

# More Relatively-Poor People in a Less Absolutely-Poor World

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## Abstract

Relative deprivation, shame and social exclusion can matter to the welfare of people everywhere. The authors argue that such social effects on welfare call for a reconsideration of how we assess global poverty, but they do not support standard measures of relative poverty. The paper argues instead for using a weakly-relative measure as the upper-bound complement to the lower-bound provided by a standard absolute measure. New estimates of global poverty are presented, drawing on 850 household surveys spanning 125 countries over 1981–2008. The absolute line is \$1.25 a day at 2005

prices, while the relative line rises with the mean, at a gradient of 1:2 above \$1.25 a day. The authors show that these parameter choices are consistent with cross-country data on national poverty lines. The results indicate that the incidence of both absolute and weakly-relative poverty in the developing world has been falling since the 1990s, but more slowly for the relative measure. While the number of absolutely poor has fallen, the number of relatively poor has changed little since the 1990s, and is higher in 2008 than 1981.

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## 1. Introduction

One of the oldest debates on poverty concerns whether it is “absolute” or “relative.” The idea of relative poverty has long dominated measurement practice in Western Europe. The poverty line is set at a constant proportion—one half is common—of the country or year-specific mean (or median) income.<sup>2</sup> By contrast, absolute poverty lines have dominated past practice in some rich countries (including the US) and in most developing countries. By this view, the poverty line is intended to have constant real value. An example is the World Bank’s international line of \$1.25 a day at 2005 purchasing power parity (Ravallion et al., 2008).

There are two ways we can interpret this difference. One can think of a poverty line as the money metric of an underlying concept of welfare. While not observed, the poverty line in the welfare space can be thought of as a social norm, which may well vary from one setting to another. The poverty measure in any given setting will only have salience and be accepted if it accords reasonably well with prevailing ideas of what “poverty” means in that setting.<sup>3</sup> We can expect norms to differ between a rich society and a poor one, and evolve over time in growing economies. In this sense “poverty is relative.” However, using a lower real poverty line in poorer countries will not then be welfare consistent, in that two people judged to have the same welfare can be treated differently depending on where or when they live. Reasoning along these lines has motivated the past emphasis on measuring absolute poverty using a common real poverty line.

There is a second, very different, interpretation of why richer countries have higher poverty lines. The absolute approach implicitly sees welfare as depending on “own consumption,” though often with allowances for differing needs, depending on (say) household size or demographic composition.<sup>4</sup> By this view, the setting in which a person lives is irrelevant to whether that person is deemed to be poor or not, once one knows the person’s own consumption level. By contrast, a relative line is implied by the presence of certain social determinants of welfare, which naturally vary with the context. Relative lines are seen to reflect

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<sup>2</sup> See, for example, Smeeding et al. (1990), Atkinson (1998), Eurostat (2005), Nolan (2007) and OECD (2008, Chapter 5).

<sup>3</sup> This can be formalized in the idea of a social subjective poverty line, which postulates that in any given society there is a level of consumption below which people typically think they are poor, but above which they do not. For an overview of this approach and antecedents in the literature see Ravallion (2012a).

<sup>4</sup> The poverty lines are typically anchored to the nutritional requirements for good health and normal activities. Of course, the use of absolute lines within developing countries does not mean that different developing countries use the same line. Even if there are no differences in the normative nutritional requirements, there are infinitely many food bundles that can attain any given nutritional intake.

welfare effects of relative deprivation—that comparing two people at the same real income the one living in the richer country will feel worse off—and costs of social inclusion, namely the extra expenditures deemed necessary for participation in a rich society as compared to a poor one, including the spending needed to avoid shame. By this second interpretation, poverty comparisons can still be interpreted as absolute in the space of welfare, but (given the social effects) an absolute line in the welfare space requires a relative line in terms of consumption.<sup>5</sup>

So we can identify two quite different reasons why poverty lines might vary systematically with the average consumption or income of a society. One reason says that there is a common underlying poverty level of welfare, but that the level of consumption needed to attain it varies, stemming from social effects. The other reason does not require such effects, but rather postulates that social norms vary, implying different reference levels of welfare. Furthermore, the choice between these two interpretations matters to whether one favours relative lines over absolute lines. If one thinks that it is really only social norms that differ, with welfare depending solely on own consumption, then one would probably prefer an absolute measure, imposing a common norm (though one would presumably also be drawn to consider more than one possible line). However, if one is convinced that there are social effects on welfare then one would be more inclined to use a relative line in the consumption or income space, anchored to a common welfare standard.

The problem for global poverty comparisons is that we do not know which of these two interpretations—differing social norms or social effects on welfare—is right. And we may never resolve the matter from conventional empirical evidence.<sup>6</sup> This uncertainty makes it compelling to consider both approaches when measuring global poverty.

How then might we devise a reasonable global measure of relative poverty, alongside prevailing absolute measures? Past arguments for relative poverty measures do not provide a compelling starting point. Setting the poverty line as a constant proportion of the current mean implies that poverty depends solely on relative distribution. If all incomes were to increase by the same proportion then the measure of poverty would be unchanged. Thus relative poverty will behave more like an inequality measure than a measure of absolute poverty. However, this property of standard measures of relative poverty requires implausible assumptions, namely that

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<sup>5</sup> For further discussion see Ravallion (2008b). An influential early version of this argument is Sen (1983).

<sup>6</sup> There have been many claims about the existence of various social effects on subjective welfare responses, though problems remain in credibly identifying such effects, as discussed further in Ravallion (2012a).

people are concerned solely with relative deprivation and/or that the costs of social inclusion can fall to nearly zero in the poorest places (Ravallion and Chen, 2011).

Relaxing these assumptions one obtains the “weakly relative” class of measures proposed by Ravallion and Chen (2011). This generalizes the measures proposed by Atkinson and Bourguignon (2001) to allow for a positive lower bound to the costs of social inclusion. Our weakly relative poverty measures entail that the poverty line only rises with the mean above some critical value and it then does so with an elasticity less than one. Then a process of distribution-neutral growth will reduce the incidence of weakly relative poverty. The absolute measure is only obtained as a special case for sufficiently poor countries.

An obvious place to look for identifying the parameters of a schedule of weakly relative poverty lines is the set of national poverty lines found across developing countries. Naturally these vary; there are undoubtedly many idiosyncratic factors in how poverty lines are set at country level. What is striking, however, is that national poverty lines amongst developing countries show a systematic non-negative relationship with the average consumption of a country, as first noted by Ravallion et al. (1991). We can call this the “relativist gradient.” Weakly relative measures are consistent with the relativist gradient, as shown by Ravallion and Chen (2011). They are also consistent with micro evidence on subjective perceptions of welfare in developing countries (Ravallion and Lokshin, 2010; Ravallion, 2012a).

Weak relativity is also suggested by the recent signs that the idea of what “poverty” means in developing countries is changing. Rising average livings standards appear to be coming with a re-evaluation of what level of living is tolerable to not be considered “poor.” Though the process of revising poverty lines is fraught with political perils and resistance, a number of growing developing countries have revised the real value of their lines upwards.<sup>7</sup> We do not need to think that this reflects a higher welfare threshold—it may instead be that a higher income is deemed necessary to attain the same level of welfare.

To reflect this uncertainty as to whether an absolute line in the welfare space implies an absolute or a relative line in terms of real income, this paper proposes a bounded (rather than point) estimator of global poverty. At the lower bound, there is presumed to be zero social effect

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<sup>7</sup> For example, China’s official poverty line of around \$0.90 per person per day came to be seen as largely irrelevant to modern-day China. In response, in 2011, the government doubled the official line to about \$1.80 a day. Another example is India, where the official poverty line was recently increased from about \$1.00 a day to \$1.20. An upward revision is also underway in Vietnam. Of course, the use of a higher line does not change the normative case for giving priority to the poorest.

on welfare and the relativist gradient is attributed entirely to social norms. At the upper bound, the relativist gradient is due entirely to social effects, and an absolute welfare comparison calls for a weakly relative poverty line.

The paper provides a new schedule of weakly relative lines that anchors the relative lines to the means from the same surveys used to measure poverty. This is more consistent with past practice in measuring relative poverty than the method used in Ravallion and Chen (2011). It also means that we are better able to use sub-national data; for example, we can allow for a relative line that is higher in urban areas than rural areas. Second, the paper implements both this approach and the absolute approach on a larger data set than has been used before, adding results from almost 200 household surveys to bring our data base up to 850 surveys, spanning 1979-2011 and 125 countries. The paper presents summary results for the developing world as a whole and by region back to 1981, and up to 2008. Along with this paper, a substantially revised and updated version of the Bank's website [PovcalNet](#) has been produced, which provides public access to the primary data, to replicate our estimates, and to make estimates for selected countries and alternative poverty lines.

The following section describes both our absolute and relative lines, while section 3 describes the data base of household surveys and other data inputs. Section 4 then presents our absolute poverty measures while Section 5 presents the relative measures. Section 6 looks at how our poverty measures compare to a measure of inequality. Section 7 concludes.

## **2. Poverty lines**

*Absolute poverty:* In setting an international absolute line we follow the same approach used in our past work, namely that the line should be representative of the national lines found in the poorest countries—in the spirit of the original “\$1 a day” line (Ravallion et al., 1991; World Bank, 1990). For this purpose, Ravallion, Chen and Sangraula (RCS) (2008) compiled a new set of national poverty lines for developing countries drawn from the World Bank's country-specific *Poverty Assessments* and the *Poverty Reduction Strategy Papers* done by the governments of the countries concerned. While the Ravallion, Datt and van de Walle (1991) data set on national poverty lines was drawn from sources for the 1980s, the new and larger compilation produced by RCS are all post-1990, such that in no case do the proximate sources overlap.

RCS converted these national poverty lines to a common currency using the household consumption PPPs derived from the 2005 round of the *International Comparison Program* (ICP) (World Bank, 2008a,b). We use the same PPPs to convert the international line back to local currency for measuring poverty. The 2005 ICP is the most complete and thorough assessment to date of how the cost of living varies across countries. The ICP collected primary data on the prices for 600-1000 (depending on the region) goods and services grouped under 155 “basic headings” deemed to be comparable across 146 countries. The prices were obtained from a large sample of outlets in each country. The price surveys were done by the government statistics offices in each country, under supervision from regional authorities.

