Raising the Standard: The War on Global Poverty

By

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Introduction

It is an understatement to emphasize the fact that poverty reduction is one of the most important goals of our time. Much has been written on this topic, and the fight against world poverty is now more than thirty years old. In 1973, Mr. McNamara, President of the World Bank, made a speech about the need to fight global poverty, a speech that launched concentrated work , effort and aid towards poverty reduction by the developed, and developing, world.

The latest estimate (as of 2001) of world poverty is 1.1 billion people. That is, more than a billion people have per day consumption expenditures of less than a (PPP) dollar a day. This number is not that much different from that which prevailed a decade earlier – 1.13 billion in 1990. In 1981, global poverty was estimated as 1.5 billion. These calculations are as provided by the "official" source of world poverty numbers, namely the World Bank. What has changed over the last two decades is the composition of the poor – in 1981, both India and China contributed two-thirds (1 billion) to the total. Poverty then was essentially an India-China story. Two growth decades later (2001), the importance of India-China is reduced (370 and 210 million poor, respectively) but the two Asian economies still comprise about 60 percent of the world's poor.

Both Bhalla(2002), *Imagine there's no country: Poverty, inequality and growth in an era of globalization,* hereafter referred to as *Imagine,* and Sala-I-Martin (2002b) have contended that world poverty is significantly below the World Bank estimates. Depending on assumptions, our estimates for global poverty range from about 200 to 500 million, an order of magnitude lower than the official estimates. Which set of estimates are "correct" has enormous implications for aid and development policy, and for evaluations of how the globalization growth process in the last twenty years has affected the lives of the poorest.

These "new" estimates have been based on the old method of estimating poverty, and the one followed universally till the early nineties (see Ahluwalia, Carter, Chenery, 1979 for the first such estimate). This method relies upon national account means of per capita consumption, and household survey distributions of consumption (or income). Critics have rejected such estimates of poverty, primarily on the assumption that survey based estimates of per capita consumption, and not national accounts based estimates,

are the only reliable figures for the mean of per capita consumption in different parts of the world.

This paper is **not** about poverty estimates as revealed by household survey data "matched" with national accounts data[1]. Rather, this paper is about the authenticity and reliability of survey based measures of poverty. In other words, the starting assumption of this paper is that survey based estimates of poverty are likely to be "correct". Given this assumption, what can we say about poverty, inequality, and growth in the developing economies for the period 1980 to present?

This paper is also properly viewed as an extension of the poverty estimates reported in (Bhalla(2003c), 2004). The 2003c paper, "*Crying Wolf…*" paper documented how World Bank data and poverty measurement methods (i.e. using survey, not national account means) themselves indicated that the Millennium Development Goals of reducing poverty to 15 percent of the developing country population by 2015 had already been reached – and reached at about the same time as the goals were being formulated in 2000. The 2004 paper documented how some of the important parameters of World Bank poverty calculations (e.g. growth in per capita consumption between 1987 and 1998) could **not be reproduced** by the country specific data on survey means made available by the World Bank on its website.

Given this inaccuracy, there is a need to develop alternative estimates of world poverty according to survey means not suffering from World Bank "adjustments". Thus, this paper estimates poverty according to three different definitions of survey means; first, the reproduction of World Bank poverty data as reported on its website[2] for different non-OECD countries and different years. The second estimate is provided from our own collection of data on distributions and survey means[3]. These first two methods do not adjust for the noisy, and mostly declining, ratio of the survey mean relative to the estimate of the mean provided by national accounts data. A third method of estimating

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[1] The reader is referred to *Imagine*, for an extensive discussion of the issues related to poverty measurement.
[2] This website allows users to obtain World Bank data on means, distributions, and poverty estimates for the following years: 1981, 1984, 1987, 1990, 1993, 1996, 1999 and 2001. The website is http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp.
[3] For some countries and survey years that we were not able to obtain the survey means data, the World Bank website data were used.

poverty is provided in this paper; this method incorporates *all* the characteristics of survey data except one, the noisy and declining character of survey capture: the ratio of household survey means to national account means. This third method forces the ratio of the survey mean to national accounts mean to be *constant* and reflect the value obtained in an arbitrary year (e.g. 1987). This method allows the survey/national accounts ratio (S/NA) to be different across countries, but to stay constant within a country.   The above definitions differ with respect to means. The *distribution* of consumption, used by us, the World Bank, Sala-I-Martin etc. are all similar, if not identical, and do so because they originate from the same source, household surveys; and unlike for survey means, researchers have generally refrained from "adjusting" data on distributions.

The three different sources/methods yield differing estimates of poverty, but strikingly, the strong result that emerges is that regardless of the methods chosen, developing country poverty is already close to the MDG goal of 15 percent for 2015; that world poverty today is essentially about poverty in Africa; and that the World Bank estimates of poverty in India and China (especially India) seem to be gross over-estimates, and estimates not corroborated by other researchers or institutions (e.g. the official government of India estimate for poverty in India, *for the same poverty line* as that used by the World Bank, is about *10 percentage points lower* in 1999/2000).

Given this overwhelming evidence in favor of significant poverty reduction in the formerly poorest part of the world, Asia, and especially given the magnitude of poverty reduction in the two large countries, India and China, this paper argues that time has come to raise the decades old poverty line from $ 1 a day (1985 PPP prices) to a poverty line significantly higher, around $1.80 per capita per day.

The plan of the paper is as follows. Section 2 examines the data and definition issues involved in the generation of poverty estimates. Section 3 analyzes the trends in the S/NA ratio and concludes that the systematic nature of the decline prohibits a blind acceptance of survey means; hence, the need to develop a third estimate (constancy in the S/NA ratio for a country over time) of country and global poverty. Section 4 outlines a

model[4] that emphasizes the role played by the clustering or congestion of people close to the poverty line; different degrees of this congestion affect our interpretation of poverty trends, and our interpretation of how good (or bad) economic growth has been in reducing poverty. This theoretical development also helps in understanding the role of initial inequality (and inequality change) in affecting poverty decline, a subject examined in some detail in Section 5. Section 6 presents estimates of growth, inequality change, and poverty reduction in the developing world. Estimates are presented for all the three definitions of survey means. This section shows that using official and non World Bank survey means, and no change (from the World Bank) in the methods of estimation, results in developing country poverty to be lower by 250 million in 2001 – an estimate of 825 million poor rather than the 1100 million World Bank poor. Keeping the S/NA ratio constant at each country's 1987 level, and all other parameters the same as the World Bank, world poverty is reduced further to 580 million. In other words, a credible alternative survey based poverty estimate is about **half** the official World Bank estimate.

Section 7 examines the important issue of aid and poverty. Has foreign aid been "adequate" to reduce poverty, adequate being defined in terms of whether the transferred resources are at least equal to the minimum required to eliminate poverty.[5] The results are somewhat surprising – aid has been theoretically enough, and been so for over a decade. Indeed, the 'excess" aid transferred to developing countries has often been more than 50 percent of the minimum amount. This calculation is made after accepting the World Bank estimate of world poverty e.g. 1.1 billion in 2001. It appears that the conventional wisdom result that aid has theoretically not been adequate is based on a fundamental flaw in traditional calculations. The Indian example (home to 360 million out of the 1.1 billion poor, World Bank estimates) is used to demonstrate that the aid needed to remove dollar a day poverty on an ongoing basis in India is only $ 6 billion; for the entire developing world, this translates into a $ 18 billion requirement, rather , rather than the $124 billion estimated by Sachs, the World Bank, and others.

Section 8 examines the data on national poverty lines in the world, and concludes that the world poverty line of $1.08 a day is too low, and low by about 70 percent. With

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[4] See *Imagine* and Bhalla(2004) for a detailed discussion.
[5] This section has been inspired by Sachs(2005), *The End of Poverty*. Sachs himself uses this definition of adequate aid: the money needed to lift each person's consumption expenditure above the poverty line of $ 1.08 a day.

development, poverty is reduced, and the world's perception of poverty has moved away from absolute poverty to a notion of relative poverty. Most of the developing world, except sub-Saharan Africa, is in that transition mode; hence, time for the aid community to adjust and raise the standard for being poor – and raise it to PPP $ 1.8 per capita per day. Section 9 concludes.

Section 2: Data and methods

The study of poverty, and its determinants, requires that definitions of three important variables be explicit, and clear. There are several definitions of *Poverty*, but the one used here is the head-count ratio i.e. the fraction of the population whose per-capita expenditures (or income) are less than, or equal to, a pre-defined level of expenditures given by a "poverty line". *Inequality* can be measured by several indices (share of expenditures of the bottom 20 percent, the ratio of mean expenditures of the bottom 20 relative to the top 20 percent, the Gini index, etc). All these are aggregate indices – the point of departure of our analysis is that what is relevant for poverty reduction is not the decline in *aggregate* inequality but rather the change in inequality *at (or close to) the poverty line*. That this is neither trivial, nor just a theoretical point, is testified by the results presented in Section 5.

All inequality and poverty estimates require data on the *distribution* of consumption or income[6] and its *mean*. There is only one source for the distribution, and that is obviously from household surveys. But there are *two* sources for the mean – that obtained from national accounts data and that obtained from household surveys. Data for income are proxied in the national accounts by GDP per capita, and for consumption, by private final consumption expenditure. At any particular point in time, the survey mean of per capita consumption (or income) will diverge from the corresponding NA mean. This is to be expected, since definitions differ e.g. the NA mean is GDP per capita, the survey mean is personal income per capita[7]. There is a closer correspondence in the consumption measures; the two sources have the same definition but differ in coverage of the

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[6] Most poverty estimates require data on the distribution of *consumption*; the term income and consumption and expenditure are used interchangeably when referring to poverty calculations.
[7] For a few countries (e.g. US) NA data on personal incomes are easily available; for most countries, this is not the case. For consistency reasons, most analysts prefer to use GDP per capita data even when personal income data are available.

institutional (prisons, hospitals) and NGO population in the economy (the NA includes them, the surveys exclude)[8].

Growth is the least problematic variable, definitionally, but in terms of measurement, even with this variable there are problems, and controversy. In particular, as argued in Bhalla(1997) and *Imagine* , there is a need for consistency; i.e. the consumption *growth estimates need to be derived from the same source as the poverty estimates*. For example, given an estimate of the distribution of expenditures, poverty calculations using *growth* rates as revealed by national accounts will be different than the poverty estimates which use household survey growth rates. There is no comment here on which is the correct procedure – only that when exploring the growth-poverty relationship, one has be consistent in that both variables are obtained from the same source.

Income, Consumption: Data on consumption and income have been compiled from the World Development Indicators CD-ROM 2002, 2004, and World Bank online data. The 2002 CD-ROM makes available growth data for all countries till the year 2001 and uses the 1993 base for purchasing power parity (PPP). To update the growth data from the 2002 CD-ROM to those of 2004 CD-ROM, which uses 1995 as the base for PPP data, growth rates from the 1995 PPP data series are used to update the 1993 based data. Local consumer price indices (CPI) and the constant 1993 PPP World Bank consumption exchange rate are used to construct consumption growth in real PPP terms.

Distributions and survey means: Inequality data (distributions) have been gathered from three major sources, namely, Deininger and Squire (1996), WIDER Beta version (2004), and data collected from various projects undertaken at Oxus Research: *End of Asian Poverty?*, a report prepared for the Asian Development Bank; *Not as Poor, nor as Unequal as you think*, a report prepared for the Planning Commission, government of India; and the Institute of International Economics publication, *Imagine…*

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[8] It has been speculated (see Ravallion(2000)) that the NGO population in India maybe causing a significant part of the divergence between survey and NA means, and growth rates. As pointed out in Bhalla(2003c) the divergence is too large, and the NGO contribution is likely to be too small to matter.

Survey means for middle-eastern economies have been obtained from Adams- Page (2003). Survey data for 18 Asian countries were obtained from the *End of Poverty?* ; for other countries the survey means are taken from various sources; if an independent official source of data was not available, then survey means data were obtained from the World Bank websites: the old, www.worldbank.org\povmonitor and the new website http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp. [9]

Poverty Line : Data on *national* poverty lines were obtained for Asia from *End of Poverty?*; and for other countries, from Reddy-Pogge (2002), which in turn were obtained from World Bank. The international poverty line chosen is the official one: $ 1.08 per capita per day in 1993 PPP prices.

A large part of the divergence between our estimates of world poverty (presented in Section 7) and the official World Bank estimates are caused by the difference in the estimates for India. This divergence also occurs between the World Bank estimates and the official government of India estimates. This can easily occur if the Indian national poverty line is different than $1.08. But it is not – it is identically equal. This is shown as follows.

Equivalence between Indian national poverty line and $ 1.08 per capita per day
The Indian poverty line is defined in terms of 30 day consumption and in 1993/94 was equal to Rs. 206 in the rural areas and Rs. 286 in the urban areas, or an all India average of Rs. 227 per capita for 30 days. This yields a per day average of Rs. 7.57. The World Bank consumption PPP exchange rate for 1993 is given as 7.02 yielding the national Indian poverty line, in PPP 93 terms, of 7.57/7.02 or $ 1.08[10]. **A number exactly the same as the international poverty line.**

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[9] Strangely, for several countries the survey means from the two World Bank websites differ: e.g. mean per capita per day consumption for Ghana in 1993: 2.5 (old) and 1.4 (new); Bolivia in 1990: 3.7 (old) and 4.6 (new); Zimbabwe in 1990: 3.0 (old) and 1.9 (new); Indonesia in 1996: 2.85 (old), 2.50 new; India in 1987: 1.35 (old), 1.43 (new). The "strangeness" arises because unlike national accounts, the survey means do not, cannot, get updated. It is this non-matching of data that led us to estimate survey based poverty independently of the World Bank data.
[10] If the PPP exchange rate for income is taken (6.0 rather than 7.02) the Indian poverty line, in PPP terms, is not 1.08 but PPP$ 1.26 per capita per day.

