Unknown: The Extent, Distribution, and Trend of Global Income Poverty

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ABSTRACT: The estimates of the extent, distribution and trend of global income poverty provided in the World Bank's *World Development Reports* for 1990 and 2000/01 are neither meaningful nor reliable. The Bank uses an arbitrary international poverty line unrelated to any clear conception of what poverty is. It employs a misleading and inaccurate measure of purchasing power "equivalence" that vitiates international and intertemporal comparisons of income poverty. It extrapolates incorrectly from limited data and thereby creates an appearance of precision that masks the high probable error of its estimates. The systematic distortion introduced by these three flaws likely leads to a large understatement of the extent of global income poverty and to an incorrect inference that it has declined. A new methodology of global poverty assessment is feasible and necessary.

For some 16 years now, the World Bank ('the Bank') has regularly reported the number of people living below an international poverty line, colloquially known as '$1/day'. Reports for the most recent year, 2001, put this number at 1,089 million.[2] The Bank's estimates of

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[2] Chen and Ravallion 2004, 153

severe income poverty — its global extent, geographical distribution, and trend over time — are widely cited in official publications by governments and international organizations and in popular media, often in support of the view that liberalization and globalization have helped to reduce poverty worldwide. For instance, the former President of the World Bank has declared: "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."[3]

Most readers, including many economists, take these figures as clear-cut facts. But the method used to calculate them has serious flaws, which render the resulting estimates untrustworthy. First, the international poverty line (IPL) used by the Bank to identify the absolutely poor fails to meet elementary requirements of consistency. It does not have a common interpretation (in terms of purchasing power) across countries and years. As a result, the Bank's poverty line leads to meaningless poverty estimates, as some of those identified as poor have clearly greater command over commodities than some of those identified as non-poor. These inconsistencies are an inherent consequence of the Bank's method and cannot be eliminated without jettisoning the method altogether. Second, the Bank's poverty line is not anchored in any assessment of the basic resource requirements of

[3] James D. Wolfensohn: "Responding to the Challenges of Globalization: Remarks to the G-20 Finance Ministers and Central Governors," Ottawa, November 17, 2001. These data appear to be drawn from World Bank 2002, 8.

human beings. Third, the poverty estimates currently available are subject to massive uncertainties because of their sensitivity to the values of crucial parameters that are estimated on the basis of limited data or none at all. An alternative method of estimating global poverty is feasible and necessary.

The Bank's Method Produces Meaningless Estimates

In order to estimate global poverty, it is necessary to define a common standard according to which individuals may be identified as poor or non-poor. The Bank proposes its international poverty line (IPL) as such a common standard: People are to be counted as poor if their consumption expenditure has less *purchasing power* than some *baseline level*, defined in terms of a certain quantity of the currency of a *base country*, A, in a chosen *base year*, V. For example, the IPL employed by the Bank in its first major global poverty estimation exercise was US$1/day PPP 1985.[4] According to this standard, people are to be counted as poor if, and only if, their daily consumption expenditure has less purchasing power than $1 had in the United States in 1985.

To make its IPL applicable to other countries and years, the Bank uses a two-step procedure. First, the Bank undertakes a spatial translation. It uses the purchasing power parity conversion factors (PPPs) of base year V to convert the chosen baseline amount into the national currencies of other countries (B, C, D). In this way, the Bank determines, for each country, a national poverty line for year V which it deems equivalent to the IPL. Second, the Bank undertakes a temporal translation of the resulting year-V national poverty lines. Here the Bank calculates national poverty lines for other years (W, X, Y) by inflating
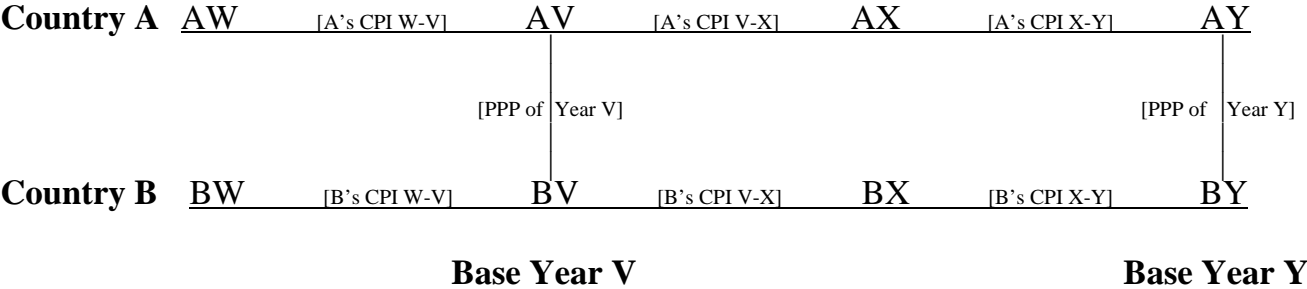
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[4] The Bank inaugurated its present methodology in World Bank 1990, with an IPL of $31/month PPP 1985. In the early 1990s, this IPL was "rounded off" to $30.42/month or $1/day PPP 1985 (Chen and Ravallion 2001, 285 n. 7).

or deflating each country's year-V national poverty line according to that country's national consumer price index (CPI). After performing these two operations, the Bank, relying on household income and consumption surveys, identifies the poor in any given year as those living below their country's national poverty line for this year.

