1.37	0.99	1.12	0.47	0.60
Zimbabwe	0.81	1.17	1.02	1.19	0.46	0.50	1.46	1.27	1.47	0.57	0.62
Benin	150.87	179.08	127.05	195.88	74.33	115.64	1.19	0.84	1.30	0.49	0.77
Cameroon	207.23	277.18	280.91	287.15	98.19	143.66	1.34	1.36	1.39	0.47	0.69
Congo	272.25	351.15	256.99	293.72	122.21	179.74	1.29	0.94	1.08	0.45	0.66
Ivory Coast	236.11	428.27	431.58	392.53	146.62	202.10	1.81	1.83	1.66	0.62	0.86
Madagascar	341.42	260.76	305.64	338.13	120.75	244.69	0.76	0.90	0.99	0.35	0.72
Mali	207.54	285.23	200.54	296.15	100.42	140.40	1.37	0.97	1.43	0.48	0.68
Morocco	3.25	3.95	3.34	3.53	1.65	.	1.22	1.03	1.09	0.51	.
Rwanda	55.97	81.20	49.28	72.15	26.52	54.20	1.45	0.88	1.29	0.47	0.97
Senegal	197.43	249.20	193.48	199.67	87.06	164.07	1.26	0.98	1.01	0.44	0.83
Tunisia	0.37	0.72	0.70	0.57	0.27	0.60	1.95	1.89	1.53	0.73	1.62
Poland	88.16	145.86	147.25	149.44	98.82	111.91	1.65	1.67	1.70	1.12	1.27
Grenada	2.22	2.53	3.84	1.87	2.28	4.44	1.14	1.73	0.84	1.03	2.00
Jamaica	3.07	3.04	4.16	2.85	3.68	5.80	0.99	1.35	0.93	1.20	1.89
St. Lucia	1.90	1.63	2.04	1.27	1.46	2.89	0.86	1.07	0.67	0.77	1.52
Bangladesh	8.67	8.92	8.09	10.37	14.18	3.74	1.03	0.93	1.20	1.64	0.43
Nepal	6.88	8.76	5.37	13.22	14.97	2.69	1.27	0.78	1.92	2.18	0.39

	Low and Lower Middle Income Countries	Low Income Countries
Geometric Mean Ratio of PPP for Men's clothing to PPP for All Consumption	1.31	1.26
Geometric Mean Ratio of PPP for Women's clothing to PPP for All Consumption	1.02	0.83
Geometric Mean Ratio of PPP for Children's clothing to PPP for All Consumption	1.26	1.30
Geometric Mean of Ratio PPP for clothing materials and accessories to PPP for All Consumption	0.65	0.63
Geometric Mean Ratio of PPP for repair and maintenance to PPP for All Consumption	0.76	0.53

* Note: Boldface denotes that a country was classified as "low income" and a normal typeface denotes that a country was classified as "lower-middle income" according to the 1990 WDR.