This identity in poverty lines makes comparison of World Bank and Indian government poverty estimates very simple – the two should be near identical. But they are wide apart. For 1993/94, the World Bank estimate of all India poverty is 42 percent; the government of India (GOI) estimate for the *same* year, using the *same* NSS data, is a considerably lower 36 percent; on a population of 900 million, that is an *extra 54* million people deemed Indian poor by the World Bank. The divergence increases for the survey year 1999/00. Again, for the same poverty line, the World Bank estimates 36 % poor, in comparison, the government of India estimate is 26 percent – that's an extra 100 million poor in India, and the world.

On calculating mean expenditure / distribution when data are not available
Household surveys are conducted intermittently in any given country. Yet analysts, and policy makers, are interested in estimating poverty for a country (and the world) when a new household survey was not conducted. For this purpose, one needs an estimate of the distribution and the mean in this non-survey year. The procedure adopted here for the distribution (and to the best of our knowledge by most others) is to assume that the distribution remains the same in the non-survey year as that observed most recently.[11] As regards the imputation of the survey mean, the **growth** rate observed by the only mean available i.e. the national accounts per capita consumption mean, is grafted onto the survey mean for the previous period when a survey was conducted.

The method of calculating survey means for "out of sample" end years is as follows: take the last available survey mean for each country and project it forwards to say 2001 using the **growth rate** as reported by national accounts data[12]. If only one survey was conducted in a country, then the growth rate backwards and forwards is taken from that survey. This is the thrust also of the World Bank method, especially for the end years (1981 and 2001).

Conversion of nominal local currency units to PPP 1993 units
The method used by the World Bank (and the one followed here) is to convert all current expenditure data into 1993 constant price data using local consumer price indices. The

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[11] For years prior to the first survey, the distribution as observed in the first survey year is assumed; for years post the last survey, the last observed distribution is used.
[12] Different deflators (GDP or consumer price index) lead to different growth rates, with the CPI generally yielding higher inflation.

World Bank 1993 PPP consumption exchange rate is then used to convert constant local currency data into constant 1993 PPP data.

Different methods of estimating survey means:

To help provide a perspective on the likely influence of survey patterns on measured poverty, this paper provides for three separate measures of per capita consumption. The first measure is the World Bank survey mean, as provided on the World Bank website (new website data, not the old website data). The second measure uses non-World bank survey means whenever possible. The third estimate of survey mean is provided by the value of S/NA prevailing in an arbitrary selected year. By keeping the S/NA ratio constant, one obtains a growth rate in consumption, that is survey based, but yet not "contaminated" by swings in the S/NA ratio. The year 1987 was chosen as the "constant S/NA" year, partly because the trend decline in S/NA ratios seems to have accelerated, in many countries around the world, around the late eighties.

Section 3: **The trend in survey capture: ratio of survey means//national account means (S/NA)**

Until the early 1990s, the conventional method for estimating poverty was to obtain the distribution from household surveys and impose the mean of per capita consumption obtained from national accounts data. In the 1990s, starting with the World Bank World Development Report 1990 (WDR 1990), the method changed to obtaining poverty from survey means and survey distributions. But in discussions about the impact of growth on poverty, the conventional procedure still remains to use survey based poverty measures of poverty and national account (NA) based measures of growth (e.g. WDR(1990), Dollar-Kraay(2001), Datt-Ravallion(2002), Besley-Burgess(2003)).

This questionable procedure was dubbed the "Peter-Paul" problem in *Imagine* i.e. using survey based poverty and growth from national accounts was akin to using Peter's income to determine Paul's poverty. There is only one consistent method of deriving or estimating the impact of growth on poverty – average growth should be calculated from the same source as the growth in individual incomes.

One of the more important findings to emerge in the poverty measurement debate in recent years has been the highlighting of the fact that the ratio of survey means to national account means (hereafter S/NA) had, almost universally, declined precipitously in the last two decades.[13] When the growth rate of survey means is close to the growth rate of national account means, the S/NA ratio stays constant. This is what was observed in most of the world prior to 1980s. Since early 1980s, however, this ratio has declined, especially in some important poor countries; e.g. in India, the S/NA was 78.2 percent in 1977/78, and 71.2 percent in 1987/88 and 55.5 % in 1999/00. For China, the ratio has declined from 91.4 percent in 1981 to 80.8 percent in 2001. This decline in the S/NA can lead to a strong upward bias in the poverty calculations – unless one makes the unrealistic assumption that **all** of the marginal missing consumption accrued to the non-poor.

The fact that the S/NA ratio is less than 1 (or 100) is not disturbing, and nor is that it has declined. But the magnitude of the level below 100, (very low levels, less than 50 percent, are observed for several countries) and the magnitude of the decline pose serious problems for analysis of poverty.

The S/NA ratio can be somewhat less than unity for several reasons. Divergence of S/NA from unity reflects differences in definitions, differences in prices, and other unaccounted for differences. The third "error" includes response error of the rich, both in terms of the rich understating their expenditures to a greater extent than the poor, and in incomplete coverage of the rich.

In *Imagine*, the issue of greater under-reporting by the rich was examined in detail for one large poor country, India, using its household (NSS) survey for 1993-94 and national accounts data for the same year. The results were revealing – the bottom four deciles understated their expenditures by 29 percent; the average household understated its expenditure by 34 percent, and the top two deciles (the rich) understated their expenditures by 41 percent. Two conclusions are relevant – first, even the poor understate, an occurrence documented by the fact that even for food items, expenditures are increasingly being understated. Second, there is a large 12

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[13] See Bhalla(1997,2002), Deaton(2003), and Ravallion(2003) for documentation and analysis of S/NA trends.

percentage point gap between the understatement of the rich and the poor. However, when NA means are used with survey distributions, the error made for the poor is with reference to *average* expenditures and here the error has a small magnitude – only 5 percent. In other words, if India is a typical poor country, the "error" made by using NA per capita expenditures rather than survey expenditures is only around 5 percent at a *point in time*,[14] and almost zero percent for changes over time.

In addition, it is likely that more rich people are *missed* by the surveys (due to high walls, security guards etc.) than poor people missed because they are residing on pavements. A liberal estimate of the rich people completely missed by the surveys is the top 2 percent of the population. (For India, that means 20 million people or almost a third of the entire population residing in the four major cities of Delhi, Mumbai, Calcutta and Chennai). The average expenditure of this top 2 percent in developing countries is around 9 to 10 percent. If all of these 20 million top individuals (2 percent of the population) were missed by the household surveys, it would mean that the S/NA ratio would be close to 90 percent.

Thus, for one "typical" poor country, India, household surveys can be expected to miss out about 10-20 percent of actual expenditures – about 5-10 percent as understatement by the rich of expenditures actually reported, and about 5-10 percent of expenditures *not* reported by the rich. A lower bound of S/NA ratio is likely to be about 80 percent; anything below this number is likely to mean that some expenditures of the poor are actually being under-reported i.e. household surveys are likely to be overstating poverty for such countries.

Implications of a declining S/NA ratio for two poor countries, India and China
A declining S/NA ratio means that poverty is overstated – more the decline, the greater the overstatement. In the example of India above, the decline of S/NA from 78.2 to 55.5 percent in 1999/2000 is a decline of 35 percent, or an overstatement of poverty of about 20 percentage points! For China, the decline is of lesser proportions – about 12 percent; still, a likely overstatement of 5 percentage points or so. Without this decline in the

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[14] An identical exercise was carried out for three other survey years – 1983, 1987-88 and 1999-2000. While the average multiplier varied, the relative understatement of the different sectors of the population stays constant.

respective S/NA ratios, both Indian and Chinese head count ratios would have been observed to be in the range of 5 to 10 percent in 2001 – and world poverty (as measured by the World Bank) would be lower by about 350 million people to "only" 750 million. And this 350 million less people means that the Millennium Development Goal, for the $ a day poverty line, was reached at the same time as the goals for 2015 were being formulated in 2000.

Chart 1 plots the pattern of the S/NA ratio for India and China. Also reported is the trend in mean per capita consumption if the S/NA ratio is assumed to stay constant at its 1987 value, or if is allowed to fluctuate. Two points bear emphasis. First, the steep and continuous decline in S/NA for both the countries. Second, the gap between the mean per capita expenditure series – as used by the World Bank (fluctuating S/NA) and by us (constant S/NA). Each 1 percentage point gap in the two series implies an overestimate of poverty of about 0.7 to 0.8 percentage points for India and 0.4-0.6 percentage points for China.

Declining S/NA ratio observed for most countries
The case of "missing expenditures" or missing income in the nineties is not unique to India or China – indeed, these examples are typical. Out of 74 non-industrialized countries with more than one expenditure (or income) household survey in the post-1980 period, more than two thirds (50) witnessed a decline between the first and last survey post 1980; only 24 witnessed an increase.[15]

On average, the S/NA ratio has been declining by about 1 percentage points a year since 1990. Given that for the average developing country the "initial period" S/NA ratio was close to about 80, a 11 percentage point move translates into a decline of upwards of 14 percent in estimated survey consumption i.e. on average, 14 percent of gain in mean consumption of the average (or poor person) is "missing" *unaccounted for expenditures*.

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[15] Why this is happening is a major research undertaking; a likely cause is the wider choice of consumption items (which do not make it to the interview list of questions) and the increasing opportunity cost of time (people do not have time for the typical 5 to 6 hour interview – they have other work to do).

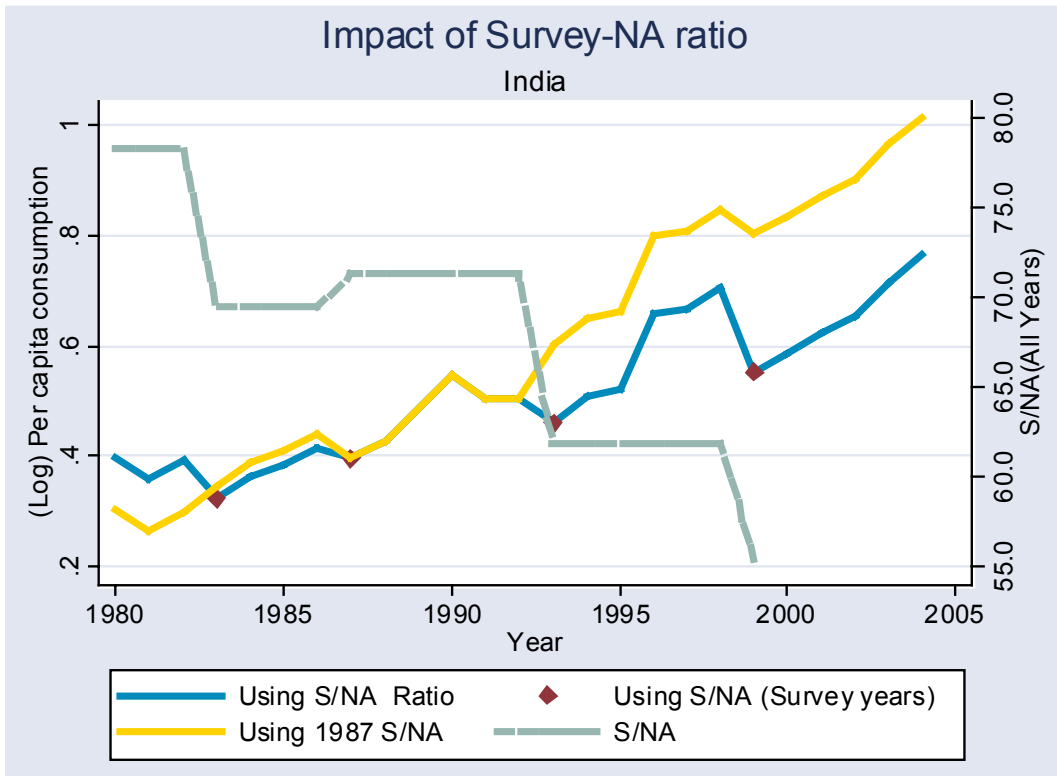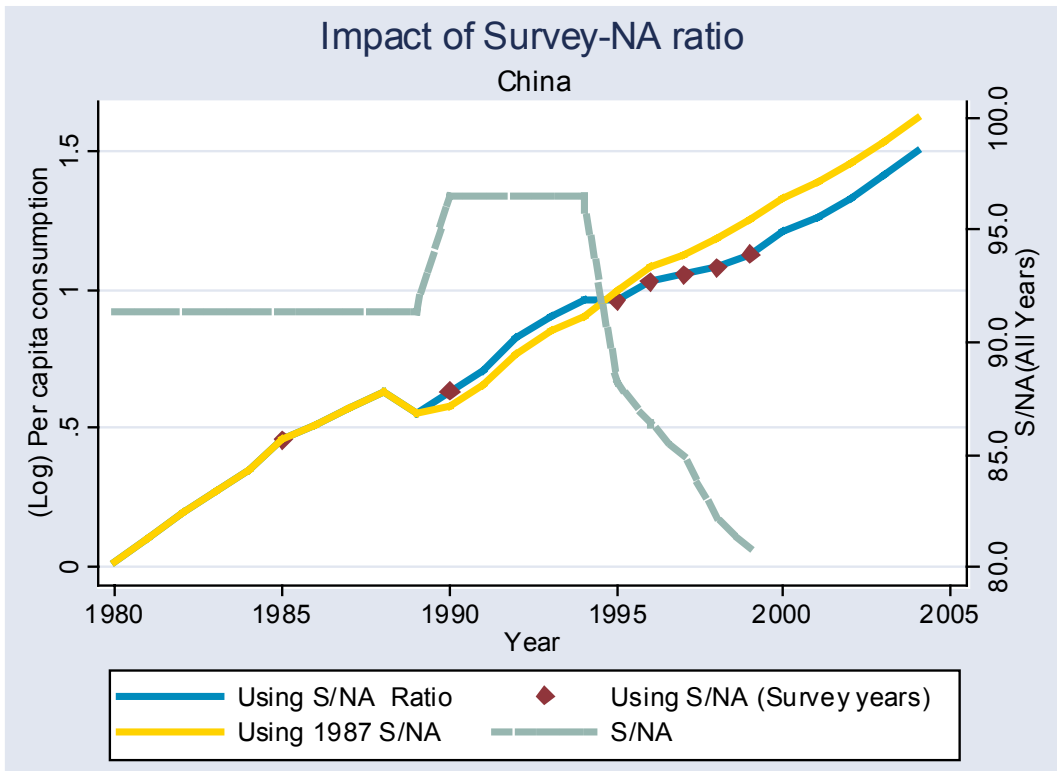Chart 1a: Declining S/NA ratios and diverging estimates of survey means - India

Chart 1a: Declining S/NA ratios and diverging estimates of survey means - China

The annualized growth rates in mean consumption for the developing world, 1990-2001, are as follows: 2.5 % per annum if the GDP deflator is used; 1.8 % p.a. if the CPI is used; survey consumption (CPI deflator) our calculations: 0.4 % p.a.; survey consumption (World Bank web data): 1.0 % p.a.