Reversing the Bank's two-step procedure, we can think of it as a method for making currency amounts comparable across countries and years. This method allows the Bank to compare a person's income in some country B and year W ("BW amount") with a person's income in some country C and year X ("CX amount"), as follows: The BW amount is converted, *via* B's CPI, into its BV equivalent and, analogously, the CX amount is converted, *via* C's CPI, into its CV equivalent. These BV and CV amounts are then further converted, *via* PPPs of the base year V, into their AV equivalents (A being the base country and V the base year). The resulting AV amounts can then be compared with one another and also with the IPL.

Though apparently straightforward, this method generates significant problems. The main difficulty is that "equivalent" purchasing power is an incomplete concept. The critical missing question is: Equivalent purchasing power *over what commodities*? PPPs value different currencies (in the base year) according to their purchasing power over a set of commodities which are weighted in proportion to their shares in *international* consumption expenditure. Each national CPI values a country's currency in each year by assessing its purchasing power over a set of commodities which are weighted in proportion to their shares in *that country's* consumption expenditure. As shall now be shown, because national consumption patterns differ greatly from one another and from the international consumption pattern, the Bank's purchasing power comparisons are not robust with regard

to the base year chosen and the poverty estimates it derives on the basis of these comparisons are therefore meaningless.

Country A	AW	[A's CPI W-V]	AV	[A's CPI V-X]	AX	[A's CPI X-Y]	AY
			[PPP of Year V]			[PPP of Year Y]	
Country B	BW	[B's CPI W-V]	BV	[B's CPI V-X]	BX	[B's CPI X-Y]	BY

Base Year V   **Base Year Y**

Each side of the rectangle in Figure 1 represents a purchasing power ratio between amounts earned or spent in a particular year and country. The left vertical line represents the purchasing power ratio between amounts in countries A and B in year V, as determined by the relevant PPP in the base year V. Analogously, the right vertical line represents the purchasing power ratio between amounts in countries A and B in year Y, as determined by the relevant PPP in alternative base year Y. The top horizontal line represents the purchasing power ratio between amounts in country A in years V and Y, as determined by the change in A's CPI between the two years. Analogously, the bottom horizontal line represents the purchasing power ratio between amounts in years V and Y in country B, as determined by the change in B's CPI during the V-Y period. If these four ratios were consistent, it would be possible to derive any one ratio from the other three. This is not possible, however, because the four ratios compare purchasing power with regard to four sets of commodities which differ in their composition: The calculated PPP ratios compare purchasing power relative to sets of commodities that reflect the composition of international consumption in years V and Y. The calculated CPI ratios compare purchasing
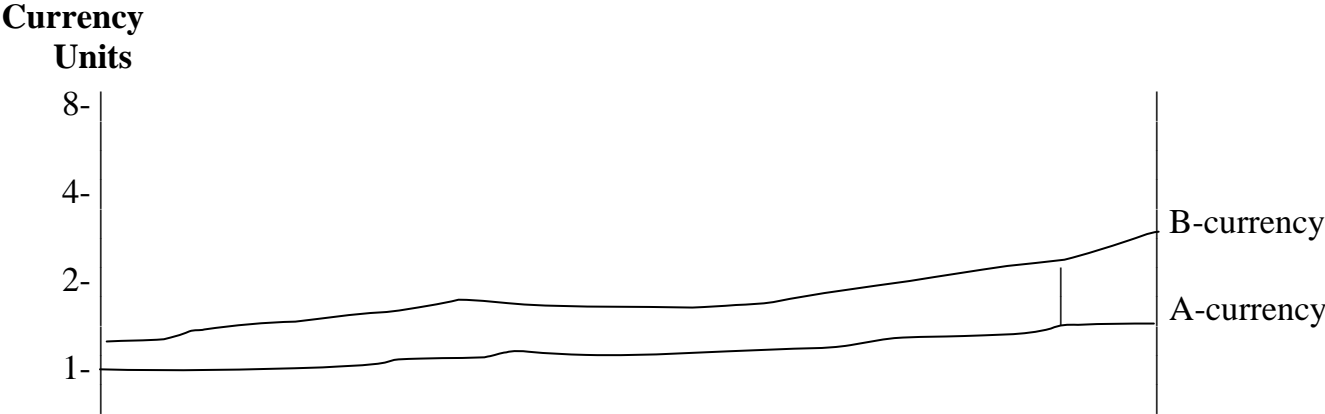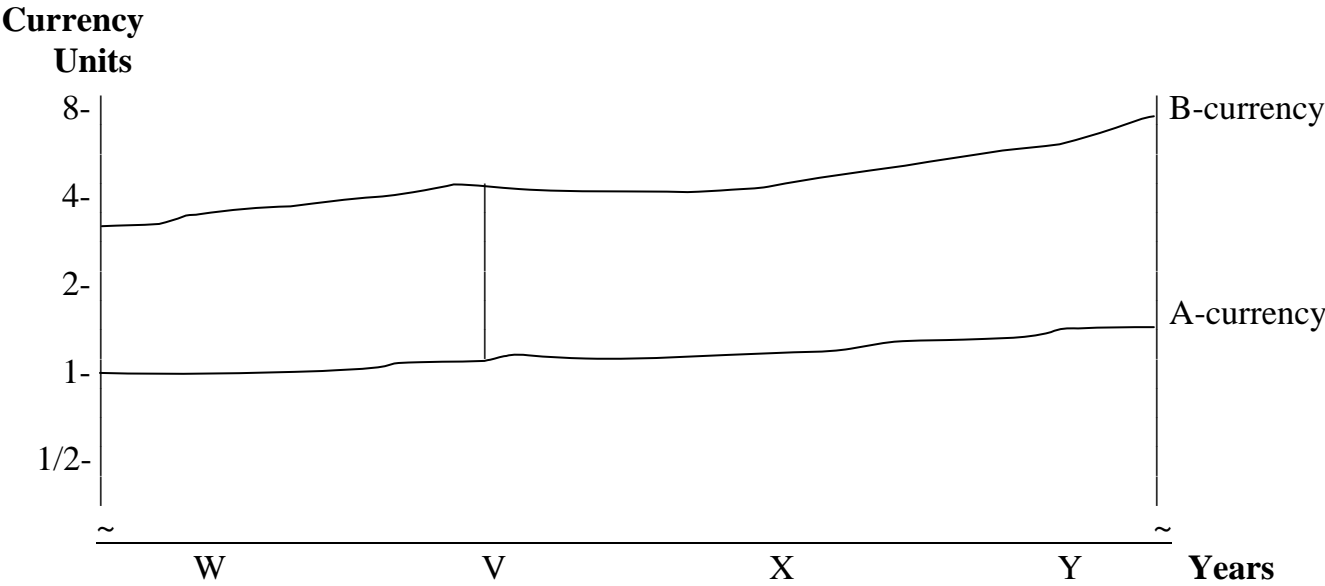
power relative to sets of commodities that reflect the composition of national consumption in countries A and B.