While these are clear improvements, the 2005 PPPs still have some limitations.<sup>8</sup> There is a problem of “urban bias” in the ICP price surveys for some countries in that it appears that the surveys were largely confined to urban areas.<sup>9</sup> Based on ICP sampling information we treat the 2005 consumption PPPs as urban PPPs for Argentina, Brazil, Bolivia, Cambodia, Chile, China, Colombia, Ecuador, Pakistan, Peru, Thailand and Uruguay. We then use existing differentials in urban-rural poverty lines at country level for these countries (from Ravallion et al., 2007) to correct the national PPP.

As was argued in Ravallion et al. (1991), a further concern is that the weights attached to different commodities in the conventional PPP rate may not be appropriate for the poor. Deaton and Dupriez (2008) have estimated “PPP for the poor” for a subset of countries with the required data; the results do not suggest that the implied re-weighting has much impact on the consumption PPP, as we show in Chen and Ravallion (2010).

Figure 1 plots the poverty lines for developing countries compiled by RCS against log household consumption per capita from national accounts, also at 2005 PPP; there are 75 countries with complete data. The Figure also gives a nonparametric regression of the national poverty lines against log mean consumption. Comparing expected values conditional on mean consumption (as estimated by the nonparametric regression in Figure 1), the range is from \$1.25 to \$30 per day. The mean line for the poorest 15 countries in terms of consumption per capita is \$1.25 while the mean for the richest 15 is \$25 a day.

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<sup>8</sup> For a fuller discussion of these issues see Deaton and Heston (2010) and Ravallion (2010).

<sup>9</sup> The greatest bias is probably in the ICP survey for China, which was confined to 11 cities. Although the survey included some surrounding rural areas of these cities, it clearly cannot be considered representative of rural China; evidence on this point is provided by Chen and Ravallion (2008b) which discusses our corrective.



We see in Figure 1 that the relationship is quite flat at low per capita consumption levels, consistent with the idea of absolute poverty. On the basis of the pattern evident in Figure 1, RCS proposed an international absolute poverty line of \$1.25 a day for 2005, which is the mean of the lines found in the poorest 15 countries in terms of consumption per capita.<sup>10</sup> The level of this poverty line is quite robust to the choice of the poorest 15 countries (taking plus or minus five countries ranked by consumption per capita). Focusing on the poorest 15 countries is also consistent with econometric tests reported below in calibrating the weakly relative poverty lines. Of course, there is still a variance in the national poverty lines at any given level of mean consumption, including amongst the poorest countries. The poverty lines found amongst the poorest 15 countries vary from \$0.70 to \$1.90 per day and RCS estimate the robust standard error of the \$1.25 line to be \$0.10 per day.

After converting the international poverty line of \$1.25 at PPP to local currency in 2005 prices, we convert it to the prices prevailing at each survey date using the best available country-specific Consumer Price Index (CPI).<sup>11</sup> The weights in this index may or may not accord well with consumer budget shares at the poverty line. In periods of relative price shifts, this will bias our comparisons of the incidence of poverty over time, depending on the extent of utility-compensated substitution possibilities for people at the poverty line.

Given the steep rise in food prices around 2008, we made extra effort to assure that the price indices we use adequately reflected those increases at country level. This was done in consultation with the Bank's poverty experts for each country. In some cases, such as India, we are already using CPIs that are anchored reasonably well to consumption behavior of the poor, so nothing needed to be done. However, for 15 countries (including China) for which food prices increased faster than other prices, we determined that the currently available CPI attached too low a weight to food, and we re-weighted the index to assure that its food share accorded reasonably well with food spending patterns in a neighborhood of the poverty line. For another 22 countries, we used CPI's provided by the Bank's country offices that were deemed to

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<sup>10</sup> The countries are Malawi, Mali, Ethiopia, Sierra Leone, Niger, Uganda, Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Nepal and Ghana. Consumption per capita for this group ranges from \$1.03 to \$1.87 per day with a mean of \$1.40 per day.

<sup>11</sup> Note that the same poverty line is generally used for urban and rural areas. There are three exceptions, China, India and Indonesia, where we estimate poverty measures separately for urban and rural areas. For China and India we also use sector-specific CPIs.

adequately reflect the rise in food prices; most of these showed higher inflation than the CPI from the World Bank's Development Data Platform (DDP).

In the remaining 75 countries in our data base, the CPI is from the DDP. As a check, we compared the implied rates of inflation with the food price index produced by the [International Labor Organization](#) (ILO). For 65 of these countries the rate of inflation between 2005 and 2008 was over 90% of the rate implied by the ILO's food price index. (In 15 countries, the inflation rate was actually higher than the ILO food price index, and for 39 it was over 95%.) In the remaining 10 countries, the CPI increased by less than 90% of the ILO index. We cannot rule out the possibility that the price indices we have used for these 10 countries are understating price increases for the poor over the period 2005-08 though the countries concerned only represent 3% of total population in the developing world and so the problem is minor.

*Relative poverty:* Following Atkinson and Bourguignon (2001), Chen and Ravallion (2001) and Ravallion and Chen (2011) we use the relationship between national poverty lines and mean consumption for identifying a schedule of relative poverty lines.

The relativist gradient in national lines emerges from quite low consumption levels. Eyeballing Figure 1, the gradient starts to be more pronounced at consumption levels over \$3 a day (a log value of about unity). The overall elasticity of the poverty line to mean consumption is about 0.7.<sup>12</sup> The elasticity is positive but significantly less than unity. If one was to set the constant of proportionality in a strongly relative poverty line based on these data using the regression coefficient it would be 0.382 (s.e.=0.021).<sup>13</sup>

However, it is clear from looking at Figure 1 that neither a constant elasticity nor a (homogeneous) constant slope functional form fits these data well, as already noted. The slope (and hence elasticity) is essentially zero amongst the poorest 20 or so countries, where absolute poverty clearly dominates. The data on national poverty lines are more suggestive of model in which the elasticity starts from roughly zero but rises to something close to unity.

Quite generally one can think of the relative poverty line as a non-decreasing function of the country and date specific mean,  $M_{it}$  for country  $i$  at date  $t$ .<sup>14</sup> Write this function as  $Z(M_{it})$ .

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<sup>12</sup> The regression coefficient of the log poverty line on log consumption per capita is 0.653 (s.e.=0.048).

<sup>13</sup> The intercept was suppressed to assure that the calculation was consistent with a strongly relative line.

<sup>14</sup> We assume that the mean is the relevant parameter rather than the median. However, counterarguments can be made and there has been some debate on this choice (Saunders and Smeeding, 2002; Easton, 2002; de Mesnard, 2007). The median is more robust to measurement errors at the extremes, although poverty lines set as a constant proportion of the median can have perverse properties when the Lorenz curve shifts (de Mesnard, 2007).

We assume that this function has an elasticity of zero w.r.t. the mean up to some critical value, but then rises above that point, with a rising elasticity but less than unity. This is illustrated in Figure 2, which also shows the corresponding strongly relative line. The theoretical rationale for weakly relative poverty lines with a rising elasticity is outlined in Ravallion and Chen (2011).<sup>15</sup>

There are three parameters to the Ravallion and Chen schedule of relative poverty lines, namely the absolute line ( $Z^*$ ), the minimum cost of social inclusion ( $\alpha$ ) and the relativist gradient ( $k$ ) above the critical minimum consumption at which the cost of social inclusion dominates the absolute poverty line; more precisely:<sup>16</sup>

$$Z(M_{it}) = \max(Z^*, \alpha + kM_{it}) \quad (1)$$

Following Atkinson and Bourguignon (2001), Chen and Ravallion (2001) and Ravallion and Chen (2011) we calibrate our schedule of relative poverty lines to how national poverty lines vary. We consider two methods of setting the parameters:

Method 1: Ravallion and Chen (2011) set these to \$1.25 a day, \$0.60 a day and 1/3 for the absolute line, the minimum cost of social inclusion and the relativist gradient respectively, giving the following schedule of poverty lines for country  $i$  at date  $t$  (in \$'s per day at the 2005 PPP for household consumption):

$$Z(M_{it}) \equiv \max[\$ 1.25, \$0.60 + M_{it} / 3] = \$0.60 + \max[\$ 0.65, M_{it} / 3] \quad (2)$$

The value of  $\hat{Z}^* = \$1.25$  a day is the international poverty line discussed above. A visual inspection of the scatter plot in Figure 1 suggests that a positive slope starts to emerge at a log of monthly consumption of around 4, corresponding to about \$2 a day, and that the gradient is about one-in-three. Ravallion and Chen (2011) also confirmed the parameter choices in (2) econometrically, using a suitably constrained version of Hansen's (2002) method for estimating a piece-wise linear ("threshold") model. (The variation on Hansen's model is that, in our case, the slope of the lower linear segment is constrained to be zero and there is no potential discontinuity at the threshold.) This gave  $\hat{Z}^* = \$1.23$  ( $t=0.193$ ) and  $\hat{k} = 0.325$  (s.e.=0.0256).

Method 2: One criticism of the above schedule of relative lines (as proposed by Ravallion and Chen, 2011) is that they are anchored to private consumption from the national accounts,

<sup>15</sup> An earlier contribution by Foster (1998) proposed a weakly relative line given by the weighted geometric mean of an absolute and a (strongly) relative line. While this is weakly relative, it has a constant elasticity, whereas the data suggest that the elasticity rises from zero (for the poorest country) to unity (the richest).

<sup>16</sup> The Atkinson-Bourguignon (2001) poverty lines are obtained as the limiting case in which  $\alpha = 0$ . This was also assumed by Chen and Ravallion (2001).

rather than the means from the surveys used to measure poverty, as appears to be standard practice in measuring relative poverty. Anchoring to the survey means also has the advantage that one can set separate relative poverty lines for urban and rural areas or sub-national regions.

If one sets the constant of proportionality in a strongly relative line based on the regression on survey means it would be 0.560 (s.e.=0.044).<sup>17</sup> Recall that the corresponding number using national accounts' consumption was 0.382. The higher value using survey means reflects the fact that national accounts consumption includes things that are not typically included in survey-based measures. Under reporting/non response in surveys or over-estimation of consumption in national accounts, could also be playing a role.<sup>18</sup>

Following the same procedure but using survey means we are led to use  $k=1/2$ , which is consistent with past practice in setting strongly relative poverty lines. As before, we set the absolute line at \$1.25 a day. The minimum cost of social inclusion must be in the interval (0, \$1.25). We set it half way, i.e.,  $Z^* = \$1.25 / 2$ . Thus we use the following schedule of poverty lines for country  $i$  at date  $t$  (in \$'s per day at the 2005 PPP for household consumption):

$$Z(M_{it}) \equiv \max[\$ 1.25, (\$ 1.25 + M_{it}) / 2] = \$1.25 / 2 + \max[\$ 1.25 / 2, M_{it} / 2]$$

(3)

These choices conform well with the empirical relationship between national poverty lines and survey mean consumption or income. Using the aforementioned constrained threshold estimator with surveys means instead of national accounts gave  $\hat{Z}^* = \$1.17$  (s.e.=0.17) and  $\hat{k} = 0.472$  (s.e.=0.07);  $n=70$ . Our chosen parameter values are not significantly different from these estimated coefficients.