Growth in per capita consumption is different according to the different authors (as shown above); the pattern of growth is also radically different. Chart 2 documents the evolution of mean expenditures for non-OECD countries as calculated by Deaton (2004, p. Fig. 3)[16], by us, and as reported on the World Bank website (Chen-Ravallion). The numbers are reported in logs so percentage change can be read easily from the charts. Data are presented for both developing economies, and traditional developing economies. The former are all economies excluding the western developed economies, and the latter grouping consists of developing economies excluding countries belonging to Eastern Europe and the former Soviet Union.

Deaton (2004) reports survey based growth for non OECD countries to be 2.8 percent a year for the ten year period 1990-2000 (his Table 3); from his Figure 3, we obtain the annualized growth rate to be approximately 2.2 percent a year (survey means, consumption where possible). This is considerably higher than our survey based consumption growth estimate of growth of only 0.4 % per annum; the World Bank estimate of average growth is a bit higher at 1.1 % per annum.

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[16] Deaton's graph contains annual values of per capita expenditure; the chart reading has been transformed by us into a per capita per day reading rather than a per capita per year reading.

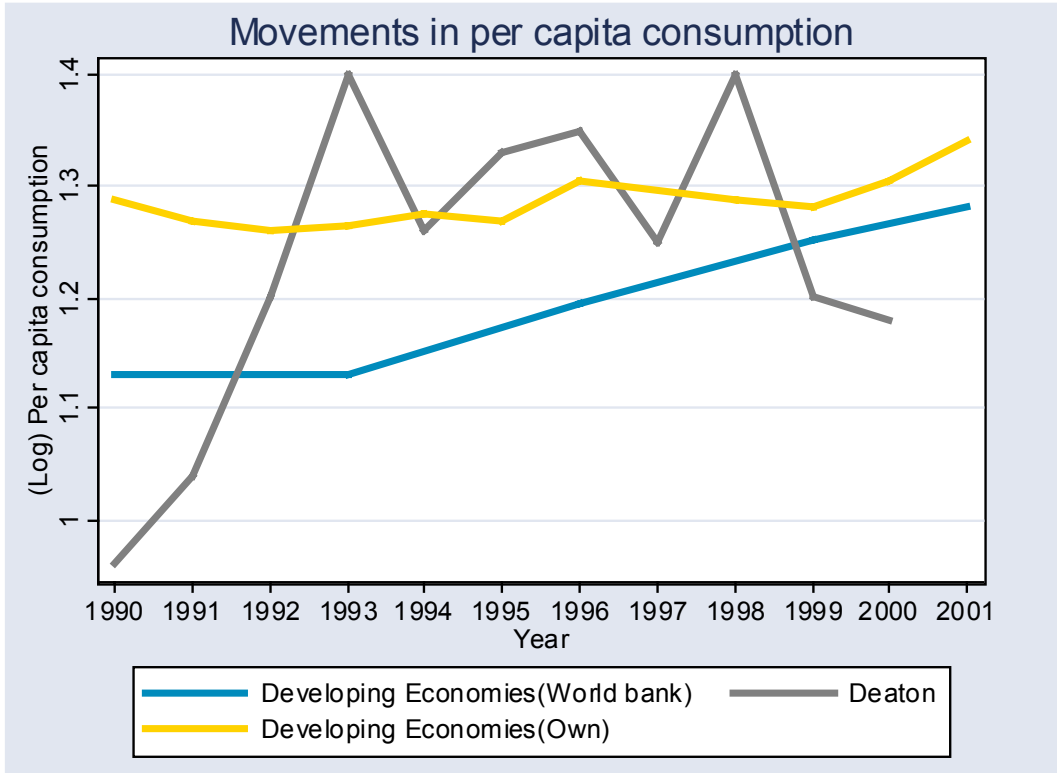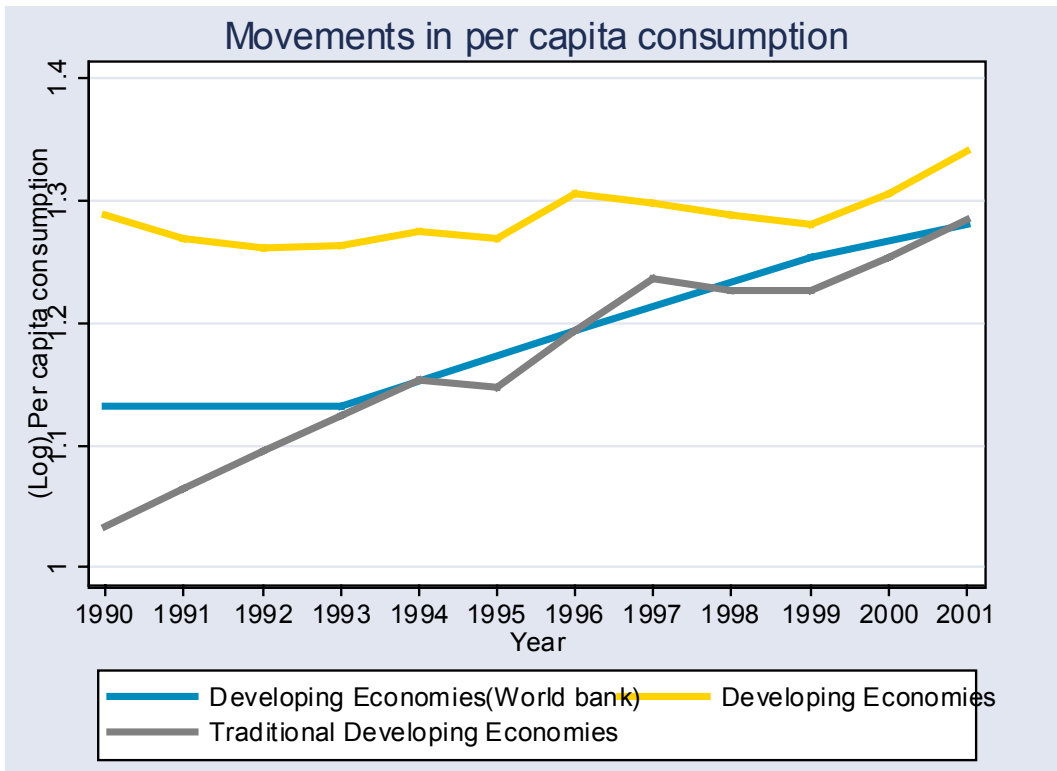Chart 2a : (Log) per capita consumption, non-OECD countries, 1990-2001

Chart 2b : (Log) per capita consumption, non-OECD countries, 1990-2001

Deaton's estimates suggest that the peak in the level of per capita consumption in developing countries was reached in 1993; his 3-year growth, 1990-1993, is a high 44 percent; his data shows the same peak being reached twice – 1993 and 1998; and in his data, over the 3 year period, 1998-2000, the average consumption level in 2000 (a recovery year) was more than 20 percent *lower* than in 1998 (an East Asian crisis year). Thus, all the decadal growth (and more) in Deaton's calculations seems to have occurred in just three years, 1990-93. Our estimates reveal a slow and gradual increase with some acceleration post 1999. The World Bank estimates show virtually no growth for the first five years, 1990-95, and then a marked acceleration for the next three years.

The pattern of growth suggests that there is greater convergence in levels today than a decade ago. In the early nineties, our estimate of per capita consumption was some 10 percentage points higher. This has a bearing on calculations of change in poverty; the World Bank estimates suggest that almost all of the decline in poverty in the 1990s took place since 1995, while our results suggest a more continuous pattern.

There is considerable interest in the role of growth and inequality in poverty decline (subjects considered in the next few sections). A changing S/NA ratio contaminates the observations making the isolation of the roles of growth and inequality change very difficult. There is one method by which the role of changing S/NA can be controlled for, or negated. The level of survey means at any point in time contains useful information about response error, understatement by the rich etc. The World Bank method is to rely on the generated survey mean in every year. Our suggested "new" method (keeping the S/NA ratio constant) incorporates the advantages of a non-uniform S/NA across countries, and negates the disadvantage of a declining S/NA.

This third method, (hereafter as the SNAk method), by purging the role of S/NA fluctuations, can help to accurately assess the differential roles of growth and inequality in affecting poverty decline, and/or whether initial inequality affects future poverty decline etc. It can also help us to assess the puzzle of high growth and little "observed" poverty decline i.e. the conclusion that poverty decline has not been commensurate with the growth that has occurred. Part of the puzzle is resolved by keeping the S/NA ratio constant; as documented in the next section, a large remaining part of the puzzle is resolved by noting that poverty decline depends, in addition to consumption growth and

inequality change, on the nature of the clustering of the poor close to the selected poverty line.

Section 4: Growth, inequality change and poverty decline - Theory

There are two important determinants of change in poverty: change in the mean (growth) and change in the distribution (inequality change). It is important to distinguish between the two, both for analytical purposes (how important is growth as a determinant?) and for policy purposes (what kind of poverty decline should one expect for each unit of consumption growth ?). An adequate theory needs to be developed linking these three variables, and Datt-Ravallion(1992) provide an approximate solution. A more exact solution is possible, a solution first offered *graphically* as early as 1964 by Anderson.

The relationship between growth and poverty can be shown as follows: If H is the cumulative distribution, and Y is per capita consumption (or income), then the relationship between the two is simply described as :

(1)   H   ≡ $F(Y_t)$,   Y goes from 0 to ∞, H 1 to 0

where $F(Y_t)$ is the distribution function evaluated at the value of Y equal to the poverty line P. For a given value of Y, say the poverty line P, the head-count ratio is read as F(Y=P).

This identity makes clear that *monetary* poverty (i.e. poverty in money incomes and not poverty due to lack of education etc.) is explained entirely by knowledge of the level, and distribution, of expenditures. Note that there is no simultaneous relationship between the level of income and poverty, nor is poverty a function of either time or other exogenous variables, after controlling for mean incomes and the distribution of such incomes.[17]

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[17] See Srinivasan(2004) who argues that such is the case.

Differentiating equation (1) and noting that the derivative of the cumulative distribution F(Y) is the density f(Y), one obtains[18]

(2) $dH = f(Y)dY$

Multiplying both the numerator and the denominator on the right hand side of the equation by Y (*one* value of which is the poverty line, another value is the mean);

(2') $dH = Y*f(Y)dY/Y = Y*f(Y)*Y'$

where prime indicates dY/Y or growth. At the poverty line, equation 2 can be read as:

(3) $dH = P*f(P)*Y'$

The term on the right hand side of equation 3 is a product of two terms, the poverty line, P, and the density evaluated at the poverty line, f(P). Since this density refers to the condition existing *prior* to economic growth, the RHS of the equation should properly be written as

(4) $H_t = \{P*[f(P)]_{t-1}\} * Y'$

Equation 4 is arguably *the* equation of interest to policy makers i.e. it answers the question of the **change** in poverty, **in percentage points**, for a given amount of growth , Y'. The left hand side of equation (4) is not the *percent change* in the head-count ratio, H', but rather dH or arithmetic change in *percentage points*.

Equation 4 implies that the impact of growth Y' on poverty decline is known *ex-ante*. But equation 4 is not the equation estimated by most analysts. The equation estimated is with percent change in H as the dependent variable. Division of both sides of equation 4 by initial head-count ratio (H_{t-1}) or Ho does yield the "standard" growth-poverty elasticity.

$$dH/Ho = H' = Y*f(Y)*Y'/Ho$$

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[18] See *Imagine*, section entitled, pro-poor math, pages 151-58, for a discussion of the formulae presented here

(5) $\eta = [H'/Y'] = Y*f(Y)/Ho$

The elasticity, η, evaluated at the poverty line, P, is therefore given by

(6') $\eta_P = [H'/Y'_P] = P*f(Y_P)/Ho$

The growth in incomes of individuals close to the poverty line, Y_P', can be written as the sum of the growth in aggregate mean incomes , Y'_M and the **growth in the share** of incomes of the poor, the fraction X close to the poverty line, Y_X' i.e.

(7) $Y_P' = Y'_M + Y_X'$

Substituting for Y_P' in equation (5)

(8) $H' = \{P*f(Y_P)/Ho\}* (Y'_M + Y_X')$

Dividing both sides of equation (8) by the mean growth in average expenditures, Y', one obtains an equivalent expression for the growth-poverty elasticity, equation 9:

(9) $[H'/ Y'_M] = \eta = \{P*f(Y_P)/Ho\}* (1 + (Y_X'/Y'_M))$

Equation (9) integrates the trinity – poverty decline, inequality change and average income growth. If it is assumed that inequality change Y_X' is zero, then this equation reduces to the conventionally measured elasticity as a special case.