One may think that the problem of inconsistent ratios can be avoided by using PPPs from a single base year alone, so that only one spatial comparison of purchasing power is ever involved. In fact, this is what the Bank does (within any one application of its method). This hides the problem, but cannot solve it. For the fact remains that all the results the Bank reaches — about the levels of the national poverty lines as well as about national, regional, and global poverty rates and poverty trends — are greatly influenced by the Bank's arbitrary choice of PPP base year, which is completely irrelevant to anyone's standard of living.

In the following diagrams, each curve represents one country's CPI (denominated in this country's currency), that is, nominal amounts in successive years that are deemed equivalent to one another in purchasing power. Curves rising toward the right reflect currency inflation: Ever more currency units must be earned in successive years for an income to maintain its purchasing power over commodities whose prices are rising.

With *one* curve, representing changes in the purchasing power of one country's currency only, its vertical position does not matter to identifying the percentage changes in income that are necessary to maintain a fixed level of purchasing power. To represent purchasing power equivalence across different countries, however, the curves corresponding to different countries' currencies must be placed at the correct vertical distance from one another. The Bank uses PPPs to fix such vertical distances. Comparison of the following pair of hypothetical diagrams illustrates how the vertical distance between curves can be affected by the choice of base year (whose PPPs are used to fix this distance). In the illustration, using Y rather than V as the base year has the effect of lowering B's national

poverty line relative to A's national poverty line for all years and must therefore either lower B's poverty headcount or raise A's poverty headcount or both. It follows that estimates of how much poverty there is in country A as compared to country B will vary substantially depending on the base year in which the Bank's IPL is defined. Moreover, estimates of poverty for *the same year and country* vary substantially depending on the base year in which the Bank's IPL is defined. It is easy to see this by thinking of country A in the diagrams below as the base country in the currency of which the IPL is defined.

Currency Units

Currency Units

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1/2 ⌐|                                        |⌐
    |                                        |
 ~  └────────────────────────────────────────┘ ~
         W           V           X           Y      **Years**
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The poverty estimates that the Bank's method generates when applied with one PPP base year are inconsistent with those it generates when applied with another. This suffices to discredit the method even when it is always applied with the same base year. Even then, it is still true that the estimates generated by the method are improperly influenced by the base year chosen.

As it happens, the Bank has, in the year 2000, revised its IPL from $1/day PPP 1985 to $1.08 PPP 1993. Marketing its new IPL under the same old '$1/day' label, the Bank downplays the significance of the revision and pretends that it has merely "updated" rather than redefined its IPL.[5] By examining the Bank's recalculated national poverty lines and poverty estimates, we can learn *how* sensitive the Bank's poverty estimates are to its choice of PPP base year.