### 3. Household survey data and poverty measures

We have estimated all the poverty measures ourselves from the primary (unit record or tabulated) sample survey data rather than relying on pre-existing poverty measures. And all our previous estimates have been updated to ensure internal consistency. Households are ranked by either consumption or income per person. The distributions are weighted by household size and sample expansion factors. Thus our poverty counts give the number of people living in

<sup>17</sup> Again, the intercept was suppressed to assure that the calculation was consistent with a strongly relative poverty line. A practical disadvantage of this method is that we lose 5 data points.

<sup>18</sup> For further discussion of the discrepancies between these sources see Ravallion (2003) and Deaton (2005).

households with per capita consumption or income below the international poverty line. The primary data come in various forms, ranging from micro data (the most common) to specially designed grouped tabulations from the raw data, constructed following our guidelines.

We draw on 850 surveys for 125 countries. Taking the most recent survey for each country, 2.1 million households were interviewed in the surveys used for 2008. The surveys were mostly done by governmental statistics offices as part of their routine operations. Not all available surveys were included. A survey was dropped if there were known to be serious comparability problems with the rest of the data set. As in past work, we have tried to eliminate obvious comparability problems, either by re-estimating the consumption/income aggregates or the more radical step of dropping a survey. However, there are problems that we cannot deal with. For example, it is known that differences in survey methods (such as questionnaire design) can create non-negligible differences in the estimates obtained for consumption or income.

Following past practice, poverty is assessed using household per capita expenditure on consumption or household income per capita as measured from the national sample surveys. When there is a choice, we use consumption in preference to income, on the grounds that consumption is likely to be the better measure of current welfare on both theoretical and practical grounds.<sup>19</sup> Of the 850 surveys, 521 allow us to estimate the distribution of consumption expenditures; this is true of all the surveys used in the Middle East and North Africa, South Asia and Sub-Saharan Africa, though income surveys are more common in Latin America.<sup>20</sup> Our data are national for almost all countries. The exceptions are China, India and Indonesia, for which we do an urban-rural split. (Given that Method 2 allows different lines for urban and rural areas we plan to do urban-rural splits for more countries in future applications.)

The measures of consumption (or income, when consumption is unavailable) in our survey data set are reasonably comprehensive, including both cash spending and imputed values for consumption from own production. But we acknowledge that even the best consumption data need not adequately reflect certain “non-market” dimensions of welfare, such as access to certain public services, or intra-household inequalities. For these reasons, our poverty measures need to

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<sup>19</sup> For further discussion see Ravallion (1994) and Deaton and Zaidi (2002).

<sup>20</sup> For a few cases we do not have consumption distributions but we still have survey-based estimates of mean consumption. Then we replace the income mean by the consumption mean leaving the Lorenz curve the same (i.e., all incomes are scaled up by the ratio of the consumption mean to the income mean). There is, however, no obvious basis for adjusting the Lorenz curve.

be supplemented by other data, such as on infant and child mortality, to obtain a more complete picture of how living standards are evolving.

We can write the poverty measure for county  $i$  at date  $t$  in the following generic form:

$$P_{it} = P[Z(M_{it}) / M_{it}, L_{it}] \quad (4)$$

Here  $M_{it}$  is the mean for date  $t$  and  $L_{it}$  is a vector of parameters fully characterizing the Lorenz curve (roughly interpretable as “inequality.”) The mean is bounded below by  $M^*$  with  $M_{it} \geq M^*$  with strict inequality for some  $i, t$ . The aggregate poverty measure for any date and region is then the population-weighted mean of  $P_{it}$ .<sup>21</sup> The absolute measure is  $P[Z(M^*) / M_{it}, L_{it}]$ . The absolutely poor are a proper sub-set of the poor.

Notice that the gap between the relative and absolute measures can be expected to change over time with changes in the mean and in distribution. Past research has indicated that the absolute poverty rate for developing countries tends to fall with economic growth; for recent evidence see Ravallion (2012d). It is an empirical issue whether our weakly relative measure will fall more slowly than the absolute measure during any process of (positive) growth in average consumption. Ravallion and Chen (2011) discuss this issue further and identify theoretical conditions under which relative poverty will change more slowly with economic growth than absolute poverty. As we will see, that prediction is confirmed by our empirical results.

We start the series in 1981 and make estimates at three yearly intervals up to 2008. Of the 125 countries, 20 have only one survey; 15 have two; 12 have three; while 78 have four or more, of which 31 have 10 or more surveys. If there is only one survey for a country then we estimate measures for each reference year by applying the growth rate in real private consumption per person from the NAS to the survey mean,<sup>22</sup> assuming that the Lorenz curve for that country does not change. We also use the annual NAS data for interpolation purposes, given the irregular spacing of the surveys, following the method outlined in Chen and Ravallion (2010).

In the aggregate, 90% of the population of the developing world is represented by surveys within two years of 2008.<sup>23</sup> Survey coverage varies by region and over time. Table 1

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<sup>21</sup> The population weights (for urban and rural poverty measures, as well as across countries) are also from the World Bank’s Development Data Platform.

<sup>22</sup> For a few countries for which private consumption per capita is missing from the DDP we use GDP.

<sup>23</sup> Some countries have graduated from the set of developing countries; we apply the same definition over time to avoid selection bias. In this paper our definition is anchored to 2005.

gives the coverage rate by region and for each reference year; for this purpose, a country is defined as being covered if there was a survey (in our data base) within two years of the reference date (a five-year window). The coverage rate in 2008 varies from 47% of the population of the Middle East and North Africa (MENA) to 98% of the population of South Asia. Naturally, the further back we go, the fewer the number of surveys—reflecting the expansion in household survey data collection for developing countries since the 1980s. And coverage deteriorates in the last year or two of the series, given the lags in survey processing. Most regions are quite well covered from the latter half of the 1980s (East and South Asia being well covered from 1981 onwards). Unsurprisingly, we have weak coverage in Eastern Europe and Central Asia (EECA) for the 1980s; many of these countries did not officially exist then. More worrying is the weak coverage for Sub-Saharan Africa (SSA) in the 1980s; indeed, our estimates for the early 1980s rely heavily on projections based on distributions around 1990. The weak coverage for EECA, MENA and SSA in the 1980s is evident in Table 1. Our estimates for these regions in the 1980s are heavily dependent on the extrapolations from NAS data.<sup>24</sup>

#### **4. Measures of absolute poverty**

Table 2 gives the absolute poverty rates—the percentage of the population living below \$1.25—at three yearly intervals during 1981-2008. Table 3 gives the corresponding results for \$2.00 a day, which is the median poverty line amongst developing countries as a whole (RCS).<sup>25</sup>

Over the 28 year period, we find that the percentage of the population of the developing world living below \$1.25 per day was halved, falling from 52% to 22%. The number of poor fell by 600 million, from 1.9 billion to 1.3 billion over 1981-2005 (Table 2). The trend rate of decline in the \$1.25 a day poverty line over 1981-2008 was 1% point per year. (Regressing the poverty rate on time the estimated trend is -1.03% per year with a standard error of 0.06%, with

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<sup>24</sup> Note that there is a “hole” in coverage for South Asia in 1999. This reflects the well-known comparability problem due to India’s National Sample Survey (NSS) for 1999/2000. (Further discussion and references can be found in Datt and Ravallion, 2002). We decided to drop that NSS survey round given that we now have a new survey for 2004/05 that we consider to be reasonably comparable to the previous survey round of 1993/94. We also decided to only use the 5-yearly rounds of the NSS, which have larger samples and more detailed and more comparable consumption modules (aside from the 1999/00 round). Unfortunately, this leaves a 10-year gap in our survey coverage for India; the estimates for India over the intervening period use our interpolation method. Including all available survey rounds for India adds to the variability in the series but does not change the trend.

<sup>25</sup> Further details on these estimates and results for other poverty lines and for the poverty gap index can be found in Chen and Ravallion (2012).

$R^2=0.97$ ). Projecting this trend forward to 2015, the estimated headcount index for that year is 16.1% (standard error of 1.4%). Given that the 1990 poverty rate was 43.1%, this calculation implies that the developing world as a whole is on track to achieving the first Millennium Development Goal (MDG) of halving the 1990 poverty rate well before 2015.<sup>26</sup>

The 1% point per year rate of decline in the poverty rate also holds if one focuses on the period since 1990 (not just because this is the base year for the MDG but also recalling that the data for the 1980s are weaker). The \$1.25 poverty rate fell 9% points in the 10 years of the 1980s (from 52% to 43%), and a further 20 points in the 18 years from 1990 to 2008.

China's success against absolute poverty has clearly played a major role in this overall progress. Tables 2 and 3 repeat the calculations excluding China. Strikingly, the number of people outside China living below \$1.25 a day is no lower in 2008 than 1981, although it rose then fell, with a marked decline since 1999, from 1.3 to 1.1 billion.

Figure 3 plots the poverty rates over time with and without China. Excluding China, the \$1.25 a day poverty rate falls from 40% to 25% over 1981-2008, with a rate of decline that is half the trend including China; the regression estimate of the trend falls to -0.53% per year (standard error of 0.05%;  $R^2=0.94$ ). Based on our new estimates, the projected value for 2015 is 23.5% (standard error=1.05%), which is well over half the 1990 value of 37% (Table 2). So past trends do not suggest that the developing world as a whole outside China is on track to reaching the MDG for poverty reduction.

Our new estimates suggest only slightly less progress in absolute terms for the \$2 per day line than \$1.25 (though less in proportionate terms). The poverty rate by this higher standard has fallen from 70% in 1981 to 43% in 2008 (Table 3). The trend is also about 1% per year (a regression coefficient on time of -0.97; standard error=0.09); excluding China, the trend is only 0.4% per year (a regression coefficient of -0.44; standard error=0.07%). Clearly, in proportionate terms, however, the rate of progress has been lower for the higher poverty line.