(10) $[H'/ Y'_M] = P*f(P)_{t-1}/Ho$

The central role in equations 9 and 10 is that of the product $P*f(Y)_{t-1}$ or $P*f(Y=P)_{t-1}$ and its property that for any period of forecast it is known *ex-ante* – P is exogenously given and $f(Y=P)_{t-1}$ is the density evaluated at the poverty line P in period t-1. In *Imagine*, the product $P*f(Y=P)$ was termed the **"shape of the distribution" elasticity** or SDE – *this quasi-elasticity yields the total arithmetic change in the head count ratio of poverty that*

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can be expected with a 1 percent change in mean expenditures of individuals clustered around the poverty line.

The income change that matters in computing SDE is that occurring at the poverty line, regardless of whether such change comes via an inequality decline, or income growth, or a combination of the two. The magnitude of SDE indicates the degree of *congestion* near the poverty line. It is this congestion that reveals the *true* "*elasticity"* with respect to growth.

Origins of SDE

Given its use and validity, it is surprising that the estimation of SDE has not become more common in the poverty literature. The first graphical formulation of SDE was done by Anderson(1964) who used US data on poverty to make the point that the rather small decline observed in US poverty in the early 1960s, despite rapid growth in per capita incomes and not much change in the distribution of incomes, was not at all surprising and had a lot to do with "congestion" of the poor near the poverty line. [19] Though Anderson does not offer any empirical values for SDE, our estimated value for SDE for the US in the early sixties is around 0.15 i.e. a ten percent change in average incomes of the poor would be needed to make the head count ratio decline by 1.5 %. Thus, even a 30 percent increase in per capita incomes over thirty years will only result in a fall of only three percentage points in the aggregate head-count ratio[20].

"For any of these groups, an increase in median income of about 2.5 per cent would reduce the incidence of poverty by 1 percentage point, judging from the slope of the central portion of Figure IV…..This analysis suggests that movements along the poverty curve corresponding to the existing income distribution will imply a declining rate of reduction of poverty", Anderson(1964, p.).

Anderson's important work was ignored by development practitioners (perhaps because it was on the US). Thus, discussion of the impact of the congestion at the poverty line on future poverty reductions remained absent until 1990 when the World Bank 1991 report

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[19] I am thankful to Angus Deaton for suggesting this reference.
[20] Part of the reason that the predicted fall is higher than actual is because the growth rate assumed is that from national accounts, while the poverty calculations are based on growth rates from sample surveys. See *Imagine* and Bhalla(2004a) for a detailed discussion of the importance and relevance of a declining S/NA ratio for poverty calculations.

on Malaysia and the 1991 World Bank report on poverty highlighted its importance; It was next emphasized by Dubey-Gangopadhyay(1998). These three reports, however, did not offer any empirical estimates of SDE.

What the SDE-growth relationship suggests (e.g. the US example) is that there can be robust growth in incomes of the poor and yet very little poverty reduction. The following heuristic example is illustrative. Assume the poverty line is 100 and that most of the poor (the center of gravity) are clustered around a mean income of 50, and that the standard deviation of the incomes of the poor is 20. An increase in mean consumption of 10 percent will have a near-zero impact on the head count ratio. Now assume that the mean shifts to 95 and the standard deviation is only 10. Now a 10 percent increase in mean consumption will lead to a very large decline in the head count ratio. If the poor are now congested at a level close to the poverty line, say 99, the elasticity will be close to infinity. So with the same growth in mean consumption of the poor, one obtains varying elasticities.

Non-linear estimation necessary for SDE
Non-linear estimation techniques are necessary to estimate the value of SDE, which maybe an additional reason why it has been "ignored" by development economists. The first estimate of SDE was provided by Kakwani in 1993. Using household level data, he stated, in the Appendix to his paper that:

"to compute the elasticities of the head-count ratio …, we need an estimate of the density function f(x) when x=z (z is the poverty line). This estimate can be obtained by fitting an equation of the Lorenz curve (Kakwani(1993), p. 136-137).

Using a very different method of estimating SDE's (see *Imagine*) the same magnitude of SDE is obtained – 0.0023 for a poverty line of $1.08 - versus Kakwani's estimate of 0.0026 for a poverty line of $1.02. Even though he estimates a value for SDE, Kakwani does not derive the simple "equivalent" relationships noted above; instead he suggests that the elasticity with respect to income growth is *different* than the elasticity with respect to the change in the distribution. Theory suggests (equation 8 above) that the two are the same; perhaps the difference is explained by the fact that Kakwani was

interested in the elasticity with respect to *aggregate* inequality, not with the elasticity with "inequality" at the poverty line, the variable dictated by theory.[21]

While appropriate for the average person, aggregate inequality calculations (as conducted by Kakwani) are *inappropriate* for the *poor* population. A simple example will help illustrate why such concentration on change in average inequality can be misleading. Assume the poverty population in the initial period is 20 percent and due to "pro-poor" growth, the share (in total expenditures) of the first quintile increases, along with the share of the third and fifth quintiles. For reasonable values of changes in shares, an aggregate index of inequality might well show a worsening in the aggregate distribution when there has actually been an improvement in equality (for the poor).

How well does SDE work in explaining poverty decline? As explained above, the poverty decline is entirely a function of the congestion near the poverty line and the growth in incomes of the poor near the poverty line. The fraction of the poor have to be kept constant as per the model.[22] Table 1 explores the predictive power of the model (equation 3) for two different poverty lines - $ 1.08 and $ 2.16 per day. Three estimates of growth in survey means are used – SM (survey means as estimated from non World Bank web data; SMA-WB, survey means adjusted, World Bank web, and SNAk, survey means computed with the assumption that the S/NA ratio for each country has stayed constant at the 1987 level.

The results are striking – for both the poverty lines, and regardless of the method, the predicted poverty decline for the 20 year period , 1981-2001, is very close to the actual decline. The only somewhat wide variation (about 15 to 20 percent) in the predicted versus actual occurs with the World Bank data.

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[21] Kakwani's important 1993 calculations were the only empirical estimates of SDE until the late nineties; to date, empirical estimates of SDE for Indian states have been provided by Deaton-Taraozzi(2000), Deaton-Dreze(2002), and Bhalla(2002); *Imagine* presents estimates of SDE for all the countries of the world, and for each year since 1950.

[22] The incomes of the poor at any point in time change very slowly i.e. the poverty gap (distance between the average income of the poor and the poverty line) stays relatively constant.

Table 1: Predicted and actual decline in HCR, 1981-2001

Type	Pline $1.08 Actual	Pline $1.08 Predicted	Pline $2.16 Actual	Pline $2.16 Predicted
Developing Economies				
SM	-20.0	-23.2	-19.8	-17.5
SNAK	-25.9	-28.3	-29.3	-27.2
SMA-WB	-19.6	-23.2	-20.3	-16.3
Traditional Developing Economies				
SM	-22.4	-26.1	-24.8	-21.2
SNAK	-28.7	-31.7	-33.7	-30.4
SMA-WB	-22.5	-26.0	-24.8	-18.9

Source: Povcal Net available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp , Surveys for various countries and years, World Development Indicators CD-ROM (2005) .

Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website); SM represents survey means based on mostly non World Bank web data .

Section 5a: Initial inequality, inequality change, and poverty

The formulation of the poverty growth elasticity in terms of SDE allows one to better understand the determinants of poverty change, and to better understand the role of initial inequality, and inequality change in affecting poverty decline. Reproducing the growth – poverty elasticity equation,

$$(9) \qquad [H'/Y'_M] = \eta = \{P*f(Y_P)/Ho\}* (1 + (Y_X'/Y'_M))$$

Some basic results/implications emerge about the characteristics of the growth-poverty elasticity, η :

Implication 1: η ambiguously depends on the magnitude of the poverty line
The elasticity depends on the level of the poverty line. The partial derivative of the elasticity with respect to poverty line P is given by the sum $(f(P) + Pf''(P))$ where $f'(P)$ is the marginal *change* in the density at the poverty line. The first term is always positive but $f'(P)$ can be both positive and negative. It depends; thus the impact of the poverty line on the growth poverty elasticity is ambiguous.

Implication 2: η ambiguously depends on initial inequality at the poverty line.
There is no direct expression for initial inequality (even at the poverty line) in equation 9. However, from that one cannot conclude that initial inequality does not matter. The density, $f(P)$, is an indicator of inequality; the more congested are the poor near P, the higher the initial equality of those close to the poverty line P. But the elasticity η is a product of $f(P)*P$. And this value can go up or down with values of initial inequality

Implication 3: η negatively depends on the magnitude of initial poverty
The elasticity η_H is not independent of the initial head-count ratio. With economic development, there is an increase in per-capita incomes, a decline in the poverty ratio, Ho, and a corresponding increase in the poverty elasticity. Indeed, this elasticity can approach infinity as one approaches lower and lower levels of poverty.

The lower the initial level of poverty, Ho, the higher the elasticity, η. Thus, the pro-poor nature of growth is **not** indicated by the growth-poverty elasticity (as argued by many –

e.g Ravallion, Klasen, Besley-Burgess). This is easily illustrated as follows. Assume for a moment that a country reduces its poverty to very small single-digit levels. The poor now are the hard-core poor, and countries find it difficult to attack such low-end poverty. In this "zone" the growth poverty elasticity is low i.e. a given amount of growth yields less poverty decline. Yet use of η suggests that it is now "easier" to reduce such poverty because the elasticity is high.

Implication 4: η does not depend on aggregate inequality.

There is no expression for *aggregate* inequality in equation 9. This is an important conclusion since the literature is replete with discussion about how aggregate inequality has a strong role to play in poverty reduction. Note that the density at the poverty line, $f(P)$, does affect η but there is no guarantee that there is a monotonic, or even a positive, relationship between inequality at the poverty line and aggregate inequality (see below for a more detailed discussion).

Implication 5: **Inequality change and growth have the same elasticity**

The most important, and surprising, conclusion to emerge from examination of equation (9) is that both average economic growth (Y') and inequality change (Y_X') have the *same* elasticity.

The impact of both average expenditure growth, and average change in the share of expenditures of the poor, is the *same* and equal to SDE_{t-1}/Ho. Thus, it is *not* the case that average growth and inequality change have different elasticities. That this "equivalence" must be so is indicated by the following. Growth in expenditures of the poor is the sum of growth from two sources: the mean growth in expenditures of the entire population (this is the popular "headline" growth variable) and the growth in the *share* of expenditures of the poor (change in inequality but only for those close to the poverty line). Thus, if mean expenditures increase by (log) 10 percent, and inequality, measured as the share in total expenditures of the population close to the *poverty line* worsens by (log) 10 percent, then there will be no change in net income of the poor, and therefore little change in the head-count ratio of poverty.

Varying growth-poverty elasticities due to varying SDE – examples of Brazil, China, India
That inequality may not be relevant for poverty reduction can also be illustrated by examining the data for three large economies – Brazil, China and India. The three economies also have different historical inequalities – from very high in Brazil, to relatively high in China to relatively low in India. The magnitude of poverty reduction in each society is a function of its SDE – which in turn is a function of the poverty line and the density at the poverty line.

Brazil: Even very unequal societies like Brazil can have "zones" where equality is not so unequal. For example, the bottom 20 percent in Brazil may have only 5 percent of total income, but all these 20 percent could have great equality and have the same low level of income; and when such incomes are close to the poverty line, the clustering will cause the poverty reducing potency of growth (the elasticity) to be very large. In the late sixties, 10 percent growth in Brazil led to a poverty decline (in percentage points) of 4.1 percent; in the nineties, if the same growth had occurred, and with no change in inequality, the poverty decline would have been only 2.2 percentage points.

India: In the early eighties, each 10 percent growth led to 8 percentage points decline in poverty; in the late nineties, the expected decline, *ceteris paribus*, was also 8 percentage points.

China: With a Gini of 27.8, China was a very equal economy in the early eighties. At that time, each 10 percent increase in incomes led to a 6.5 percentage point decline in the HCR (average value of SDE of 0.65) for the $ a day poverty line and a 4.2 percentage point decline for the $2 a day poverty line. A decade later, income distribution in China became more unequal; but the same amount of growth now led to a *larger* decline in the HCR for the $ 2 a day poverty line, 5.1 percent, (because the distribution *around the poverty line* is now more equal) .

What the examples of India, China and Brazil illustrate is that the *same* amount of economic growth can lead to similar or different poverty declines, and for similar or dissimilar poverty lines. The above statistics highlight the dangers of not adjusting for SDE ; same amount of growth, no change in the distribution, yet radically different outcomes – and false interpretations.

Section 5b: *Initial Inequality and poverty reduction*

One of the most consistent "findings" in the recent development literature is that poverty reduction is greater, *ceteris paribus*, in more equal economies. The reasoning is assumed to be straightforward : lower inequality means a higher share of income at a point in time for any given group, say the bottom 20 percent; this implies that a higher share of the same growth will accrue to the poor in the more equal country; this "higher" growth means a higher magnitude of poverty reduction; hence, the simple conclusion that a more equal distribution of income is desirable for poverty reduction. Several documents have offered this logic to advocate a more equal distribution of income as a *desirable* starting point in discussions of poverty reduction e.g. WDR 1990, WDR 2000/01, Ravallion(2001), Klasen(2001), Datt-Ravallion(2002). Some excerpts from the first and last study illustrate this belief:

WDR 1990,: "A 10 percent increase in the incomes of the poor in Bangladesh and India would reduce the incidence of poverty by about 7 percentage points. *Where the distribution of income is more unequal*, as in Venezuela and Brazil, the corresponding figure would be only 3 percentage points" (emphasis added, p.47).

Datt-Ravallion (2002, p.]: Household survey data for developing countries suggest that initial distribution does matter to how much the poor share in rising average incomes; higher initial inequality tends to reduce the impact of growth on absolute poverty. By the same token, higher inequality diminishes the adverse impact on the poor of overall contraction.