Consider, for example, the Bank's poverty estimates for Nigeria and Mauritania. Using 1985 PPPs to convert $1/day into their two currencies, and updating the resulting national poverty lines *via* each country's CPI, the Bank calculated 1993 national poverty lines of 8.68 Naira for Nigeria and 93.28 Ougulya for Mauritania. But these two national poverty lines turn out to be dramatically inconsistent with calculated 1993 PPPs, according to which 10 Naira have the same purchasing power as 29.39 Ougulya.[6] Thus, if 1993 is used

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[5] World Bank 2000, 17, where the new IPL is unveiled. It is given as $1.08 PPP 1993, although it is actually defined, nearly ½ a cent lower, as $32.74/month PPP 1993 (Chen and Ravallion 2001, 285).

[6] Reddy and Pogge 2007, Table 5.

as the PPP base year in defining an IPL *at whatever level*, then the Nigerian poverty line is over three times higher relative to the Mauritanian poverty line (than would be the case for any IPL defined with 1985 as PPP base year). Given the level chosen for the new IPL ($1.08/day), its introduction had the effect of raising Nigerian poverty lines for all years by 42% and of lowering Mauritanian poverty lines for all years by 61%.[7] Discrepancies of this kind, of varying magnitudes, can be found across all pairs of countries.

The effect of these revisions in national poverty lines on reported national poverty rates and headcounts is even more dramatic. 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 dramatically discrepant poverty rates for Nigeria and Mauritania of 70.2% and 3.8% respectively.[8]

The choice of base year also has a substantial impact on the reported regional distribution of poverty. For instance: In 1999, applying its method with the old IPL, the Bank reported that in 1993 Sub-Saharan Africa and Latin America had poverty rates of 39.1% and 23.5%,

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[7] *Ibid*.

[8] It is true that new survey data had become available in the interim. Still, the revision of the two countries' poverty lines clearly had a huge impact on their estimated poverty rates. And cases where the very same survey data were used tell a similar story: The Bank's IPL revision raised Turkmenistan's poverty rate from 4.9% to 20.9%, for example, while lowering South Africa's from 23.7% to 11.5%. *Cf*. Reddy and Pogge 2007, Tables 2 and 3, for how the Bank's poverty rate estimates have changed for these and many other countries. Our tables are based on comparing Table 4 in World Bank 1999, 236-37, which still provides national poverty estimates based on the old IPL, with Table 4 in World Bank 2000, 280-81, which provides national poverty estimates based on the new IPL.

respectively.[9] In 2000, applying its method with the new IPL, the Bank reported that these same regions in the same year (1993) had poverty rates of 49.7% and 15.3%, respectively.[10]

How does the Bank's switch of PPP base year affect reported *global* poverty rates and poverty trends? Dismissing the objection that the IPL redefinition has reduced US poverty lines for all years by 20%, Chen and Ravallion contend: "Arguably a better way to compare the two poverty lines is to compare the implied aggregate poverty rates for the same year."[11] They do this for 1993 and conclude that the two global poverty rates are "approximately the same."[12] This is not exactly true (as we show in the next section). But it could have been made true by setting the new IPL at exactly the right (higher) baseline level. By setting the new IPL (defined in terms of a different PPP base year) at just the right level, it is always possible to replicate any *one* poverty estimate made on the basis of the old IPL — the poverty rate in Nigeria, Mauritania, Latin America, Sub-Saharan Africa, or the world. But it is generally not possible to replicate more than one, let alone all, of these.

Even if the Bank had set the new IPL so that it yields exactly the same 1993 global poverty count as the old IPL did, this coincidence could not last. The choice of PPP base year is bound to affect the global poverty trend, for two reasons. First, the level of each country's poverty line affects not merely its national headcount but also the rate at which this headcount changes over time. Second, the levels of the national poverty lines relative to one another affect each country's share in the global poverty count and hence its weight in the global poverty trend estimate. Since national poverty headcounts evolve differently in

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[9] World Bank 1999, 25, and Ravallion and Chen 1997, Table 5.

[10] World Bank 2000, 23, and Chen and Ravallion 2000, Table 2.

[11] Chen and Ravallion 2001, 288.

[12] Ibid., 290.

different countries (falling in some, rising in others), variations in countries' weights affect the rate of change of the global poverty count.

The significance of these factors is illustrated by the Bank's reporting on how the global poverty headcount index has developed during the 1987-93 period: Measured against the old IPL, this index has declined by 4.23%.[13] Measured against the new IPL, this index has declined by 0.57%.[14] Clearly then, the Bank's reported global poverty trend, as well, is heavily influenced by a factor that has absolutely nothing to do with poverty in the real world: by the Bank's choice of PPP base year.

While the Bank has so far used only 1985 and 1993 as PPP base years, there are many other years one could use, consistent with the Bank's method, for comparing currency amounts across countries. Such exercises differ dramatically in how they rank the incomes of persons in different countries. We do not know how all these applications of the Bank's method would differ in their conclusions about the trend and geographical distribution of severe poverty worldwide. But the examination of just two applications of this method suffices to show that the estimates derived through this method are *highly* sensitive to the arbitrary choice of PPP base year.

This dependence of poverty estimates on the PPP base year in terms of which the IPL is anchored goes well beyond the accustomed dependence of economic statistics on the base year in reference to which they are defined. The discrepancies between the estimates yielded by two applications of the Bank's method are so large as to render this method

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[13] From 30.7% to 29.4% (Ravallion and Chen 1997, Table 5). The global poverty headcount index is the number of human beings living below a given IPL divided by the number of persons living in the developing countries.