The number of people living below \$2 per day has fallen over 1981-2008, but only because of the progress since 1999 (Table 3). The number of people living between \$1.25 and \$2 a day has almost doubled from 648 million to 1.18 billion. Most of the 649 million fewer poor by the \$1.25 per day standard over 1981-2008 are still poor by the standards of middle-income

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<sup>26</sup> Our preliminary estimate for 2010 using survey data representing about 80% of the population of the developing world indicates that the first MDG was in fact achieved in that year.



developing countries, and certainly by the standards of what poverty means in rich countries. This marked “bunching up” of people just above the \$1.25 line suggests that the poverty rate according to that line could rise sharply with aggregate economic contraction.

To test whether the claim that poverty has fallen is robust to the choice of the international poverty line, Figure 4 plots the cumulative distribution function (CDF) up to a maximum poverty line of \$13 per person per day, which is the official line for the US in 2005 (for a family of four). As can be seen from Figure 1, this is higher than the highest poverty line found in any developing country (though still lower than national poverty lines in a number of other developed countries; see Ravallion, 2012c). To avoid cluttering we give four CDFs at 9-year intervals. The claim that poverty fell between either 1981, 1990 or 1999 and 2008 is robust; this also holds for a broad class of additive poverty measures including those that penalize inequality amongst the poor.<sup>27</sup> The claim that poverty fell over time from 1981 to 1990 to 1999 is only robust up to about \$5 a day.

*Regional differences.* Comparing Tables 2 and 3 the regional rankings are not robust to the choice of the poverty line. At the lower lines (under \$2 per day) SSA has the highest incidence of poverty, but this switches to South Asia at the \$2 a day line. Also, MENA’s poverty rate exceeds LAC’s at the \$2 line, but the ranking reverses at the lower lines.

There have been notable changes in regional poverty rankings over time. Figure 5 plots the \$1.25 a day poverty rate for the three regions that account for the bulk of the poor, East Asia, South Asia and Sub-Saharan Africa. (These three account for 96% of those living below \$1.25 a day in 2008.) We see a marked reversal of fortunes. Looking back to 1981, East Asia had the highest incidence of poverty, with 77% living below \$1.25 per day. South Asia had the next highest poverty rate (followed by SSA, LAC, MENA and lastly, EECA). By the early 1990s, SSA had swapped places with East Asia, and by 2008 East Asia’s poverty rate had fallen to 14%, while SSA’s was 48%.

Thus the composition of world poverty has changed over time. The number of poor has fallen sharply in East Asia, but risen elsewhere. For East Asia, the first MDG of halving the 1990 poverty rate by 2015 was already reached by 2002. Again, China’s progress against absolute poverty was a key factor; looking back to 1981, China’s incidence of poverty (measured by the percentage below \$1.25 per day) was roughly twice that for the rest of the developing world; by

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<sup>27</sup> On the use of dominance tests in this context see Atkinson (1987).

about 2000, the Chinese poverty rate had fallen below average. There were over 600 million fewer people living under \$1.25 per day in China in 2008 than in 1981. Progress was uneven over time, with setbacks in some periods (the late 1980s) and more rapid progress in others (the early 1980s and mid 1990s); Ravallion and Chen (2007) identify a number of factors (including policies) that account for this uneven progress against poverty over time (and space) in China.

Over 1981-2008, the \$1.25 poverty rate in South Asia fell from 61% to 36%. This was not sufficient to bring down the number of poor over the period as a whole, but the poverty count in South Asia has been falling since 1999 (Table 2).

The extent of the “bunching up” that has occurred between \$1.25 and \$2 per day is particularly striking in both East and South Asia, where we find a total of about 900 million people living between these two lines, roughly equally split between the two sides of Asia.

We find a trend declining in the poverty rate in LAC by both lines, but not sufficient to reduce the count of the number of poor over the 1981-2008 period as a whole, though with more encouraging signs of progress since 1999.

The MENA region has experienced a fairly steady decline in the poverty rate, though (again) not sufficient to avoid a rising count in the number of poor in that region. However, our estimates for MENA have weak coverage in the 1980s and also recently, given the aforementioned lags in the public availability of survey data.

We find a generally rising incidence and number of poor in EECA until 1999, but falling poverty measures since then. The paucity of survey data for EECA in the 1980s should be noted. Thus our estimates are heavily based on extrapolations, which do not allow for any changes in distribution. One would expect that distribution was better from the point of view of the poor in EECA in the 1980s, in which case poverty would have been even lower than we estimate—and the increase over time even larger.

The incidence of poverty by the \$1.25 line in Sub-Saharan Africa in 2008 is the lowest it has been in the whole period—2008 is the first time the \$1.25 poverty rate has fallen below 50% (Table 2). There was an increase until the mid 1990s, but there has been an encouraging downward trend since then. The number of poor by our \$1.25 a day standard has almost doubled in SSA over 1981-2008, from 205 million to almost 390 million. The share of the world’s poor by this measure living in Africa has risen from 11% in 1981 to 30% in 2008.

## 5. Measures of relative poverty

Recall that the relative poverty lines rise with the mean above some point, as determined by the alternative calibration methods described in section 2. Table 4 gives the average poverty line by region and year for both methods.<sup>28</sup> Using Method 1, the overall mean poverty line rises from \$2.00 a day in 1981 to \$2.90 in 2008. The mean poverty lines are similar, though slightly higher for Method 2. In 2008, the mean lines vary from \$1.60 in Sub-Saharan Africa to almost \$7 a day in Eastern Europe and Central Asia (these are for Method 1, but they are similar for Method 2).

Figure 6 gives the series of implied weakly relative poverty measures for the developing world using both methods, alongside the corresponding series of absolute measures for \$1.25 a day. We see that the overall measures of relative poverty are quite robust to the choice of method. Using the survey means (Method 2) gives slightly higher poverty counts in the 1990s and slightly lower at the end of the period. By either method we see an overall trend decline in the incidence of relative poverty, but a trend increase in the proportion of the population who are not absolutely poor but are relatively poor.

The slight upturn in 2008 using Method 1 is probably deceptive, as it appears to largely reflect a short-run gap in the growth rates implied by the national accounts consumption and those found in the surveys. We will rely more on Method 2 using the schedule in equation (3). (The Addendum gives detailed results using Method 1.)

Table 5 gives the estimates by region using Method 2, corresponding to Table 2. We see that the proportion fell over time, from 63% in 1981 to 56% in 1990, 53% in 1999 and 47% in 2008. The speed of decline in the incidence of relative poverty has not been sufficient to reduce the number of poor by this measure, which rose from 2.3 billion to 2.5 billion in 1990, 2.7 in 1999 and stayed at 2.7 by 2008.

So we find a simultaneous rise in the numbers of relatively poor, alongside the fall in absolute poverty. Economic growth has clearly pushed many developing countries into the consumption levels at which relative poverty becomes important, by our measure.

The incidence of relative poverty has fallen substantially in East Asia, from 81% in 1981 to 42% in 2008. It has risen in EECA over this period, though falling since the mid-1990s. There

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<sup>28</sup> These average lines are purely for descriptive purposes; they have no analytic role since poverty lines are calculated at country-year level.

has been no clear trend in LAC over the whole period, though with declining relative poverty incidence in the 2000s. We see a slow but reasonably steady decline in the incidence of relative poverty in MENA and South Asia. The relative poverty rate was generally rising in SSA until 1999, but has been falling since.

East Asia is the only region that has seen a decline in the number of relatively poor. In other regions, the decline in the incidence of relative poverty has not been sufficient to reduce the counts of the number of poor by this measure. South Asia and Sub-Saharan Africa saw the largest increases in the number of relatively poor—about a 250 million increase in each region over the period as a whole.

Comparing Tables 2 and 5, we see some differences in the regional profile of poverty depending on whether one uses absolute or relative poverty. The two regions with the highest incidence of absolute poverty also have the highest relative poverty rate. In 2008, SSA had the highest incidence of both absolute and relative poverty. Latin America and the Caribbean had the third highest relative poverty incidence, but came fourth in absolute poverty. East Asia experienced a generally falling count of both the absolutely poor and the relatively poor (though with a more rapid pace of progress against absolute poverty). While MENA has seen generally falling counts of absolutely poor, the number of relatively poor has been generally rising. That is also true of South Asia in the 2000s. Not surprisingly, EECA is the region with the largest gap between its relative poverty rate and its absolute poverty rate.

The differences in rates of progress against poverty we see when comparing Tables 2 and 5 clearly reflect differences in how responsive the two measures are to economic growth. The relationship between poverty reduction and economic growth is complex, as it is known that both depend on initial distribution (including poverty) and that there are important interaction effects between growth and distribution in how they impact on poverty (Ravallion, 2012d). However, here we are focusing on a purely statistical aspect of the difference between absolute and relative measures. Figure 7 plots the relationships between the proportionate rates of poverty reduction (annualized differences in the logs) and the rates of growth in the mean, and the non-parametric regression functions.<sup>29</sup> While the relationships show some nonlinearity, the OLS regression coefficient is still a convenient summary measure; the regression coefficients are -1.89 (s.e.=0.23) and -0.38 (s.e.=0.08) for the absolute and relative measures respectively. The fact that

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<sup>29</sup> The growth rates are annualized log differences expressed in percentage terms.

growth in the mean is less effective in reducing relative poverty stems, of course, from the design of the measure, given that the poverty line rises with the mean above a critical level.

## 6. Measures of inequality

It is of interest to see how our relative poverty measures compare to measures of inequality. If we measure “global inequality” similarly to how we have measured global poverty then we would ignore all country borders, pooling all residents, and measure the inequality amongst them as if it was one country. This overall measure will naturally depend on the inequality between countries as well as that within them. Thus its evolution over time will depend on growth rates in poor countries relative to rich ones (roughly speaking), as well as the things happening within countries—economic changes and policies—that impact on inequality.