There are two questions about initial inequality affecting poverty that are relevant. First, does initial inequality affect future growth which affects poverty; and second, does initial inequality, independent of its effects on future growth, affect directly the *change* in poverty (as argued above).

On the latter question, a clear answer is possible, and it is that initial inequality is irrelevant for future poverty reduction. The *change in poverty* is a function of the *change in consumption at the poverty line*. If inequality does not change, then growth cannot have a differential impact. When inequality stays constant, **the same amount of growth *will result in the same increase in the consumption of the bottom 20 or bottom 40 percent or the top 1 percent*.** So if a person was poor in 1987 in unequal Brazil or equal India and consuming $ 1 a day, and if both societies experienced a 10 percent

change in average consumption, and in both societies inequality did not change, then in both societies the poor person would be consuming $1.10 in 1998, and in both societies the person would be non-poor in 1998; i.e. initial inequality is irrelevant for poverty reduction, as far as a direct (independent of the effect on growth) impact is concerned.

But improvement in inequality does have a direct effect on poverty reduction – as shown above, it's impact is equal to the impact of growth. It has been speculated (e.g. Bourguignon(2004)) that a large part of the poverty decline can be explained by inequality change – hence, policy concentration should be on improving inequality.

Table 2 summarizes the poverty decline explained by inequality change properly measured (i.e. the change in the share of expenditures accruing to a constant fraction of the poor i.e. the percent poor in 1987.)[23] The first column reports the average annual poverty change attributed to growth, and the first column (under inequality heading) is the average annual poverty change that can be attributed to inequality change. The share of poverty change explained by inequality is around 15 to 25 percent for traditional developing economies. For developing economies inclusive of Eastern Europe and former Soviet Union economies, it is almost 50 percent. This increase in the explanatory share of inequality is entirely due to the structural change (Gini changes of more than 30 percent in most economies) that occurred in these non-traditional developing economies.

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[23] Traditional calculations of the impact of aggregate inequality change (via regression analysis) shows an even smaller impact of inequality change on the change in poverty.

Table 2: Comparative importance of growth and in equality change in reducing poverty , 1980-2000

	Growth		Inequality		Share of inequality	
	SNAk	SMA-WB	SNAk	SMA-WB	SNAk	SMA-WB
Pline $1.08 1993						
China	3.67	3.73	-0.60	-0.76	14.0	16.9
India	2.18	1.00	0.16	0.26	6.9	20.6
Traditional Developing Economies ex. India & China	0.34	0.26	-0.10	0.29	23.5	52.8
Traditional Developing Economies	1.19	1.08	0.35	0.22	22.9	16.7
Developing Economies	0.72	0.49	0.68	0.68	48.4	58.2
Pline $2.16 1993						
China	2.94	2.67	-0.99	-1.06	25.2	28.3
India	1.38	0.35	0.21	0.16	13.4	30.5
Traditional Developing Economies ex. India & China	0.44	0.27	0.18	0.32	28.7	54.2
Traditional Developing Economies	1.15	0.79	0.44	0.20	27.7	20.5
Developing Economies	0.71	0.37	0.78	0.55	52.6	59.7

Source: Povcal Net available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp , Surveys for various countries and years, World Development Indicators CD-ROM (2005) .
Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website).

Section 6: What happened to poverty, inequality and growth, 1981-2001?
There is a fierce debate on what *actually* happened to poverty over the last two decades.
A useful path for analysis is to first isolate the facts. Facts are presented for poverty,
growth, and inequality change according to three sets of survey means (the distributions
are the same) – SMA-WB, SMA and SNAk.

The groups of countries for which data are presented are as follows: all developing
economies (DE), defined as the world minus the OECD countries as in 1990[24]; such
economies excluding the countries belonging to the former Soviet Union and Eastern
Europe (traditional developing economies or TDE), sub-Saharan Africa, India, and
China.

Growth in per capita consumption:
Per capita consumption growth during the 20 year period was a high 46 percent for the
traditional developing economies, but considerably less (18 percent) for the developing
world. The difference is due to the presence of the Eastern European economies in the
latter grouping, and the influence of the structural transformation (deep decline in per
capita incomes) involving these countries also shows up in the low growth observed in
the 1990s. These estimates are for the growth as observed by survey means, SM. The
influence of the decline in the S/NA ratio is yielded by the difference in the growth rate
according to SM and SNAk – the SNAk growth is 18 percentage points higher at 64
percent. A decline in absolute per capita consumption is observed for sub-Saharan
Africa – a decline of 8 percent according to SM and 13 percent according to World Bank.

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[24] This means that present OECD countries like Korea and Mexico are part of the developing
economy set.

Table 3 : Per capita per day consumption , 1993 PPP prices, 1981-2001

	SM			SNAK			SMA-WB			Growth % (1981-2001)		
	1981	1990	2001	1981	1990	2001	1981	1990	2001	SM	SNAK	SMA-WB
China	1.1	1.9	3.5	1.1	1.8	4.0	1.2	1.9	3.6	218.2	259.9	209.2
India	1.4	1.7	1.9	1.3	1.7	2.4	1.3	1.5	1.6	30.0	83.2	28.2
Traditional Developing Economies ex. India & China	3.9	3.9	4.5	3.9	4.0	4.7	3.9	4.0	4.4	14.4	21.2	13.4
Traditional Developing Economies	2.5	2.8	3.6	2.4	2.8	4.0	2.4	2.7	3.5	46.2	63.8	46.5
Developing Economies	3.2	3.6	3.8	3.2	3.6	4.3	3.1	3.3	3.7	18.4	36.1	20.2
Sub Saharan Africa	2.7	2.4	2.5	2.7	2.4	2.5	2.4	2.3	2.1	-8.2	-7.6	-12.7

Source: Povcal Net available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp , Surveys for various countries and years, World Development Indicators CD-ROM (2005) .

Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website); SM represents survey means based on mostly non World Bank web data.

Inequality:

While calculations of inequality change are involved, a heuristic prior would be that the distribution of consumption *improved* during 1981-2001. Among the poorest countries in 1980 were China and India, and the combined population of these two countries has averaged over 5.1 percent growth per annum for the last twenty five years. This simple expectation is at odds with much of the prevailing literature, and near conventional wisdom, about what happened in the years of globalization.

This heuristic reasoning – faster growth in poorer countries should lead to a decline in inequality – is well supported by rigorous estimation of inequality changes. Chart 3 plots the evolution of the Gini index from 1980 to 2003 for the two different definitions of survey per capita consumption (World Bank and SNAk). Regardless of the type of data, inequality did decline in the poor world. Both sources indicate that the decline was quite substantial for the developing economies – a decline from an aggregate Gini level of 0.62 (or 62) in 1981 to 0.52 in 2001. For the developing world including Eastern Europe, the decline is less, as expected; from a Gini level of .55 to 0.50.

The inequality change that is most relevant for poverty considerations is not overall inequality, but that which occurs around the poverty line. Since the poor fraction is constantly changing, the actual "poor" cannot be an appropriate classification. [With development, the average incomes of the poor are likely to be constant; the improvement comes in the declining fraction]. Several analysts (e.g. Dollar-Kraay) have used an arbitrary number for the proportion that is poor i.e. the bottom 20 percent; earlier (Ahluwalia et. al 1977) had used the bottom 40 percent as the (constant) fraction poor. Here, the fraction used is the percent of poor prevailing in 1987.

The *relative* income of the poor to the income of the non-poor can be used as an index of inequality. Chart 4 graphs the evolution of this index for two different definitions of the

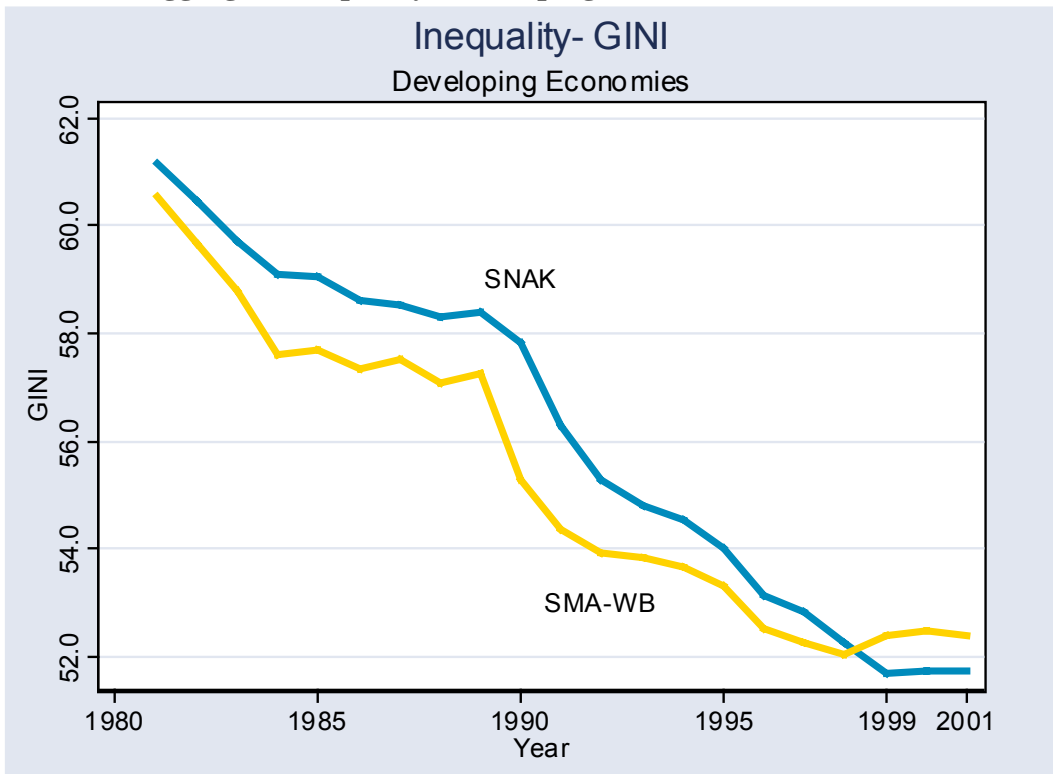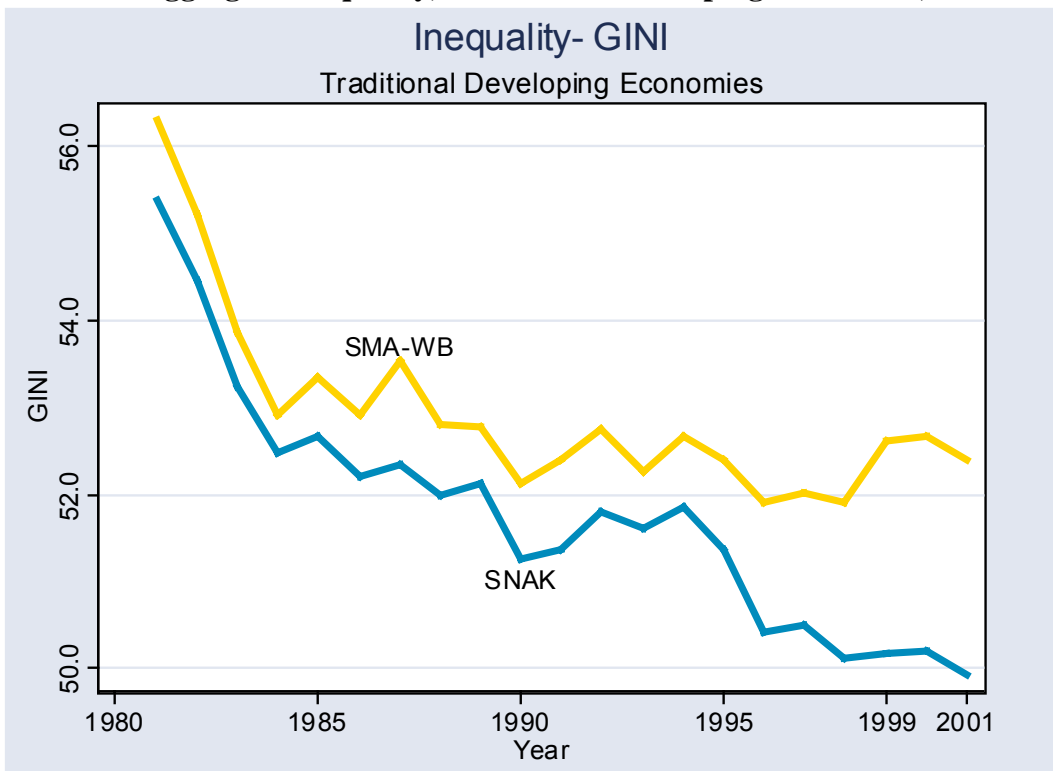**Chart 3a: Aggregate Inequality, Developing Economies, 1981-2001**

Chart 3b: Aggregate Inequality, Traditional Developing Economies, 1981-2001

poor: those with expenditures below $1.08 per capita per day, and those with expenditures below $2.16. Regardless of the poverty line chosen, or of the type of measurement (SMA-WB, or SNAk) or of the classification of countries, (developing or traditional developing) the result is the same: inequality has improved considerably since 1980. In 1981, average expenditures of the poor were 15 percent of the non-poor; by 2001, due to considerably faster growth in average expenditures of the poor, their relative expenditure level had increased by almost 33 percent to 20. For traditional developing economies, the increase in relative expenditures is less – from 19.5 to 21.5

Poverty:

Broad agreement on all regions except Asia

Asia (and within Asia, China and India), is critical for any calculation of world poverty. There are four major regions in the developing world[25] - Asia (excluding Japan), sub-Saharan Africa, Latin America and Eastern Europe. Asia contains the most people – approximately 3.2 billion in 2000. The two large Asian countries – China and India – accounted for approximately half of the developing world's population in 1980, and almost three-fourths of the poor population. If data are known for just these two countries with any accuracy, then major results on world poverty can easily be verified.