[14] From 28.31% to 28.15% (Chen and Ravallion 2000, Table 2; World Bank 2000, 23). One could easily generate an even greater diversity of 1987-93 poverty trend estimates by applying the Bank's method with yet further PPP base years (other than 1985 and 1993).

unacceptable — even more so because, as we discuss in the final section, a reliable alternative method is available.

The Bank's "Updating" Has Lowered Poverty Headcounts

Although the Bank's two IPLs are strictly incommensurable, one can still ask how the Bank's redefinition has affected the figures it reports. Examining all 92 countries for which data are publicly available, we find that the redefinition has lowered national poverty lines in 77 countries, containing 82% of the total population of the 92 countries, and raised national poverty lines in only 15 countries.[15] While no redefinition of the IPL (in terms of 1993 PPP dollars) could have yielded, for all or even for most countries, national poverty lines that match, even roughly, the national poverty lines yielded by the old ($1/day PPP 1985) IPL, the choice of a different value, higher than $1.08/day, for the new IPL could have achieved a more even balance between countries in which the new IPL is higher and those in which it is lower than the old one.[16] As the Bank's researchers admit: "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."[17] So the redefinition has reduced the 1993 global poverty count by 4.25% or 58 million. This is rather a substantial achievement compared to the reported *actual* reduction in the number of very poor people: Over the entire 1987-2001 period, the number of persons living on less

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[15] Reddy and Pogge 2007, Table 5.

[16] *Cf*. Reddy and Pogge 2007, Tables 2 and 3.

[17] Chen and Ravallion 2001, 290. Expressing the global poverty headcount index, these percentages refer to the total number of persons in the developing countries, which in 1993 was 4,633 million. The 28.2% figure is rounded up from the 28.15% cited in note 14 above.

than $1.08/day PPP 1993 reportedly declined by only 7% or 82.2 million: from 1171.2 to 1089.0 million.[18]

This lowering of the global poverty count through redefinition of the IPL might not matter if everyone understood that the two lines are strictly incommensurable. However, the media and general public cannot be expected to understand this so long as the Bank uses the same '$1/day' label for both lines. Even the Bank's president is prone to mix lines: His statement[19] that the number of poor has declined by 200 million in the 1980-2001 period is based on comparing the 1980 global headcount relative to an old IPL with the 2001 global headcount relative to $1.08 PPP 1993. In making this statement, Wolfensohn relied on World Bank 2002, where the global income poverty count is charted all the way back to 1820![20]

Any "Updating" of the Bank's IPL is Likely to Lower Poverty Headcounts

Since periodic adjustment of the base year (by reference to which an IPL is defined and purchasing power parity conversions are made) is a standard feature of the Bank's procedure, it is important to note that such adjustments are likely to introduce a systematic bias toward painting too rosy a picture of poverty trends. Adjustment of the base year reduces reported poverty headcounts insofar as international consumption is shifting toward commodities (such as services) that are very much cheaper in poor than in rich countries, and away from commodities (such as food) that are not much cheaper in poor than in rich countries. There is evidence that in recent years the share of food in consumption has decreased in a wide variety of rich and poor countries (in keeping with the relationship

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[18] Chen and Ravallion 2004, 153.

[19] Referenced in note 3 above.

[20] World Bank 2002, 8.

widely known as Engel's Law) and the share of services in consumption has increased. As the international consumption pattern shifts in this way, commodities that are very much cheaper in poor than in rich countries are given more and more weight in the calculation of general-consumption PPPs. Using such PPPs to assess the incomes or consumption expenditures of very poor people thus becomes *increasingly* distorting. The distortion arises from the fact that, no matter how much the share of basic necessities in international consumption may diminish, a poor household must still focus virtually all its expenditure on such necessities. The apparent rise in the reported purchasing power of poor households due to an international consumption shift toward services can mask the fact that such households have not gained greater access to the goods they most require.

To see the potential effect of this distortion, consider a simple hypothetical example: a world with two countries, one poor, the other rich, say India and the US. There are two commodities: food, which is somewhat cheaper (at market exchange rates) in India, and services, which are vastly cheaper (at market exchange rates) in India than in the US. Assume that two poverty assessments, involving different PPP base years, are undertaken. In particular, suppose that the IPL has been defined as $1/day in the earlier base year. Suppose further that rising general affluence has shifted international consumption away from items with higher relative prices in India (food) toward items with lower relative prices in India (services) in the period between the two base years. The calculation of the general-consumption PPP in the later base year will then be more influenced by the prices of services, and less influenced by food prices, than was the calculation of the general-consumption PPP in the earlier base year. Assuming that all prices in both countries remain constant, the shift in the pattern of international consumption causes the new general-consumption PPP to be lower than the old (8 rather than 10 Rupees per Dollar, say). How could the IPL be "updated" in this scenario? Maintaining the poverty line at $1.00/day PPP

would preserve the US poverty line but lower the Indian poverty line from Rs.10/day to Rs.8/day. Revising to $1.25/day PPP would preserve the Indian poverty line at Rs.10/day but increase the US poverty line by 25%. Any upward revision of the IPL by less than 25% raises the US poverty line and lowers the Indian one. Any such redefinition amounts to telling poor Indians that their opportunity to buy services very cheaply has become more valuable thanks to the increased share of services in international consumption expenditure. The Indian poor can plausibly reply that the international shift toward consumption of services is quite irrelevant to them, as they are still compelled to concentrate their expenditure on the basic necessities (such as food) they need to survive.