However, if we are comparing country performance at regional or global levels then we will want to isolate the within-country component of inequality. While there are many inequality measures and one can always calculate the average inequality index for a group of countries, only for a subset of inequality measures will that average accord with the within-country component of total inequality—implying a clean separation of the part we are interested in from the total inequality. (For example, such an exact decomposition is known to be impossible for the popular Gini index.) The mean-log deviation (MLD) offers a practical solution. The sample-based MLD for a group of  $n$  countries with overall mean consumption  $\bar{y}$  is given by:<sup>30</sup>

$$MLD = \ln \bar{y} - \sum_{i=1}^n s_i \sum_{j=1}^{m_i} w_{ij} \ln y_{ij} \quad (5)$$

where  $y_{ij}$  is the consumption per person of household  $i$  in country  $j$  in a sample of  $m_i$  households with weights  $w_{ij}$  ( $j=1, \dots, m_i$ ) and  $s_i$  is the population share of country  $i$ . This measure satisfies the Pigou-Dalton transfer axiom. But more importantly for the present purpose, the measure is exactly decomposable by population sub-groups, as follows:<sup>31</sup>

$$MLD = MLD^W + MLD^B \quad (6)$$

where:

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<sup>30</sup> The following formulae are well-known in the literature on inequality measurement but are reproduced here to make the discussion self-contained for non-specialists.

<sup>31</sup> On the decomposability properties of inequality measures, including MLD, see Bourguignon (1979).

$$MLD^W = \sum_{i=1}^n s_i \left( \ln \bar{y}_i - \sum_{j=1}^{m_i} w_{ij} \ln y_{ij} \right) \quad (7.1)$$

$$MLD^B = \ln \bar{y} - \sum_{i=1}^n s_i \ln \bar{y}_i \quad (7.2)$$

are the within-country component and between-country components respectively and  $\bar{y}_i$  is the mean for country  $i$ .

Table 6 gives our estimates by region. The top panel gives total inequality and then we give the breakdown into between and within components. Figure 8 plots total inequality for the developing world as a whole and the between-country component. We have made these calculations across the same set of developing countries we used above for measuring poverty and (when relevant) we have used the same methods as for our poverty measures, including how we line up the estimates to specific reference years.

We see that there has been a trend decrease in total inequality in the developing world, though with ups and downs, and an increase over 2005-08. However, that pattern has largely been due to inequality between countries (Figure 8). Over the period as a whole, we see that the between-country component has fallen while the within-country component has risen. The latter accounted for less than one third of inequality in the developing world as a whole in 1981, but almost half in 2008. This pattern has reversed since 2002, with inequality rising between countries but falling on average within.

Figure 9 plots the within-country component by region. LAC has persistently had the highest average inequality within countries,<sup>32</sup> though falling noticeably since around 2000. Over 90% of LAC's inequality is within countries. SSA is the region with the second-highest average inequality, though with no clear trend. South Asia has generally been a region of low inequality, though rising since the early 1990s. East Asia started out as the region with lowest inequality within countries, but has seen a steady rise in inequality (side-by-side with a trend reduction in inequality between countries). EECA saw a sharp rise in average inequality in the 1990s (coming with the transition to a market economy) but has seen generally falling inequality since then. MENA has seen steadily falling average inequality.

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<sup>32</sup> While we have preferred to use consumption-based distributions, incomes are more commonly used in Latin America. Incomes tend to show higher inequality than consumption for the same economy. This accounts for some, but almost certainly not all, of the gap between LAC's measures and other regions.

So it is clear that inequality behaves very differently to our poverty measures. There are strong “level effects” (such as LAC’s high inequality). A better test for co-movement is to take the changes (first differences) over time. Table 7 gives the correlation coefficients amongst the changes in poverty and inequality measures. We find a significant correlation (at 5% level) between changes in total inequality and changes in our relative poverty measure. The correlation is also positive for absolute poverty, but not significant.<sup>33</sup> The correlation is driven entirely by the within-country component of inequality; there are no correlations with the between-country component. Growth in the mean is strongly negatively correlated with changes in both poverty measures, though less so with the relative measure. Higher growth rates show no correlation with changes in inequality, echoing findings from cross-country comparisons (Ravallion, 2001; Ferreira and Ravallion, 2009).

## 7. Conclusions

Welfare consistency is an appealing concept for guiding poverty measurement. This requires that two people who are agreed to have the same level of welfare are treated equally by the poverty measure no matter where or when they live. Social effects on welfare—adverse effects of relative deprivation or socially-specific costs of avoiding shame or social exclusion—may then demand that higher poverty lines (in terms of command over commodities) are used in richer societies. However, the fact that we tend to see such a “relativist gradient” in national poverty lines across countries could also reflect an underlying economic gradient in social norms, with no role for social effects on welfare. Then welfare consistency may still call for absolute lines, such that global poverty is assessed against a common, global, welfare norm.

We have argued that this ambiguity makes it compelling to look at relative measures of global poverty, as a complement to absolute measures. Given we cannot say which interpretation is right, it would be unwise to base global poverty comparisons on only one of the two measures. However, the prevailing approaches to measuring relative poverty—using a line that is set at a constant proportion of the current local mean—are subject to numerous objections. Instead we have proposed a “weakly relative poverty line” in which there is a positive lower bound to the relative poverty line, interpretable as the minimum cost of social inclusion. Thus the elasticity of

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<sup>33</sup> So there are no signs here of a “poverty-inequality tradeoff” as has often been assumed in development policy thinking; this echoes the findings of Ravallion (2005) using country-level data over time (including China).

the poverty line to the mean rises from zero for the poorest countries to approach unity for the richest. The absolute and (weakly) relative poverty lines can be interpreted as the lower and upper bounds (respectively) to a welfare-consistent poverty line.

We find evidence of a continuing decline in the incidence of absolute poverty in the developing world. The overall percentage of the population living below \$1.25 a day in 2008 was 22%, as compared to 52% in 1981. We find that 1.3 billion people in 2008 lived below \$1.25 a day, as compared to 1.9 billion in 1981. Progress has been uneven across regions, but (encouragingly) all regions have seen falling poverty counts in the 2000s.

The incidence of relative poverty has also fallen, from 63% in 1981 to 47% in 2008. But this was not sufficient to prevent rising numbers of relatively poor; indeed, the total number of relatively poor rose by about 360 million over 1981-2008 (while the corresponding number of absolutely poor fell by almost 650 million). Over 80% of the relatively poor in 1981 were absolutely poor, but by 2008 the proportion had fallen to under half. In other words, the range between our lower and upper bounds to a welfare-consistent poverty measure has risen markedly over time; in 1981, the range was 11% points while by 2008 it was 25% points.

So a substantial increase in the number of people who are relatively poor but no longer absolutely poor has come hand-in-hand with the developing world's success against absolute poverty. Economic growth has generally come with a lower absolute poverty rate but over time it has also meant that many developing countries have moved into the region in which relative considerations become more important. And the relative measures of poverty are naturally less responsive to economic growth—and more responsive to inequality.



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**Table 1: Percentage of the population represented by household surveys**

Region	Survey covered population (%) two years away from reference year									
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	73.4	85.1	88.5	92.4	93.3	93.7	93.4	93.5	93.2	93.6
Eastern Europe and Central Asia	0.0	8.4	93.6	81.5	87.3	97.1	93.9	96.3	94.7	89.9
Latin America and the Caribbean	55.9	71.5	92.3	94.9	91.8	95.9	97.7	97.5	95.9	94.5
Middle East and North Africa	0.0	40.3	40.7	76.8	65.3	81.7	70.0	21.5	85.7	46.7
South Asia	87.6	89.0	96.6	96.6	98.2	98.2	19.6	98.1	98.0	97.9
Sub-Saharan Africa	11.3	23.6	32.8	46.0	68.8	68.0	53.1	65.7	82.7	77.9
<b>Total</b>	<b>56.7</b>	<b>67.3</b>	<b>82.9</b>	<b>86.4</b>	<b>89.5</b>	<b>91.6</b>	<b>67.7</b>	<b>87.9</b>	<b>93.1</b>	<b>89.7</b>

**Table 2: Absolute poverty measures for \$1.25 a day by region 1981-2008**

Region	% of population below \$1.25 a day in 2005 PPP									
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	77.2	65.0	54.1	56.2	50.7	35.9	35.6	27.6	17.1	14.3
China	84.0	69.4	54.0	60.2	53.7	36.4	35.6	28.4	16.3	13.1
Eastern Europe and Central Asia	1.9	1.6	1.5	1.9	2.9	3.9	3.8	2.3	1.3	0.5
Latin America and the Caribbean	11.9	13.6	12.0	12.2	11.4	11.1	11.9	11.9	8.7	6.5
Middle East and North Africa	9.6	8.0	7.1	5.8	4.8	4.8	5.0	4.2	3.5	2.7
South Asia	61.1	57.4	55.3	53.8	51.7	48.6	45.1	44.3	39.4	36.0
Sub-Saharan Africa	51.5	55.2	54.4	56.5	59.4	58.1	58.0	55.7	52.3	47.5
<b>Total</b>	<b>52.2</b>	<b>47.1</b>	<b>42.3</b>	<b>43.1</b>	<b>40.9</b>	<b>34.8</b>	<b>34.1</b>	<b>30.8</b>	<b>25.1</b>	<b>22.4</b>
Total excl. China	40.5	39.1	38.1	37.2	36.6	34.3	33.6	31.5	27.8	25.2
Region	Number of people (in millions) below \$1.25 a day in 2005 PPP									
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1096.5	970.0	847.6	926.4	870.8	639.7	655.6	523.1	332.1	284.4
China	835.1	719.9	585.7	683.2	632.7	442.8	446.3	363.1	211.9	173.0
Eastern Europe and Central Asia	8.2	6.9	6.8	8.9	13.7	18.2	17.8	10.6	6.3	2.2
Latin America and the Caribbean	43.3	52.9	49.3	53.4	52.5	53.6	60.1	62.7	47.6	36.8
Middle East and North Africa	16.5	15.1	14.6	13.0	11.5	12.3	13.6	12.0	10.5	8.6
South Asia	568.4	573.8	593.0	617.3	631.9	630.8	619.5	640.5	598.3	570.9
Sub-Saharan Africa	204.9	239.1	256.8	289.7	330.0	349.4	376.8	390.4	394.9	386.0
<b>Total</b>	<b>1937.8</b>	<b>1857.7</b>	<b>1768.2</b>	<b>1908.6</b>	<b>1910.3</b>	<b>1704.0</b>	<b>1743.4</b>	<b>1639.3</b>	<b>1389.6</b>	<b>1289.0</b>
Total excl. China	1102.8	1137.8	1182.5	1225.5	1277.6	1261.2	1297.0	1276.2	1177.7	1116.0

Note: Regions with survey coverage less than 50% are highlighted.