For the developing world, most analysts and estimates agree that since 1980, there has been virtually no per capita income growth in Latin America, and, not surprisingly, no poverty decline. There was a lot of growth volatility, and several macro-economic crises in the last two decades, but the continent barely managed to keep its income level constant. Sub-saharan Africa did not even manage to do that, and witnessed about a 10 percent decline in per capita income between 1980 and 2000. This resulted in a 5 to 10 percentage point increase in the head-count ratio of poverty. Today, about half the population (44 percent) in sub-Saharan Africa is absolutely poor, the same level in 1980 and 1960. This region has not seen much development, or growth, or poverty reduction for forty years.

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[25] Variously, the poor world is described as the developing countries, the South or the Third World.

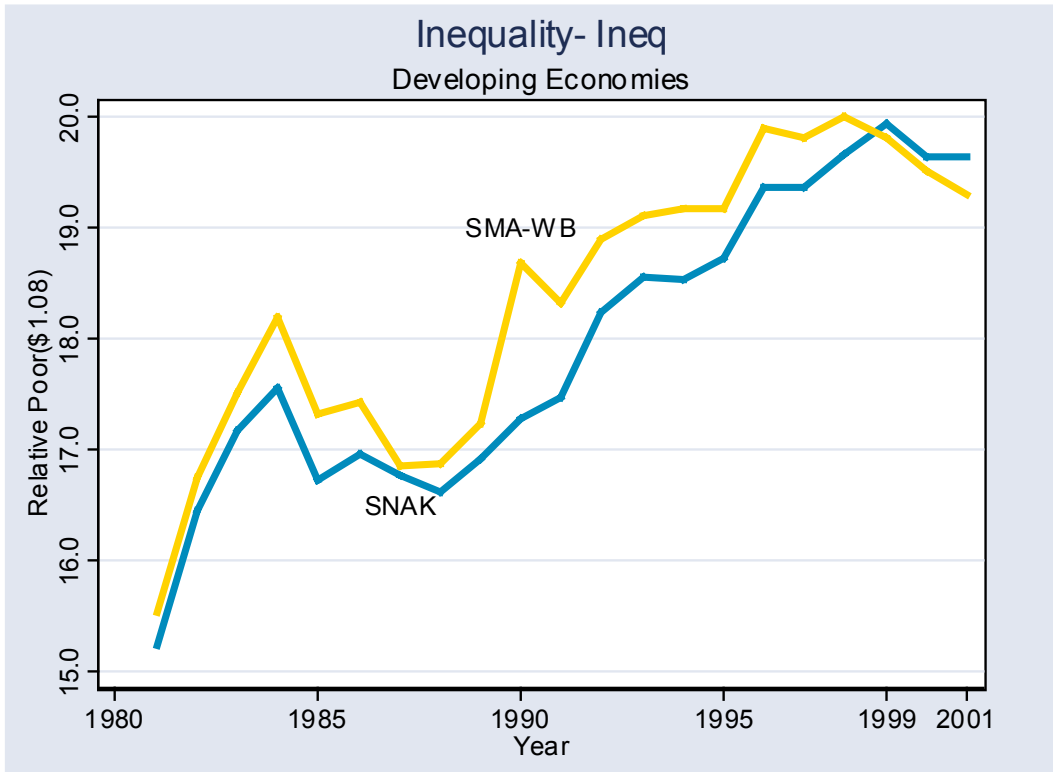**Chart 4a: Aggregate Inequality, relative expenditures, 1.08 $ a day poverty line, Developing Economies, 1981-2001**

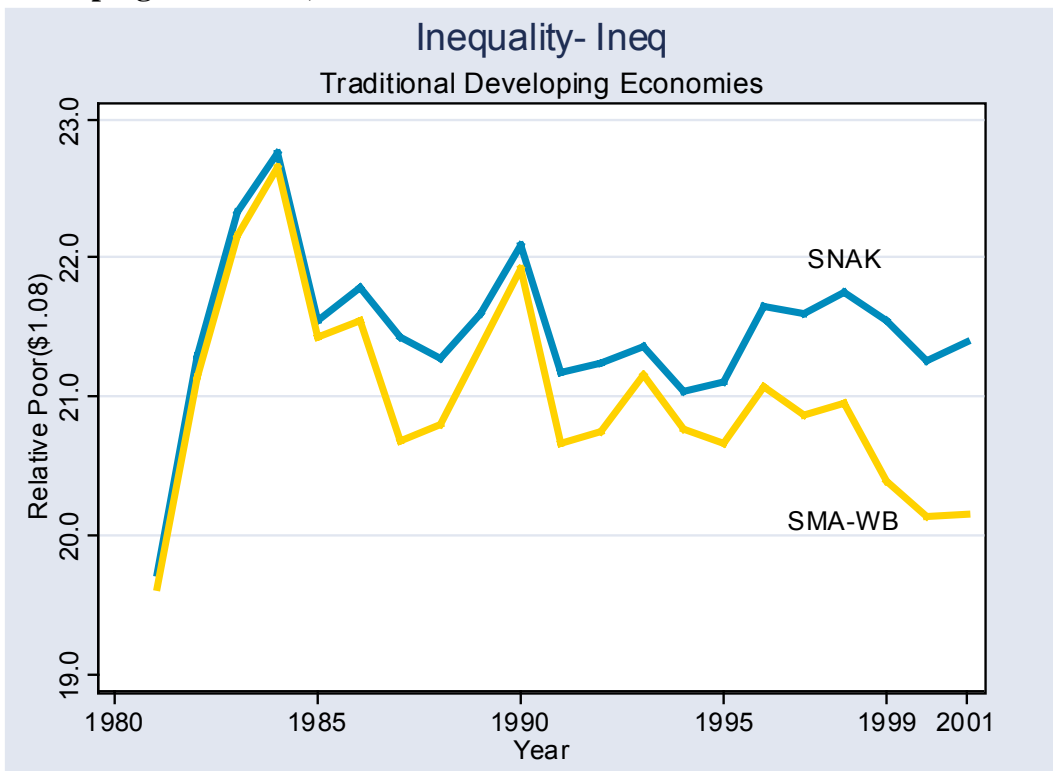**Chart 4a: Aggregate Inequality, relative expenditures, 1.08 $ a day poverty line, Developing Economies, 1981-2001**

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Table 4 : Inequality 981-2001

	1981	1990	2001
Gini			
China	29.5	33.8	40.5
India	30.3	30.1	32.0
Traditional Developing Economies ex. India & China	59.4	57.3	58.7
Traditional Developing Economies	55.2	50.3	51.9
Developing Economies	60.9	57.2	52.9
Share of bottom 40 %			
China	20.2	19.2	16.1
India	22.0	22.3	21.5
Traditional Developing Economies ex. India & China	9.8	10.3	9.7
Traditional Developing Economies	12.2	13.6	12.6
Developing Economies	9.7	11.0	12.1
Relative expenditure of the poor (Pline $1.08)			
China	36.7	34.5	27.8
India	39.9	42.9	44.6
Traditional Developing Economies ex. India & China	14.9	14.8	13.3
Traditional Developing Economies	19.9	22.7	20.5
Developing Economies	15.4	17.7	19.4
Relative expenditure of the poor (Pline $2.16)			
China	42.1	37.2	30.2
India	32.9	35.7	36.2
Traditional Developing Economies ex. India & China	16.3	17.7	16.7
Traditional Developing Economies	19.4	22.7	21.1
Developing Economies	15.4	17.9	20.6

Notes:
1. The estimates are computed under the SNAk definition of survey consumption means i.e. it is assumed that the survey means to the national account means S/NA ratio in each country is fixed at its 1987 level for each country.
2. "Relative expenditure" is the ratio of the expenditure of the poor (1987 fraction) to the average expenditure of the non-poor.

Eastern Europe, faced with structural change and the collapse of the planning system, saw both per capita incomes decline by a largish 25 percent. The bottom half of the population in these countries witnessed a radical decline in incomes, almost a halving of incomes.

The aggregate population in these three regions was close to 1400 million in 2001. The poor population close to 20 percent or approximately 350 million. On this figure, there is no variation between our estimates and those of the World Bank. So why the difference between the World Bank's global estimate of poverty (1100 million) and our estimate of global poverty for the same poverty line and using household survey data and unadjusted survey means – about 825 million? (Table 5)

The difference arises primarily because of the poverty figures for India and China. For India, the World Bank has 35 percent poor in 2001, a number almost 10 percentage points higher than the official government of India estimate **for the same poverty line** two years earlier in 1999. In terms of numbers, the WB estimate of poor in India in 2001 is 367 million; our estimate is 200 million (survey means) and 65 million (SNAk). For China, the respective numbers are 215, 134 and 92. The difference in the estimates for these two countries alone is 248 million, almost the entire amount of the difference in these two methods.

All three methods start from approximately the same number of poor in 1981 and end up very divergent in 2001. For the $ a day poverty line, the estimates are (SM-WB, SM and then SNAk): 1.1 billion, 825 million and 580 million. For the $ 2 a day poverty line, the corresponding numbers are: 2.7 billion, 2.6 billion and 2.1 billion.

Apart from problems with estimates for India (and to a lesser extent China) at any point of time, there are problems with understanding WB India's poverty numbers for India relative to the WB estimates for neighboring countries. The World Bank's estimate of poverty in Pakistan for 2001 is only 12 percent of the population, a massive decline from 48 percent in 1990, and easily among the fastest declines in poverty observed by the World Bank for any part of the developing world. This 36 percentage point reduction in absolute poverty, in only 11 years, and with an average growth rate in per capita GDP of less than 1.3 percent per annum.

Table 5a : Headcount ratio and number of poor (Pline $ 1.08)

	1981			1990			2001		
	SMA-WB	**SM**	**SNAK**	**SMA-WB**	**SM**	**SNAK**	**SMA-WB**	**SM**	**SNAK**
HCR (%)									
China	62.3	53.5	53.5	32.5	28.2	31.2	16.9	10.5	7.2
India	54.3	44.2	51.2	42.1	27.1	27.1	35.5	19.4	6.3
Traditional Developing Economies ex. India & China	40.2	24.9	24.2	28.2	22.3	21.9	21.0	19.0	16.9
Traditional Developing Economies	43.5	37.4	39.1	29.6	24.5	25.2	21.7	16.9	11.8
Developing Economies	42.1	34.2	35.4	28.8	22.5	23.2	21.2	16.1	11.3
Sub Saharan Africa	41.4	35.9	35.9	44.3	47.4	47.3	46.1	45.2	44.5
Number of Poor (in millions)									
China	619	532	532	369	320	354	215	134	92
India	382	311	360	357	230	230	367	200	65
Traditional Developing Economies ex. India & China	636	394	383	553	438	430	506	458	408
Traditional Developing Economies	1429	1227	1283	1170	967	995	1023	797	557
Developing Economies	1528	1241	1285	1254	980	1011	1089	825	579
Sub Saharan Africa	157	136	136	219	234	233	302	296	291

Source: Povcal Net available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp , Surveys for various countries and years, World Development Indicators CD-ROM (2005) .

Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website); SM represents survey means based on mostly non World Bank web data.

Table 5b : Headcount ratio and number of poor (Pline $ 2.16)

	1981			1990			2001		
	SMA-WB	SM	SNAK	SMA-WB	SM	SNAK	SMA-WB	SM	SNAK
HCR (%)									
China	87.9	94.4	94.4	71.5	70.1	73.1	47.3	39.2	33.1
India	89.6	87.1	89.9	86.1	79.3	79.3	80.6	75.4	56.5
Traditional Developing Economies ex. India & China	68.7	56.9	56.9	61.8	52.4	51.9	53.1	47.5	42.3
Traditional Developing Economies	72.2	75.7	76.3	64.6	64.1	64.4	54.6	51.5	43.2
Developing Economies	69.9	69.4	70.1	62.8	59.1	59.4	53.7	50.1	41.2
Sub Saharan Africa	73.0	68.8	68.8	74.7	75.1	74.9	76.2	71.8	71.4
Number of Poor (in millions)									
China	873	938	938	812	796	830	601	499	421
India	630	612	632	731	674	674	833	778	583
Traditional Developing Economies ex. India & China	1088	901	901	1214	1029	1019	1280	1146	1021
Traditional Developing Economies	2370	2484	2503	2551	2530	2542	2577	2429	2038
Developing Economies	2537	2519	2545	2736	2575	2588	2752	2567	2111
Sub Saharan Africa	277	65	65	369	53	55	499	28	24

Source: Povcal Net available at http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp , Surveys for various countries and years, World Development Indicators CD-ROM (2005) .

Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website); SM represents survey means based on mostly non World Bank web data.