This distortion arising from the Bank's "updating" of its IPL can have the effect of improving the appearance of the long-term global poverty trend. Where trend estimates inappropriately compare poverty headcounts based on distinct IPLs (defined in terms of earlier and later PPP base years) the effect of the distortion is clearly to produce a more favorable estimate of the poverty trend than would otherwise result: As successive IPLs correspond to ever lower Indian national poverty lines, more and more Indians will be counted as non-poor even if all incomes and prices in India remain the same.

Where trend estimates invoke poverty headcounts based on a single IPL, the year in which this IPL is defined influences the estimate of the trend (just as it influences estimates of the extent of global poverty in a given year). Given the biases just described, an IPL defined in terms of a later PPP base year will tend to be associated with lower PPPs (poor-country currency units per US dollar) and hence with lower poor-country poverty lines and lower poor-country poverty headcounts for all years.[21] The impact of this effect on global poverty

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[21] The IPL used by the Bank is itself endogenous, and varies with the PPPs used. However, as discussed above (text at note 15), the evidence from the most recent redefinition suggests that it lowered national poverty lines in most countries.

trend estimates depends on how this trend varies with the level of national poverty lines. In recent years, it appears that the trend in the global poverty count has been more favorable at lower levels of the IPL.[22] If this is any indication, then the effect of "updating" the IPL may well have been to create a more favorable picture of the global poverty trend than would have resulted from maintaining the old line defined in terms of an earlier base year. Evidence for this conjecture is provided by the fact that the trend reported by the Bank in the last report in which it used the old ($1/day PPP 1985) IPL was unfavorable, in sharp contrast to the trend reported for a closely similar period using its new IPL. Over the 1987-99 period, the number of persons living on less than $1.08/day PPP 1993 reportedly declined by 75.5 million: from 1171.2 to 1095.7 million.[23] In contrast, estimates produced by the Bank using the old ($1/day PPP 1985) IPL led to the conclusion that, "the absolute number of those living on $1 per day or less continues to increase. The worldwide total rose from 1.2 billion in 1987 to 1.5 billion today."[24]

The Bank's Method Tends to Overstate the Purchasing Power of the Poor in Relation to the Commodities They Need

Price ratios between rich and poor countries vary widely across commodities. For goods easily traded across borders, prices compared at market exchange rates are about the same in rich and poor countries. For goods and services not easily traded across borders, prices compared at market exchange rates can be fifty times higher in rich countries than in poor

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[22] Cf. text at note 30 below.

[23] Chen and Ravallion 2004, 153.

[24] World Bank 1999, 25. The word "today" may refer to 1999 rather than to 1998. Still, this minor variation cannot possibly account for the huge discrepancy between this trend estimate, based on the old IPL, and the trend estimate referenced in note 18 above, which is based on the new poverty line. — It should be noted, however, that the conjecture does not hold for 1987-93: For this much shorter period, the trend relative to the new IPL looks *worse* than the trend relative to the old IPL. Cf. text at notes 13 and 14 above.

ones. 'Broad-gauge' general-consumption PPPs of the kind used by the Bank average out these price ratios in a way that, roughly speaking, weights each commodity in proportion to its share in international consumption expenditure.

The use of such PPPs is quite inappropriate for poverty assessment and severely distorts the resulting poverty estimates. To illustrate, consider once more our simple two-country world. Suppose, not unrealistically, that $1 buys about three times as much food in the US as Rs.10 buy in India and also that Rs.10 buy about three times as much services in India as $1 buys in the US. If food and services have equal shares in international consumption expenditure, conventional methods of calculating PPPs will then equate the purchasing power of Rs.10 with that of $1. This may be fair enough guidance for assessing average incomes in the two countries. But not for assessing very low incomes: Poor Indians' disadvantage of lesser command over basic foodstuffs is not compensated by their advantage of greater command over services. Even if richer persons spend much of their income on maids, drivers, haircuts, etc., the poor do not, and cannot, do so. They must concentrate what little income they have on basic necessities. The calculated PPP (Rs.10 per $1) thus grossly overstates the true value of their incomes.

Very low incomes should therefore be assessed by relating them *not* to the prices of *all* goods and services, but *only* to the prices of those commodities they must consume to meet their basic needs. This would ensure that the IPL is meaningfully related to the circumstances under which people actually live. Under the Bank's procedure, by contrast, people living at the IPL may differ greatly in their command over basic necessities.