**Table 3: Absolute poverty measures for \$2 a day by region 1981-2008**

Region	% of population below \$2.00 a day in 2005 PPP									
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	92.4	88.3	81.6	81.0	75.8	64.0	61.7	51.9	39.0	33.2
China	97.8	92.9	83.7	84.6	78.6	65.1	61.4	51.2	36.9	29.8
Eastern Europe and Central Asia	8.3	6.7	6.3	6.9	9.2	11.2	12.1	7.9	4.6	2.2
Latin America and the Caribbean	23.8	26.8	22.4	22.4	21.7	21.0	22.0	22.2	16.7	12.4
Middle East and North Africa	30.1	27.1	26.1	23.5	22.1	22.2	22.0	19.7	17.4	13.9
South Asia	87.2	85.6	84.5	83.6	82.7	80.7	77.8	77.4	73.4	70.9
Sub-Saharan Africa	72.2	74.7	74.3	76.0	78.1	77.5	77.5	76.1	74.1	69.2
<b>Total</b>	<b>69.6</b>	<b>68.0</b>	<b>64.8</b>	<b>64.6</b>	<b>63.1</b>	<b>58.6</b>	<b>57.4</b>	<b>53.5</b>	<b>46.9</b>	<b>43.0</b>
Total excl. China	59.3	59.1	58.2	57.7	57.8	56.4	56.1	54.2	49.9	47.0
Region	Number of people (in millions) below \$2.00 a day in 2005 PPP									
	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1312.9	1316.3	1279.0	1333.8	1300.7	1139.9	1137.6	983.9	757.5	659.2
China	972.1	963.3	907.1	960.8	926.3	792.1	769.7	654.9	481.6	394.6
Eastern Europe and Central Asia	35.7	29.5	28.8	31.9	43.1	52.8	57.0	37.2	21.7	10.4
Latin America and the Caribbean	86.6	104.2	92.2	97.6	99.9	101.7	111.4	117.6	91.7	70.5
Middle East and North Africa	51.8	51.2	53.9	52.9	53.5	57.1	59.8	56.8	52.7	44.4
South Asia	810.6	854.8	905.9	958.8	1010.4	1047.3	1068.8	1119.7	1113.1	1124.6
Sub-Saharan Africa	287.6	323.8	350.4	389.2	434.0	466.0	503.3	533.3	559.1	562.3
<b>Total</b>	<b>2585.3</b>	<b>2680.0</b>	<b>2710.2</b>	<b>2864.1</b>	<b>2941.5</b>	<b>2864.8</b>	<b>2937.9</b>	<b>2848.4</b>	<b>2595.8</b>	<b>2471.4</b>
Total excl. China	1613.2	1716.7	1803.1	1903.3	2015.2	2072.7	2168.2	2193.5	2114.2	2076.8

Note: Regions with survey coverage less than 50% are highlighted.

**Table 4: Average relative poverty line by region and year**

<b>Method 1</b>	Mean poverty line \$/person/day at 2005 PPP									
Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1.33	1.34	1.35	1.39	1.43	1.57	1.66	1.82	2.03	2.34
China	1.25	1.25	1.25	1.25	1.25	1.35	1.48	1.64	1.85	2.20
Eastern Europe and Central Asia	4.05	4.21	4.35	4.21	3.78	3.79	3.98	4.54	5.61	6.99
Latin America and the Caribbean	4.32	4.25	4.07	4.00	4.28	4.41	4.68	4.76	5.09	5.79
Middle East and North Africa	2.42	2.56	2.40	2.41	2.47	2.50	2.59	2.80	3.05	3.37
South Asia	1.27	1.27	1.30	1.35	1.38	1.47	1.54	1.58	1.74	1.94
Sub-Saharan Africa	1.55	1.55	1.53	1.51	1.49	1.51	1.51	1.53	1.55	1.60
<b>Total</b>	<b>2.00</b>	<b>2.01</b>	<b>2.00</b>	<b>2.00</b>	<b>1.99</b>	<b>2.08</b>	<b>2.17</b>	<b>2.30</b>	<b>2.54</b>	<b>2.90</b>
Total excl. China	2.29	2.30	2.28	2.28	2.26	2.34	2.41	2.52	2.77	3.13
<b>Method 2</b>										
Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1.36	1.38	1.41	1.45	1.54	1.73	1.80	2.06	2.39	2.72
China	1.26	1.29	1.33	1.34	1.42	1.61	1.71	2.01	2.40	2.81
Eastern Europe and Central Asia	4.19	4.36	4.49	4.27	4.76	4.37	3.96	4.39	5.22	6.71
Latin America and the Caribbean	4.51	4.17	4.36	4.42	4.47	4.68	4.70	4.66	5.17	5.93
Middle East and North Africa	2.84	3.04	2.84	2.85	2.98	2.98	3.06	3.35	3.02	3.24
South Asia	1.30	1.32	1.35	1.37	1.38	1.41	1.46	1.48	1.54	1.58
Sub-Saharan Africa	1.71	1.66	1.65	1.60	1.54	1.56	1.58	1.61	1.63	1.78
<b>Total</b>	<b>2.09</b>	<b>2.09</b>	<b>2.12</b>	<b>2.11</b>	<b>2.18</b>	<b>2.24</b>	<b>2.23</b>	<b>2.37</b>	<b>2.60</b>	<b>2.94</b>
Total excl. China	2.41	2.39	2.41	2.38	2.46	2.46	2.41	2.50	2.66	2.98



**Table 5: Weakly poverty measures for the developing world 1981-2008**

(a) % of population below relative poverty line

Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	80.5	70.0	60.4	63.6	60.1	51.9	52.1	48.8	43.4	42.4
China	85.2	72.6	59.0	65.2	61.1	51.2	51.3	48.4	41.9	41.0
Eastern Europe and Central Asia	22.0	21.4	21.5	25.4	32.2	34.0	32.2	30.4	29.3	28.2
Latin America and the Caribbean	49.6	50.3	46.9	46.8	50.0	49.9	51.1	51.2	47.9	45.9
Middle East and North Africa	42.0	41.2	40.7	39.3	38.6	38.4	38.8	37.9	36.6	35.0
South Asia	64.0	61.6	60.9	60.3	58.9	58.0	56.9	56.8	55.1	53.5
Sub-Saharan Africa	62.3	64.3	64.2	65.1	66.9	66.6	66.5	65.3	63.6	61.1
<b>Total</b>	<b>62.8</b>	<b>58.5</b>	<b>54.4</b>	<b>56.0</b>	<b>55.7</b>	<b>52.7</b>	<b>52.6</b>	<b>51.2</b>	<b>48.2</b>	<b>46.9</b>
Total excl. China	54.6	53.4	52.8	52.9	53.8	53.2	53.0	52.0	50.2	48.6

(b) Number of relative poor (in millions)

Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1143.4	1044.1	946.2	1047.0	1031.8	925.2	959.2	924.4	841.7	840.4
China	847.0	753.1	639.8	739.9	720.0	623.1	642.7	620.0	546.5	542.6
Eastern Europe and Central Asia	94.7	94.7	97.5	118.0	150.8	159.7	151.3	143.1	138.0	133.6
Latin America and the Caribbean	180.7	195.4	193.6	204.3	230.0	241.1	259.1	270.9	263.4	261.5
Middle East and North Africa	72.4	77.8	83.9	88.5	93.3	98.7	105.6	109.0	111.1	111.9
South Asia	594.7	615.7	653.4	691.6	720.3	752.0	781.6	821.4	836.6	849.4
Sub-Saharan Africa	248.1	278.6	302.8	333.6	371.4	400.6	431.9	457.9	479.9	496.4
<b>Total</b>	<b>2333.9</b>	<b>2306.1</b>	<b>2277.3</b>	<b>2483.0</b>	<b>2597.6</b>	<b>2577.1</b>	<b>2688.7</b>	<b>2726.6</b>	<b>2671.0</b>	<b>2692.9</b>
Total excl. China	1486.9	1553.0	1637.5	1743.1	1877.6	1953.9	2046.1	2106.6	2124.5	2150.3

Note: Relative poverty lines based on Method 2. Regions with survey coverage less than 50% are highlighted.

**Table 6: Inequality between and within countries by region and year**

Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
<b>Total inequality</b>										
East Asia and Pacific	0.283	0.234	0.229	0.272	0.313	0.296	0.322	0.349	0.328	0.366
Eastern Europe and Central Asia	0.283	0.274	0.283	0.409	0.340	0.358	0.305	0.281	0.279	0.291
Latin America and the Caribbean	0.636	0.652	0.655	0.657	0.695	0.715	0.713	0.725	0.648	0.609
Middle East and North Africa	0.358	0.379	0.311	0.290	0.292	0.298	0.311	0.333	0.261	0.266
South Asia	0.164	0.173	0.175	0.165	0.166	0.186	0.194	0.191	0.193	0.195
Sub-Saharan Africa	0.503	0.533	0.552	0.552	0.521	0.471	0.475	0.509	0.502	0.531
Total	0.651	0.591	0.569	0.576	0.585	0.540	0.518	0.528	0.520	0.567
<b>Inequality between-countries</b>										
East Asia and Pacific	0.158	0.100	0.079	0.093	0.113	0.092	0.104	0.108	0.089	0.110
Eastern Europe and Central Asia	0.155	0.144	0.152	0.151	0.067	0.095	0.089	0.077	0.062	0.066
Latin America and the Caribbean	0.096	0.101	0.090	0.058	0.037	0.051	0.043	0.042	0.045	0.048
Middle East and North Africa	0.101	0.122	0.063	0.054	0.060	0.071	0.081	0.104	0.042	0.052
South Asia	0.008	0.008	0.007	0.010	0.009	0.008	0.012	0.009	0.011	0.014
Sub-Saharan Africa	0.165	0.186	0.176	0.177	0.166	0.140	0.149	0.164	0.141	0.184
Total	0.446	0.378	0.344	0.329	0.325	0.276	0.252	0.250	0.249	0.296
<b>Inequality within-countries</b>										
East Asia and Pacific	0.125	0.133	0.150	0.179	0.201	0.204	0.218	0.241	0.238	0.256
China	0.093	0.104	0.127	0.147	0.173	0.171	0.193	0.222	0.212	0.237
Eastern Europe and Central Asia	0.128	0.130	0.131	0.258	0.272	0.263	0.216	0.204	0.217	0.225
Latin America and the Caribbean	0.541	0.551	0.565	0.600	0.658	0.664	0.670	0.683	0.603	0.561
Middle East and North Africa	0.256	0.257	0.249	0.236	0.232	0.227	0.229	0.230	0.219	0.215
South Asia	0.156	0.165	0.168	0.155	0.157	0.178	0.182	0.182	0.182	0.181
Sub-Saharan Africa	0.338	0.347	0.376	0.375	0.355	0.331	0.326	0.345	0.361	0.347
Total	0.205	0.213	0.226	0.247	0.260	0.264	0.266	0.277	0.271	0.271
Total excluding China	0.249	0.256	0.263	0.285	0.292	0.297	0.292	0.296	0.291	0.282

Note: Regions with survey coverage less than 50% are highlighted.