Chart 5a: Head Count Ratio of poverty, 1.08 $ a day poverty line, Developing Economies, 1981-2001
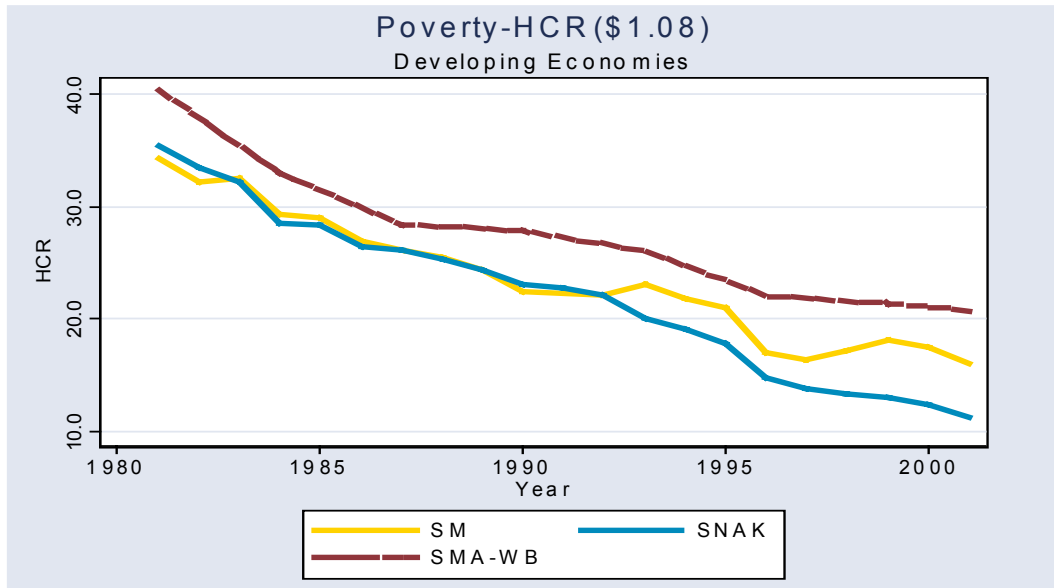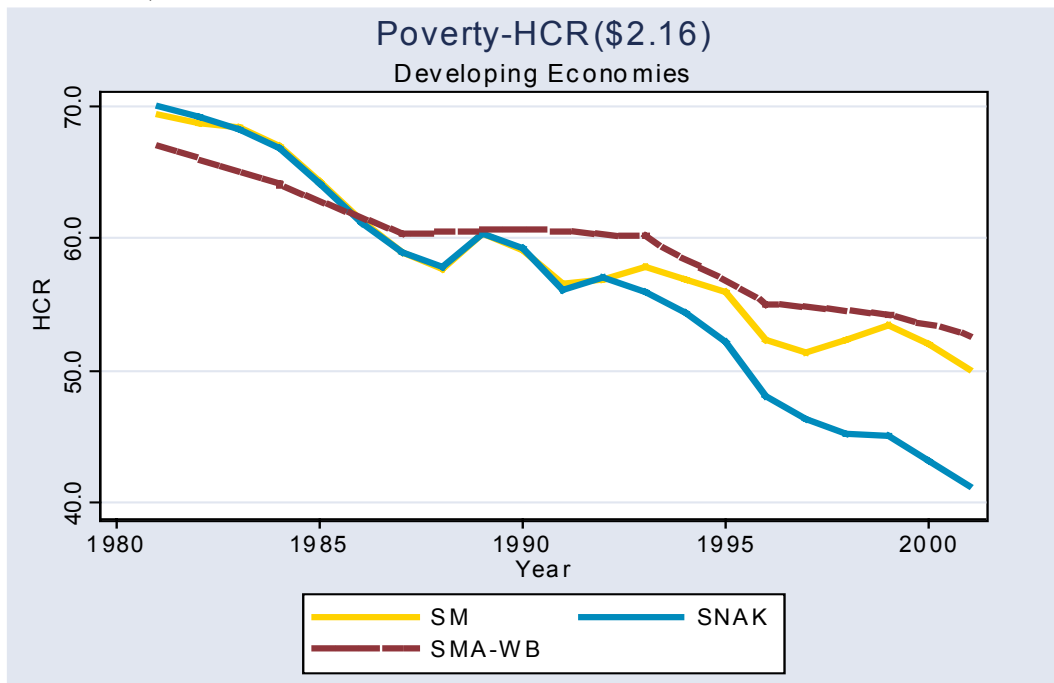

Poverty-HCR($1.08)
Developing Economies

Chart 5b: Head Count Ratio of poverty, 2.16 $ a day poverty line, Developing Economies, 1981-2001

Poverty-HCR($2.16)
Developing Economies

Notes:
1. Developing economies are all countries excluding western (OECD) economies; traditional developing economies exclude countries from Eastern Europe and the former Soviet Union.
2. SNAk estimates survey consumption means by assuming that the S/NA ratio in each country is fixed at its 1987 level; SMA-WB are adjusted survey means available from the World Bank (povcal website); SM represents survey means based on mostly non World Bank web data.

Another problem World Bank poverty country is Nepal – there the reduction in poverty is from 44 percent in 1990 to 14 percent in 2001. According to WB figures, the average Nepalese in 2001 was more than 50 percent richer than an average Indian – average per capita per day consumption of 2.55 PPP$ vs. the average for India of only 1.65. Poverty in Bangladesh is less than India – 33 percent; however, despite reasonable per capita growth (1.3 % per annum since 1980), there has been no poverty reduction – the WB head-count ratio is the same, at 31 percent in both 1981 and 2001.

The WB poverty estimates for China also do not seem plausible. Despite GDP per capita growth of close to 8 percent a year, or 50 percent over the five years, rural poverty in China *increased* from 25 % in 1996 to 27 % in 2001. (Urban poverty stayed the same at less than 1 percent). Regional comparisons with Philippines and Vietnam suggest that the WB China poverty estimates need some explanation. In 2001, per capita consumption in the Philippines was about 40 percent more than China, and Chinese per capita consumption was about 50 percent *higher* than that observed in Vietnam. The distribution of consumption was about the same in China and Vietnam, with the Philippines distribution being decidedly worse. Yet, the WB figures for poverty in 2001 in Vietnam are zero (actually, only 2.1 percent of the population!). China 17 percent and Philippines 15 percent.

Poverty decline since 1981: Very Large

Charts 5a and 5b document the enormous decline that has taken place in world poverty since 1981. The World Bank itself acknowledges that poverty has declined from 40 to 20 percent; the more accurate SNAk measure of per capita consumption has poverty declining from 35 to 11 percent, $1.08 poverty line, and from 70 to 40 percent, $ 2.16 poverty line. The percentage point decline, regardless of source or poverty line, is a reduction of some 20 to 30 percentage points. These data are till 2001; the fast pace of developing economy growth in the last five years means that in 2005, the global poverty numbers are likely to be less than 10 percent, $1.08 , and in the low 30s, $2.16 poverty line. These statistics suggest that the time has come to raise the world poverty line from its $1.08 level – a subject explored in Section 8.

Section 7: Has Aid been adequate for poverty removal?

Eradication of poverty is an important international objective. Presently, the international organizations are spending close to US $60 billion in the fight against poverty, and have been spending this amount (in real terms) for at least a decade. Whether aid has been helpful in reducing poverty or not is a controversial issue, and not of concern here. What is of concern is that given the estimates of world poverty, what can one say about the adequacy of aid. The "adequacy" is easily defined: the amount of aid (or money) needed to lift everyone out of poverty, to make poverty "history". The answer obviously depends on the estimate of the number of poor. As shown in the previous section, these estimates vary, and the "official" World Bank numbers are the highest, by an order of magnitude.

To abstract from problems of estimation, all the poverty calculations used in this section are based on the World Bank numbers, as provided on their website for each three year period since 1981. Since estimates are also available by country (and therefore by region), calculations of aid needed by the most needy region, sub-Saharan Africa, are also presented.

In his book, "The End of Poverty" Prof. Jeffrey Sachs of Columbia University, makes the case for more aid, about $ 50 billion more, and for a redirection of such aid to make it more effective. This rationale for more aid is simply spelt out in a sub-section entitled "The Simplest Calculation" (Sachs(2005, p. 290). Sachs accepts the poverty estimate of the World Bank that there were approximately 1.1 billion living below the $ 1.08 poverty line in 2001. (Chen-Ravallion).[26] Sachs also quotes this same source to report that the average expenditure level of the poor in 2001 was 77 cents a day in 1993 PPP$.[27] The average poverty gap was 31 cents a day (poverty line is $ 1.08) or 113 PPP$ a year. Thus, the money required to eliminate poverty on an *on-going flow* basis is 1.1 *113 or PPP$ 124 billion.

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[26] As shown in the previous section, these numbers most likely overstate the actual number of poor by an order of magnitude i.e. there were not 1.1 billion but 600 million extreme poor in the world in 2001.

[27] This is not a controversial figure – even with our reduced poverty estimate of 600 poor, the average expenditure level of these poor was 76 cents a day in 2001.

The theoretical flow of aid that is needed to remove poverty is an important input into policy decisions. It is logical for the aid community to devote at least this amount for the removal of poverty. Given leakages, the aid required should be even somewhat higher than the PPP $ 124 billion estimated by Sachs. The present flow of aid is estimated to be around US $ 60 billion, and if debt repayments are incorporated, the net flow of aid to developing countries is only around US $ 50 billion. Sachs himself cites several other studies, which have also argued for an urgent increase in aid. Thus, the case for more aid appears universal, and a magnitude of PPP 124 billion dollars a very basic request, though given leakages, it should really be significantly more than that.

Such aid provision is doable, and well within the incomes and past promises of the donor countries. The GDP of the twenty-two developed (donor) countries in 2001 was PPP$ 20.2 trillion, and as Sachs notes, the ratio of what should be given (124 billion) and what is "available" (donor incomes of 20.2 trillion) in 2001 was only 0.6 percent i.e. well within the 0.7 % of GDP long promised by the developed countries as aid that *should* be given to developing countries.

That vastly more aid is needed to "theoretically make poverty history" on an on-going basis is also the conclusion reached by several other organizations. On a base of current aid flows of $ 70 billion, the Zedillo committee estimated *incremental* aid needs to be $ 50 billion a year, or an actual level of aid of $ 130 billion; ditto for the World Bank in 2001; in 2003, the World Bank "noted that low-income countries could immediately absorb some $ 30 billion per year of *additional* aid, given their absorptive capacity" . In 2004, the leaders of UK and France called for "roughly a doubling of ODA from 0.25 percent of donor GNP to around 0.5 percent of donor GNP" (Sachs(2005), p.301 emphasis added).

All the "more aid is needed" calculations converge on a doubling of aid to around $ 120 to $ 140 billion a year. That poverty elimination is an urgent and universal objective is a goal for which there are only believers. But several studies have questioned the efficacy of aid e.g. Easterly, Chakravarti. Our purpose here is not to join or elaborate on that debate. The limited point we wish to make is **that the more aid is needed *calculations* seem to be deeply flawed**. The reasoning is very simple. The above calculations (by Sachs and others) are in terms of PPP dollars, but PPP dollars do not exist. Aid is given

in US dollars (or euros, or yen etc). The conversion from PPP dollars to US dollars is given by the division of PPP dollars by the PPP$ to US dollar exchange rate for each individual country. On average, one US dollar in 2001 was equivalent to 1.1 international PPP$ in developed countries. For non-OECD countries, the exchange rate was 4.0 with some very poor countries e.g. Ethiopia having the "PPP exchange rate" well above 4 at 7.4. In other words, in 2001, a US dollar went considerably further in Ethiopia (7.4), or Cambodia (6.5) or India (5.4) than it did in Germany (1.2) or Japan (0.8).

Thus, Sachs's "simplest calculation" involves a basic error, an error that runs through the enormous set of calculations made by him (and others) on aid needs and donor financing. This error involves the assumption that the exchange rate for converting 1993 PPP consumption dollars into current US income dollars is the *same* for the poor recipient countries as it is for the rich donor countries. This assumption is likely to be grossly inaccurate since the entire raison d`etre of constructing purchasing power parity dollars (or International *Comparison* Dollars as per the original usage – see Kravis et. al. (1975)) was precisely because it was felt that exchange rates did not accurately affect purchasing power. Nor is this error small – the estimated aid requirements by this method are four to five times the "actual" requirements.

Aid is earned in developed countries and spent in developing countries. It is this calculation that seems to have been missed by Sachs, the World Bank and others. To the extent aid goes towards the import of goods, it does not have the extra benefit; but in most countries, the import content, by policy design, is kept low. Further, poverty is defined as consumption of PPP dollars, not US dollars (consumption less than PPP $ 1.08 per person per day). When US $ 100 million is sent as aid by developed countries, it is equivalent to, on average, $ 370 PPP dollars. So the aid needed to remove poverty on an ongoing basis is approximately (124*100/370) or $ 34 billion US dollars. And this amount is well in excess of the aid presently given to developing countries, and well in excess of net aid (after deduction for loan repayments).

Application of Aid Adequacy model to India

 It is useful to examine whether the calculations of aid adequacy are correct for one large poor country, India, which, according to the World Bank, had 350 million poor in 1999, or approximately a third of the global poor population.

In 1999/00, for the PPP$1.08 poverty line, there were 260 million poor in India, and the average consumption of these poor was Rs. 10.3 per capita per day. The poverty line in 1999/00 rupees (equivalent to $1.08 in 1993 PPP prices) was Rs. 12.1 a day. This means that Rs. 1.73 per poor person per day would be required to make poverty history in India. Total rupee expenditure needed: 260*1.73*365 millions or approximately Rs. 164 billion. The current US dollar exchange rate in 1999: 43.1. Hence, the amount of US dollars needed to remove poverty in India: 164/43.06 or US $ 3.8 billion. The World Bank poverty number for India for 1999/00 is not 260 million but 360 million; hence a higher amount of US dollars would have been needed to remove poverty in India, approximately $ 5.3 million. If for a third of the poor population only $ 5.3 billion is needed, then for the global poor population of 1.1 billion, approximately US $ 16 billion would be needed to eliminate poverty in the world, on an ongoing basis.

The example of India illustrates how in current dollars, the amount needed to remove world poverty is considerably less than that which has actually been given for the last decade or so. The number may be higher than 16 billion because PPP exchange rates vary among poor countries, but is unlikely to be substantially higher.

Table 6 documents the magnitude of aid given, and the adequacy of aid , to developing economies, and to sub-Saharan Africa, for each year since 1975. For the developing world as a whole, more aid has been provided than needed in each year since 1990 (except 1997). The magnitude of the difference is also large – approximately $ 10 to $ 30 billion extra. Even for Africa there has been excess aid in the 1990s – an excess in 2003 of almost 80 percent over what is adequate. These aid removal numbers are put in perspective by noting that the administrative costs alone (expenditures of World Bank, UN, IMF, the regional international banks etc.) are around $ 10 billion dollars a year, or about 40 percent of the aid needed to remove poverty.