We do not currently possess all of the data needed to estimate poverty worldwide in this more sensible way, although it should be possible in the future to collect it. The data we do have suggest how global poverty estimates would be different if a more credible procedure

were used. Existing data about the prices of foodstuffs and, more specifically, of staple

bread and cereals, show that these items (a large part of the consumption requirements of

the poor) cost far more in poor countries than general-consumption PPPs suggest. The same

is true for many basic necessities other than food.[25] It is very likely that the Bank, were it to

use PPPs more closely related to the needs of the poor, would translate its $1/day standard

into substantially higher national poverty lines for most poor countries.

How much higher would these national poverty lines be? If prices of foods, or more

specifically of breads and cereals, rather than prices of all commodities had been used to

convert the Bank's existing IPLs, then poor-country poverty lines would likely be some 30-

40% higher on average,[26] which would raise the estimated global incidence of severe

income poverty substantially. For a small number of countries for which we were able to

make estimates, we found that increases in national poverty lines by 30-40% entail

increases in poverty headcounts of a similar magnitude.[27]

The Bank Sets its IPLs at an Arbitrarily Low Level

The question of whether the Bank's IPLs have an interpretation in terms of the resources

needed by human beings to achieve elementary capabilities, to meet their basic needs, may

also be approached in another way. If the PPP conversion factors employed by the Bank

correctly captured the currency amounts necessary in different countries to possess

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[25] Data from International Comparison Program benchmark surveys on http://pwt.econ.upenn.edu.

[26] Reddy and Pogge 2007. See especially Tables 6A and 6B, giving population-weighted geometric means of this ratio for all poor countries for which data were available. If all-food PPPs are used in lieu of general-consumption PPPs to convert $1 PPP 1985 into national currencies, national poverty lines of poor countries increase by 40% on average. Using bread-and-cereals PPPs to convert $1 PPP 1985, the average increase is 34%. Using all-food PPPs to convert $1.08 PPP 1993, the average increase is 31%. Using bread-and-cereals PPPs to convert $1.08 PPP 1993, the average increase is 40%.

[27] Ibid., Table 10.

equivalent purchasing power, then the IPL would have such an interpretation in poor countries only if it had such an interpretation in the US. Does it?

One way to investigate this question is to ask what is the cost of achieving a particular elementary requirement of human life (for example, the ability to be adequately nourished) in the US. 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. 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 a female ages 20 to 50, and two children ages 6 to 8 and 9 to 11.[28] According to the Bank's IPLs, by contrast, this reference family needed in 1999 only $43.35 ($1/day PPP 1985) or $34.72 ($1.08/day PPP 1993) to avoid poverty, that is, to meet *all* its basic requirements — not only for food, but also for clothing, shelter, and minimal health care. Even if we allow that the USDA has taken a generous view of what it takes to be adequately nourished, it is clear that the Bank's IPLs are too low to reflect even the basic nutritional requirements of human beings — let alone all their basic requirements.

It is obvious that, were the Bank to set its IPL at an appropriately higher level, it would arrive at a much higher global poverty count. It is less obvious, but true, that the Bank

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[28] USDA 1999, ES-1. 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 US. 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 was $2.736 (1963), or $0.684 (1963) per person. Adjusting this figure by the US CPI results in an estimate of $2.41 (1985) or $3.23 (1993) per person (www.bls.gov/cpi/home.htm). Cf. Schiller, 2001.

would then also be likely to calculate much worse poverty trends.[29] Using its $1.08/day PPP 1993 IPL, the Bank calculates that the number of poor worldwide has fallen from 1171.2 million in 1987 to 1089.0 million in 2001. Relative to a more appropriate doubled IPL of $2.15/day PPP 1993, however, the number of poor worldwide has, by the Bank's own estimate, *increased* from 2477.5 million in 1987 to 2735.4 million in 2001.[30] Note that a 1999 US reference family living at this doubled IPL would still have only $69.44 per week — well below the $98.40 the USDA says such a family needs for food alone.

The Data to Which the Bank Applies its Method are a Further Source of Massive Uncertainties

The general-consumption PPPs currently in use are based on limited and highly questionable evidence. A large number of countries containing poor people — including China and India, which contain the largest number of the world's poor — have not participated at all in recent "benchmark" price surveys of the International Comparison Program. As a result, a massive element of guesswork and gap-filling underlies current poverty estimates.[31] The current estimates of PPPs for China that are considered to be plausible differ by a factor of two.[32] Shifts in China's poverty line resulting from the

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[29] At the least, this is true if the other aspects of the Bank's method are left unchanged. If they are modified (as we argue they ought to be) very different and as yet unknown conclusions may result.

[30] Chen and Ravallion 2004, 153.

[31] One important factor is the role of questionable "regression" exercises, which are used to estimate PPPs for countries that did not participate in benchmark price surveys. Although the R^2 in such regressions is often high, the estimates for individual countries are often unstable and subject to considerable fluctuations depending on what specification of the regression equation is used. See Ahmad, S. (1992) for a description. A second important factor is that PPPs are currently generated by linking across regions estimates of the relative price levels of the different countries within each region. This is done through "link countries" that participate in price surveys in more than one region. The choice of link country is likely to have a substantial influence on calculated PPPs.