**Table 7: Correlation matrix for the changes in variables between reference years**

	Total inequality	Inequality between countries	Inequality within countries	Absolute poverty	Log absolute poverty	Relative poverty	Log relative poverty	Log mean
Total inequality	1.000	0.635	0.746	0.140	0.171	0.256	0.269	0.116
Inequality between countries	0.635	1.000	-0.041	0.179	-0.025	0.085	-0.066	0.067
Inequality within countries	0.746	-0.041	1.000	0.027	0.243	0.258	0.406	0.092
Absolute poverty rate	0.140	0.179	0.027	1.000	0.393	0.866	0.708	-0.668
Log absolute poverty rate	0.171	-0.025	0.243	0.393	1.000	0.514	0.639	-0.750
Relative poverty rate	0.256	0.085	0.258	0.866	0.514	1.000	0.929	-0.581
Log relative poverty rate	0.269	-0.066	0.406	0.708	0.639	0.929	1.000	-0.525
Log mean	0.116	0.067	0.092	-0.668	-0.750	-0.581	-0.525	1.000

Note: n=60; correlation coefficients over 0.25 (in absolute value) are significant at the 5% level; 0.32 is the critical value for 1% significance.

**Addendum: Weakly relative poverty measures for the developing world 1981-2008 using poverty lines anchored to private consumption from national accounts (Method 1)**

**(a) % of population below the relative poverty line**

Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	79.7	68.3	57.5	61.1	56.5	46.8	50.0	46.1	38.5	39.9
China	84.0	69.4	54.0	60.2	53.7	41.2	45.2	41.5	32.8	33.9
Eastern Europe and Central Asia	34.2	33.6	33.6	29.8	26.6	31.5	33.8	34.0	35.2	33.0
Latin America and the Caribbean	50.6	53.5	44.5	43.4	47.6	48.6	50.7	52.3	47.3	45.1
Middle East and North Africa	34.2	33.6	32.5	30.3	29.9	31.3	32.4	33.8	35.9	37.3
South Asia	61.8	58.5	57.6	59.6	59.1	61.2	61.1	62.5	64.2	68.4
Sub-Saharan Africa	56.6	60.2	59.2	61.1	63.7	63.0	62.9	60.7	57.6	53.3
<b>Total</b>	<b>62.5</b>	<b>57.9</b>	<b>52.6</b>	<b>54.1</b>	<b>52.8</b>	<b>50.5</b>	<b>52.2</b>	<b>51.4</b>	<b>48.6</b>	<b>49.5</b>
Total excl. China	54.7	53.8	52.1	52.0	52.5	53.6	54.5	54.5	53.4	54.1

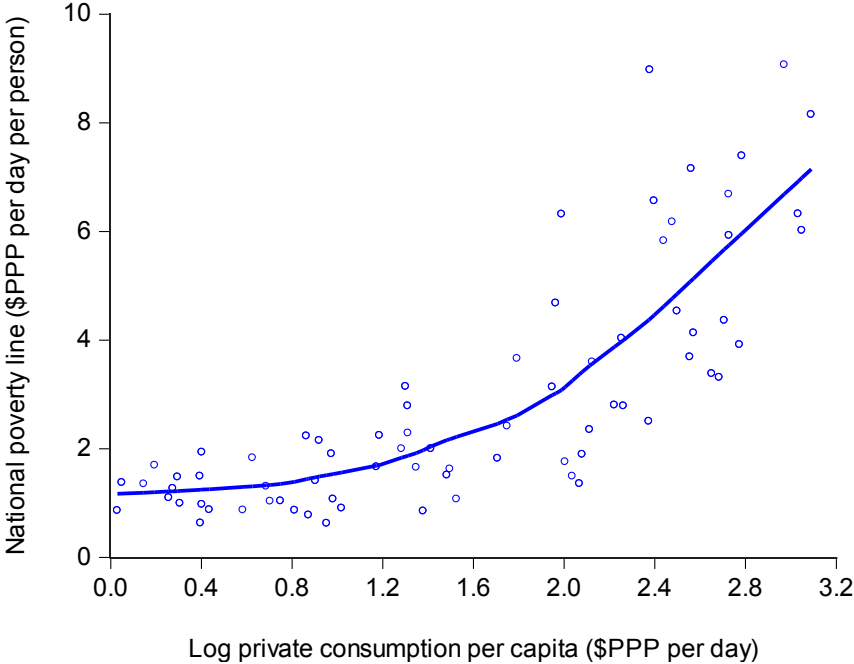
Note: Regions with survey coverage less than 50% are highlighted.

**(b) Number of people (in millions) below the relative poverty line**

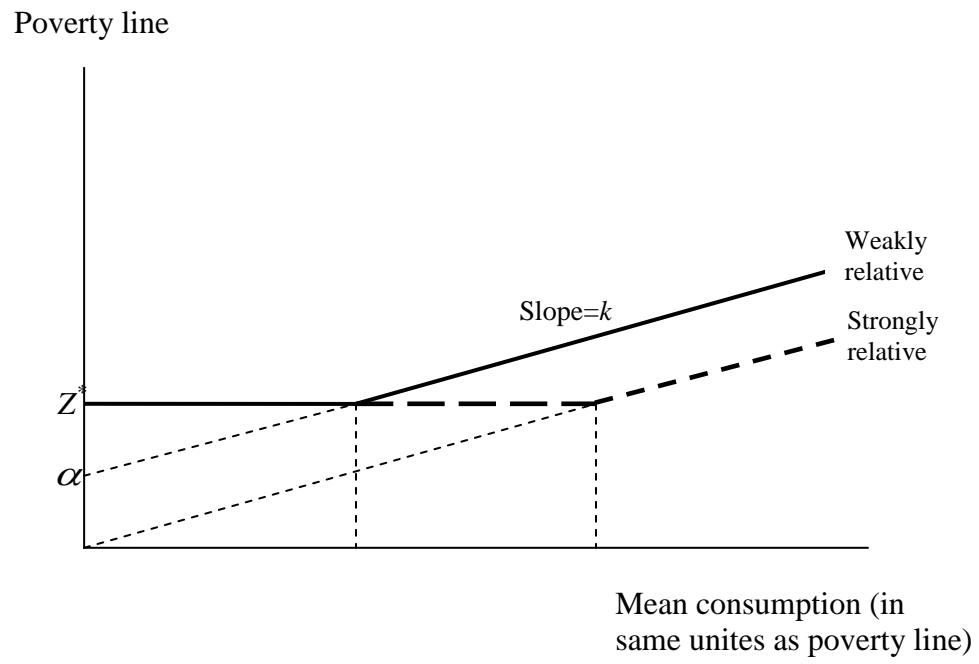
Region	1981	1984	1987	1990	1993	1996	1999	2002	2005	2008
East Asia and Pacific	1132.2	1018.5	900.7	1006.6	970.3	833.6	920.9	873.2	746.3	791.8
China	835.1	719.9	585.7	683.2	632.7	501.9	565.6	531.1	427.4	449.3
Eastern Europe and Central Asia	146.9	148.3	152.8	138.4	124.7	147.8	158.9	160.0	165.7	156.5
Latin America and the Caribbean	184.4	207.9	183.4	189.3	218.9	235.1	257.0	276.4	260.0	257.0
Middle East and North Africa	59.0	63.4	67.1	68.3	72.3	80.3	88.3	97.4	109.0	119.2
South Asia	574.8	584.1	617.5	684.0	721.9	794.5	838.3	904.6	974.2	1085.1
Sub-Saharan Africa	225.3	261.1	279.3	313.1	353.7	378.5	408.4	425.1	434.9	432.7
<b>Total</b>	<b>2322.7</b>	<b>2283.3</b>	<b>2200.7</b>	<b>2399.6</b>	<b>2461.9</b>	<b>2470.0</b>	<b>2671.8</b>	<b>2736.7</b>	<b>2689.8</b>	<b>2842.3</b>
Total excl. China	1487.7	1563.4	1615.0	1716.5	1829.2	1968.1	2106.2	2205.6	2262.4	2393.0

Note: Regions with survey coverage less than 50% are highlighted.

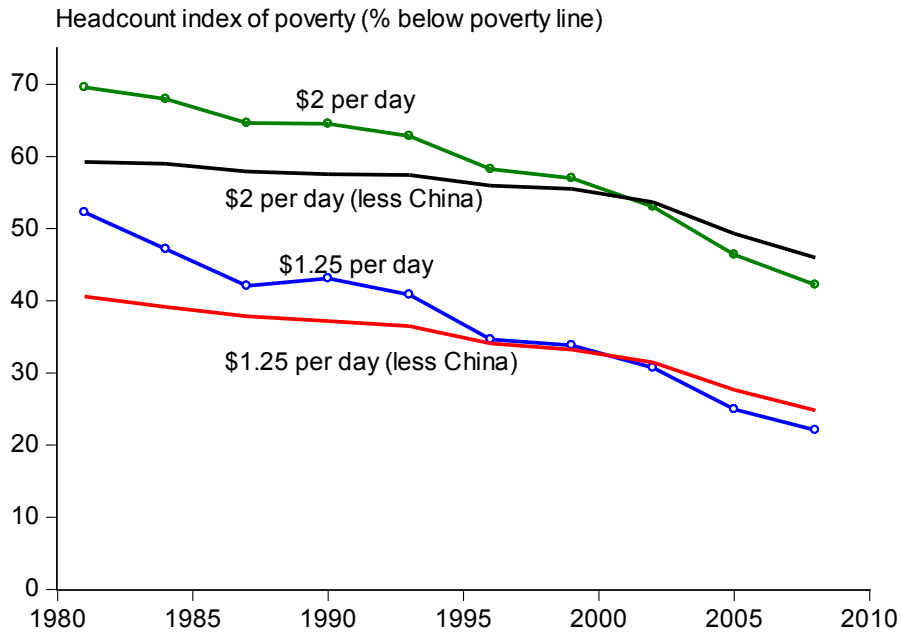
**Figure 1: National poverty lines plotted against mean consumption**