Table 6: Aid Adequacy, 1975-2003 *(in current US dollars, billion)*

Year	World			Sub Saharan Africa		
	Actual	Adequate	Extra	Actual	Adequate	Extra
1975	15.5	113.2	-97.7	3.3	10.1	-6.8
1976	15.0	105.2	-90.2	3.1	11.8	-8.7
1977	16.2	104.8	-88.7	3.6	14.3	-10.7
1978	19.1	127.6	-108.5	4.9	17.1	-12.2
1979	23.3	122.0	-98.7	6.3	18.8	-12.5
1980	27.5	115.2	-87.8	7.4	21.2	-13.8
1981	26.9	97.5	-70.6	7.3	22.5	-15.2
1982	25.4	78.6	-53.2	7.5	24.5	-17.1
1983	24.6	70.1	-45.4	7.3	27.8	-20.5
1984	24.8	62.6	-37.8	7.5	28.3	-20.8
1985	27.0	59.7	-32.8	8.5	24.4	-15.8
1986	31.0	46.5	-15.5	10.4	15.8	-5.4
1987	33.7	42.9	-9.3	12.1	11.8	0.3
1988	36.0	46.2	-10.2	13.7	16.7	-3.0
1989	37.6	44.0	-6.4	14.5	14.5	-0.1
1990	50.7	37.5	13.2	17.2	11.1	6.1
1991	56.7	37.6	19.1	16.9	11.9	5.0
1992	54.9	33.4	21.4	18.2	9.8	8.4
1993	49.3	36.4	12.9	16.8	12.1	4.7
1994	54.6	37.0	17.6	18.1	15.6	2.5
1995	54.8	44.0	10.8	17.9	23.2	-5.3
1996	49.6	45.9	3.7	15.1	29.0	-13.9
1997	42.0	43.6	-1.5	13.4	27.5	-14.2
1998	45.3	41.0	4.4	13.3	27.7	-14.3
1999	47.3	25.9	21.4	12.3	12.2	0.0
2000	44.4	25.9	18.5	12.2	14.0	-1.8
2001	46.4	25.1	21.3	13.0	13.4	-0.4
2002	53.0	22.9	30.1	17.4	12.6	4.8
2003	58.8	22.4	36.4	22.3	13.3	9.0

Source: World Bank, World Development Indicators, 2005.
Notes:
1. Aid Adequacy is defined as aid enough to lift every persons expenditure level above the $1.08 per capita per day poverty line.
2. Actual aid is a composite figure of aid given to developing economies.
3. Extra aid is the difference between Adequate aid and aid given.

Section 8: Existing Poverty Lines: Too Low

According to our estimates of world poverty, "only" 16 percent of the world population was poor in 2001 (survey means) and only 11 percent poor in the same year if the declining survey to national accounts ratio is frozen for each country at its 1987 value. The previous sections have documented that a large part of the difference in our reproduction of World Bank data and World Bank data arises from the unusually high World Bank poverty numbers for India (and China) – almost 2 percentage points of global poverty. Little difference was obtained between ours and WB estimates for sub-Saharan Africa.

Even the "high" World Bank estimate of poverty in 2001 is 21.2 percent poor in 2001, and rapid growth in several developing countries (including countries in Africa) should have made some dent in world poverty. If a "projection" is made, a fair assessment would be that the most conservative estimate of poverty in 2005 was around 15 percent poor.

We also offered several pieces of evidence to corroborate our estimates of world poverty i.e. it is very likely that the Millennium Development Goal of 15 % poor by 2015 has already been reached, *no matter what the method, or source, of estimation* [28] These low poverty estimates are based on a very low level of living, hence, the term absolute poverty. What these low level of numbers signify is that the world poverty problem is different today – it is more of a relative poverty problem than a problem of absolute poverty. Of course, almost half of sub Saharan Africa is absolutely poor, but this continent contains only about 300 million absolute poor; and most of the rest of the developing world is not absolutely poor.

Latin America and the MENA region (Middle East and North Africa) have for more than a decade now recorded absolute dollar a day poverty levels in the single digits. For both these regions, the domestic, local poverty lines are above $ 2 a day. The former Soviet Union and Eastern Europe economies do not have much $ a day poverty. Which leaves one with Asia, and its two population giants India and China. The official World Bank numbers on China and India are just not plausible, and most other populated countries in Asia have, according to the World Bank, less than 15 percent poor. Which leads one

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[28] See Bhalla(2003) for a detailed exposition of this finding.

to the conclusion that international agencies should start developing a *relative* measure of poverty.

Despite rapid per capita growth, the world poverty line has not shifted since the original $ a day poverty line based on 1985 PPP prices. Indeed, the 1993 PPP poverty line of $ 1.08 a day, deemed to be the "equivalent" of $ a day, 1985 prices, entailed a reduction in the poverty line of almost 22 percent. (See *Imagine* for details). US inflation was close to 30 percent between 1985 and 1993; since US is the numeraire in PPP calculations, it follows that international price inflation was close to 30 percent. Hence, $ a day in 1985 prices is approximately equal to $ 1.3 a day, 1993 PPP prices.

it is necessary to reevaluate what it means to be poor; this, by implication, means that it is necessary to raise the international poverty line. What should the new international poverty line be? A common, and correct, presumption is that poverty lines should rise with economic development. Ahluwalia-Carter-Chenery (1979) present the first set of world poverty estimates, calculated for 1975. Since then, per capita consumption in the developing world has increased by 50 (log) percent – from $3.62 in 1975 to $5.89 in 2003. The elasticity of the poverty line with respect to average consumption is 0.64, as illustrated by the following regression for 93 traditional developing countries in 1993:

$$log(poverty\ line) = 0.16 + 0.64*log(per\ capita\ consumption)$$

Data for 93 Countries; R^2=0.49; t-Statistic (log consumption): 9.46

This implies that the poverty line needs to be raised by 36 percent. Given an initial poverty line of $1.30 in 1993 PPP (or $1 a day in 1985 PPP) , this yields $1.77 as the new poverty line. Since 1993, US price inflation has been about 20 percent, which yields an equivalent line in current PPP $ of 2.12. The international community has been using $ 1.08 and $ 2.16 as the poverty lines in constant 1993 international prices. It is suggested that $ 1.80 be the new poverty line in PPP 1993 prices.

Additional support for the $ 1.80 poverty line is obtained by noting that it is also the poverty line (actually $1.84) for the median developing country resident in 1993. Further, Latin America has been using a > $ 2 a day poverty line for some time; the average country-

specific poverty line in Latin America there is a high PPP $5.6 a day; in sub-Saharan Africa, the average country-specific line is about $1.6. The region with poverty lines needing revision is the region with the fastest growth, Asia. Chart 6 – which is based on the regression presented above – poignantly illustrates the large existing gap between mean consumption levels and poverty lines in Asia, as well as the rest of the developing world. It is apparent that a majority of countries – and especially China, Indonesia and India – had, in 1993, poverty lines that were far below their *predicted* poverty lines.

Chart 6: National poverty lines and per capita consumption , 1993

National Poverty Lines and Per Capita Consumption
1993
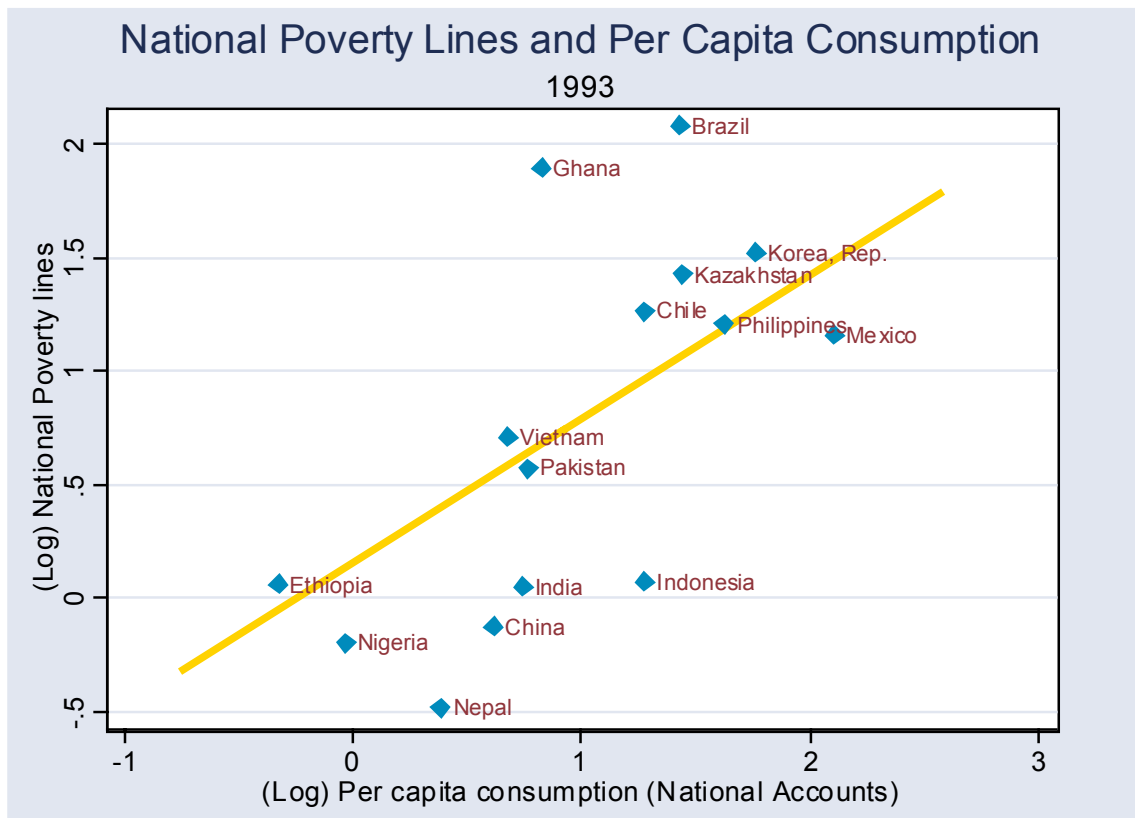
Reddy-Pogge correctly question whether the international poverty line accurately reflects the consumption basket of the poor, rather than the consumption basket of the average person in each economy. It is very difficult to construct a poverty line of the poor in the world. But *growth* rates in consumption in real local currency units can be compared with growth in consumption, PPP data. If the latter is higher in magnitude, then it is likely that the decline in poverty is being overestimated compared to what would be obtained with the unobservable basket of the poor; conversely, if NA growth rates are higher, then PPP data understates the decline in poverty. The reality – local currency consumption growth is 10 percentage points *higher* than PPP consumption growth i.e. use of PPP data is likely biased towards showing a significantly lower decline in poverty than the more correct consumer price data for poor people.

Poverty also is relative. Who the Malaysians (or Argentinians) consider poor will be considered middle class in most parts of Asia. It does not make the poor Korean any happier to know that several hundred million people are poorer in the rest of the world. Each country has its own poverty line to reflect these different country averages of standard of living. We have seen above that own poverty lines, especially in Asia, are falling behind the poverty lines which *should* be present. Asian and world poverty has declined significantly, and the concept of absolute poverty has receded. Today, absolute poverty in most parts of the developing world is relative; hence the need for a new, and higher, poverty line.

Section 9: Conclusion

World poverty today is primarily a sub-Saharan Africa problem. In that region, more than 40 percent of the population exists on less than the very low absolute poverty line of a dollar a day. The number of poor in Africa are around 300 million. The major challenge for the world community is to bring this level of poverty down to Asian, Latin American and Middle Eastern levels i.e. less than 10 percent poor.

The rapid rates of growth experienced in most of the developing world over the last 25 years, and especially over the last 10, has brought about large declines in absolute poverty, for both the one and two dollar a day poverty lines. A striking feature of this development has been the improvement of inequality in the developing world, and this improvement has occurred for all the estimates of per capita consumption and distribution that exist. This is an intuitive result, and has occurred because the poorest and the most populous region in the world in 1980, Asia, has witnessed rapid progress. Such progress has been observed in the two giant economies, China and India – but also has occurred in Thailand, Vietnam, Bangladesh, Pakistan, Lao, Indonesia, …It is hard to find one nation in Asia that has fallen behind, though data are not available for the war torn economy of Afghanistan or the closed economy of Myanmar.

The rapid decline in poverty, and to levels unimaginable even a decade ago, means the time has come to revise upwards the absolute poverty line. This line has stayed constant for almost 25 years, and indeed was lowered when the World Bank changed this line from $ 1 day, PPP 1985 prices to $ 1.08 a day, PPP 1993 prices. Given that "international" inflation was close to 30 percent in these years, the appropriate 1993 PPP poverty line is closer to $1.3 rather than $ 1.08.

As happens in all countries, our notion of absolute poverty changes (increases) with the average level of development. These perceptions are changing, and a sign of success is that we are moving towards a notion of relative poverty. As a first approximation, it is suggested that we increase the international poverty line to $ 1.8 in 1993 PPP prices (or about $2.15 in current PPP prices), a level some 70 percent higher, in real terms, than the old $ 1.08 poverty line. The world poor according to this poverty line would be close to 25 percent, a level that the world was dealing with for the much lower $1.08 line just seven years ago in 1998.

On its way to recommending this new poverty line, this paper also examined some old assumptions about the determinants of poverty. In particular, the question of whether and how initial inequality affects poverty decline was explicitly taken up. The answer is in the negative: there is no theoretical, or empirical, basis to think that initial inequality affects future poverty change. Also, the growth poverty relationship was examined and it was observed that the impact of growth on poverty depends… In 1981, a 10 percent increase in per capita expenditures led to a 5.5 percentage point decline in absolute poverty; in 2003, the same growth would result in only a 3.5 percentage point decline. For the $ 2.16 poverty line, the corresponding responses are the reverse: a 10 % growth in 1981 would have led to a poverty decline of 3.5 percentage points; today, the same growth would mean a larger, 5.1 percentage point decline.

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