[32] For details about these various estimates, see Reddy and Pogge 2007 section 4.1.

adoption of alternative PPPs would entail massive variations in the global poverty count. India has not participated in a benchmark survey since 1985. As observers of India are well aware, there are likely to have been significant changes in its internal price structure since then. Consequently, current estimates of India's poverty headcount are subject to substantial uncertainties.

While the Bank reports global poverty counts with five-digit, even six-digit precision, suggesting possible errors of a few thousand at most, the data used in producing these estimates (PPPs in particular) are subject to vast uncertainties. This fact sharply undermines any claim to precision, and should be more fully acknowledged.

In addition to these reasons why the Bank's estimates of the extent of poverty are uncertain, there are additional reasons to believe that poverty trends in particular are uncertain, and that they may currently be represented in an overly favorable manner: When the Bank lacks up-to-date data about the distribution of consumption expenditure in a country, it assumes that the distribution is unchanged. In particular, the Bank assumes that the consumption of all individuals has grown in proportion with the rate of growth of consumption in the national income and product accounts. There are several reasons to doubt the validity of this procedure. First, it is well known that in recent years income inequality has risen in many countries, again including China and India.[33] It may thus be overly optimistic to assume that the consumption of the poor has grown in tandem with mean consumption in their country. Second, as argued powerfully by Deaton (2003), the measure of consumption in the national income and product accounts is a broad one and is likely to reflect growth in forms of consumption that have little significance for the poor.

Conclusion: There is a Feasible Alternative

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[33] See for example Reddy and Minoiu 2005.

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Data about income poverty are of great importance for the design and evaluation of policies, agencies, and social institutions. To be sure, there are other important sources of information about people's standard of living: data about their health status and educational attainments and about mortality and morbidity, for example. Such data do and should inform overall judgments concerning the extent, distribution, and trend of poverty in the world. Income poverty data are nevertheless an essential part of the picture.

Despite the Bank's substantial efforts, we do not yet know with any reasonable degree of confidence how many income-poor people there are in the world, how poor they are, where they live, and how their number has changed over time. If we are to monitor progress against absolute income poverty, as the first of the Millennium Development Goals requires, then this gap must urgently be filled.

Fortunately, the serious flaws in the Bank's method have a common root and are avoidable through one straightforward innovation: The definition of severe income poverty must be more appropriately focused on what being poor consists in: on what people generally need to achieve a set of elementary capabilities, rather than on arbitrary dollar amounts. This would give the IPL a clear and plausible meaning: those living below it lack the resources they need to satisfy the most basic requirements of human beings.

In a global poverty monitoring exercise, it may be desirable to specify at the global level — through a transparent and widely consultative process — not only these income-dependent elementary human capabilities, but also the characteristics of the commodities typically needed to achieve them. For instance, the basic requirement of being adequately nourished can be met by consuming commodities containing calories and essential nutrients. The income persons need to avoid poverty at some particular time and place can then be specified in terms of the least expensive locally available set of commodities containing the

relevant characteristics needed to achieve the income-dependent elementary capabilities, while respecting the role of factors beyond the immediate control of persons (such as specificities of culture or natural environment) that ought to be taken into account.

A fixed set of elementary human capabilities can also provide a uniform standard for adjusting national poverty lines over time so as to reflect changing prices of the basic necessities needed to achieve the elementary capabilities. Such adjustments should be made by national committees, acting with the goal of developing national poverty lines that are consistent with the global standard adopted. There will be no need for a definition (let alone periodic redefinitions) of an IPL expressed in monetary terms, if this common standard — invariant across countries and years — is adopted. A uniform standard will allow the world to have confidence that the concept of poverty used in estimating the number of the world's poor *means* something — and means the *same* thing regardless of where and when they live.

The advancement of the approach to improving global poverty estimates that we advocate can simultaneously serve (and be served by) a second effort — that of improving poverty estimates at the national level. Our favored approach requires nothing more than the adoption of common methods for setting poverty lines and for generating poverty estimates in countries around the world. The common application of such improved methods can simultaneously strengthen national poverty estimates and make them suitable for comparisons and aggregations. National poverty estimates that can be compared and aggregated can in turn be used to produce regional and global poverty estimates.

It is necessary to strengthen the data and methodology of poverty assessment within countries if more meaningful global poverty estimates are to be created. It is notable that such efforts have been lacking, although they are feasible. An example of what is possible

is given by the diffusion throughout the world of a common system of national income and product accounting through the involvement of the United Nations[34] — an achievement once thought highly improbable. Although the development of a credible system of global poverty monitoring will require time and resources, these costs are small compared to the potential costs of continued ignorance. Without an effort to develop such a system, it will be difficult to accept that the agencies charged with monitoring global income poverty are serious about the task.

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[34] "Post adjustment" data concerning the cost of maintaining a similar standard of living in different cities across the world are readily available and widely used by international agencies and multinational corporations (see e.g. Ahmad 1992 and www.un.org/Depts/icsc/cold/pubs/index.htm). That such data are being collected suggests that it is entirely feasible similarly to estimate the cost of achieving elementary human requirements.

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