**Figure 2: Relative poverty lines**

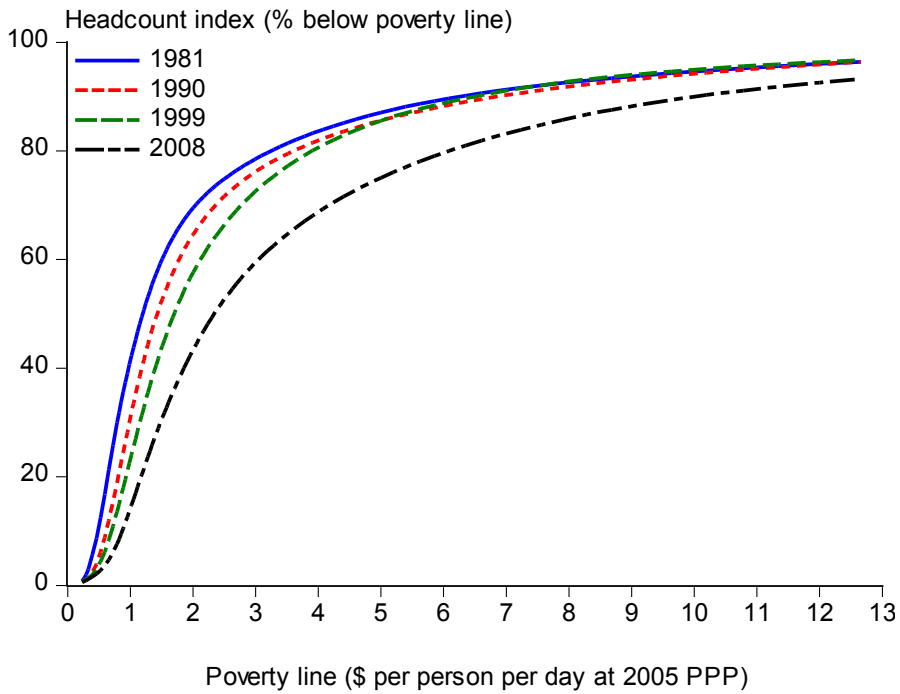


**Figure 3: Headcount indices for the developing world 1981-2008**

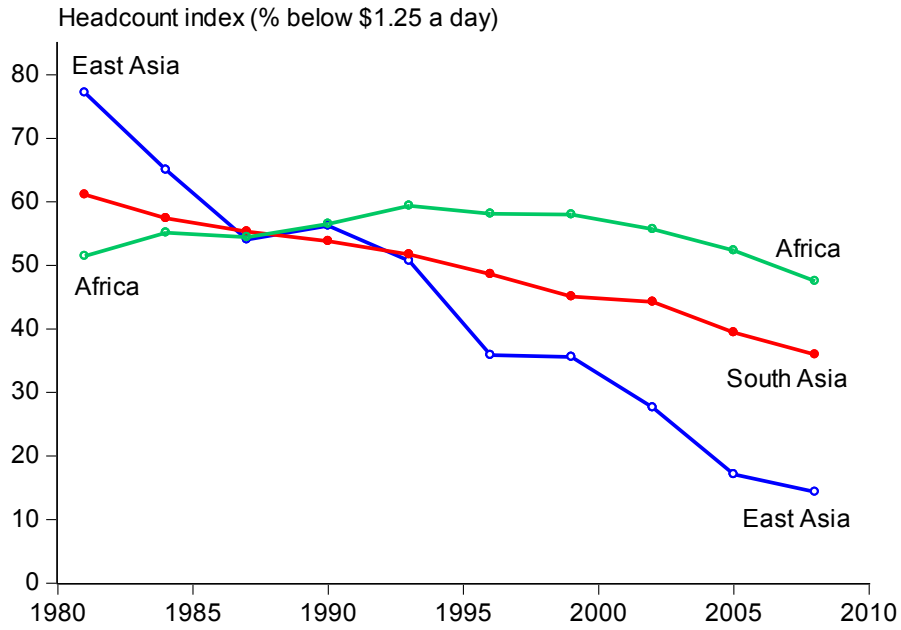


Note: Poverty lines in 2005 PPP

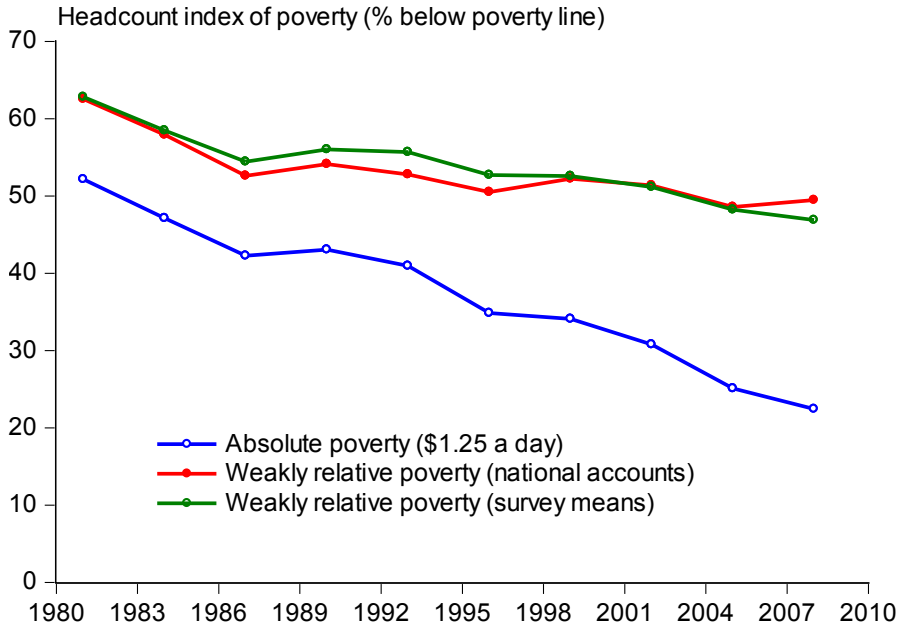
**Figure 4: Cumulative distribution functions up to US poverty line**



**Figure 5: Differing fortunes for poor people in three regions**

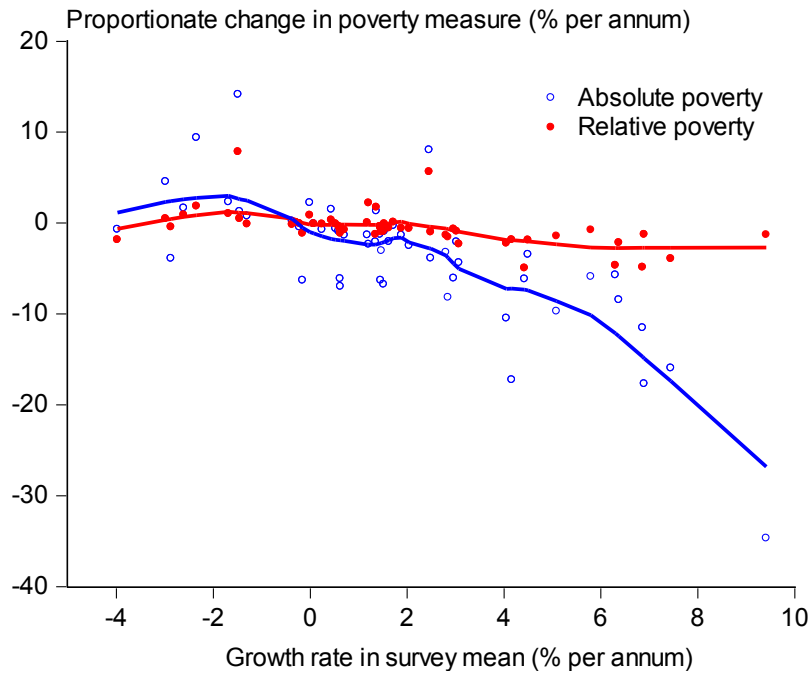


**Figure 6: Incidence of absolute and weakly relative poverty in the developing world**

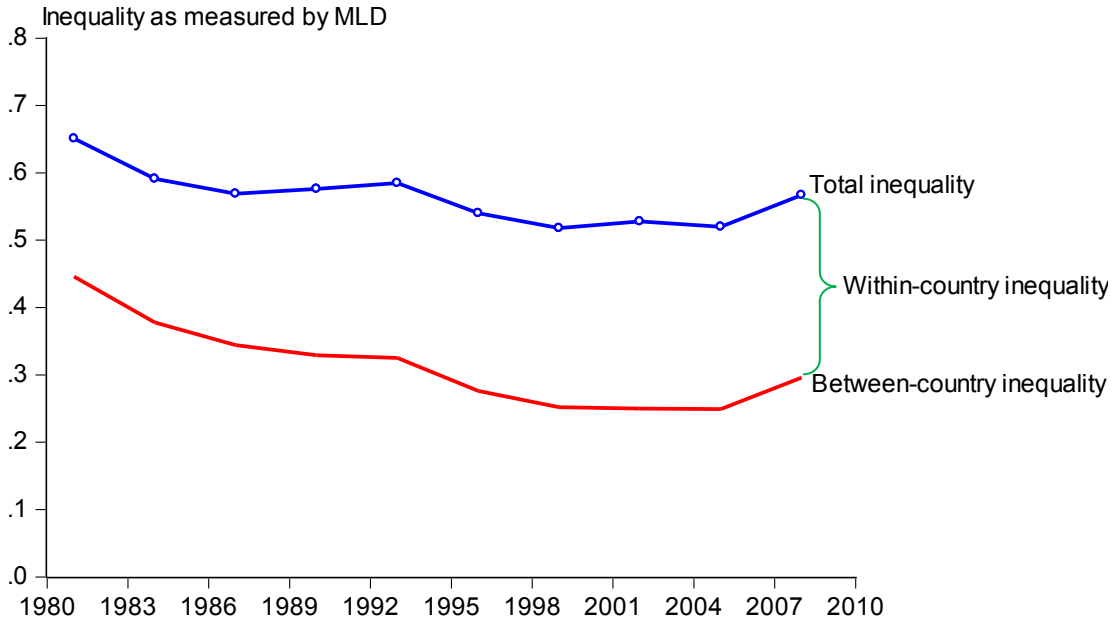




**Figure 7: Growth and poverty reduction**



**Figure 8: Inequality in the developing world**



**Figure 9: Evolution of average inequality within countries**

