



WP/05/47

# IMF Working Paper

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## The Disconcerting Pyramids of Poverty and Inequality of Sub-Saharan Africa

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**IMF Working Paper**

African Department

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March 2005

**Abstract**

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Poverty and inequality in Sub-Saharan Africa (SSA) should not be ascertained only on the basis of scarce and unreliable income distribution statistics, but should also take into account social conditions. Recent, widely disseminated claims that poverty and inequality have increased over the past 30 years are based on regional income estimates with falling medians and rising upper variances over that period. Graphically, this translates into pyramid-shaped income distributions that, perversely, shift to the left and widen over time. However, during the same period social indicators improved significantly (if insufficiently), and we argue in this paper that such a trend represents progress with social equity in SSA. This point is illustrated through the configuration of alternative “social pyramids” that move for most of the last 30 years in the right direction. However, more recently, social indicators are being set back by the HIV/AIDS pandemic, which will generate greater and more dehumanizing poverty in the years ahead even if meaningful economic growth is achieved. As underscored by the multiplicity of “pyramid” representations, poverty and inequality time trends in SSA can thus best be described as disconcerting in that they remain arguably illusive and definitely disturbing.

JEL Classification Numbers: I31, I32, I38

Keywords: poverty, inequality, Sub-Saharan Africa, social expenditure, social indicators, HIV/AIDS

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<sup>1</sup> The author wishes to acknowledge Prof. Xavier Sala-i-Martin’s (Economics Faculty, Columbia University) interesting work that inspired me to write this paper as an alternative view; and Mr. Anupam Basu (Deputy Director, African Department of the IMF) for a very useful analytical suggestion and, in particular, for his encouragement.

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## SUMMARY

The ongoing globalization debate has raised awareness of international social equity issues, in particular as regards Sub-Saharan Africa (SSA), where social conditions are the harshest and have shown the least improvement. And, while it is evident that poverty is widespread and made worse by glaring inequalities, the lack of income distribution statistics has made it difficult to ascertain regional historical trends.

Existing research on poverty and inequality in SSA is based largely on regional aggregations that leave out, or extrapolate for, countries for which there are no data. For the most part, such research shows poverty in SSA falling slowly over time. One notable exception is Sala-i-Martin's (2002) recent landmark study arguing that poverty and inequality have increased in SSA over the past 30 years. This conclusion is based on regional income estimates, with falling medians and rising upper variances over that period, that are poignantly illustrated through pyramid-shaped distributions that perversely shift to the left and widen over time.

While reiterating the seriousness of poverty and inequality in SSA, this paper argues that the regional statistical data used to construct such pyramids are too scarce and biased to be conclusive. And, while it proposes no alternative data (because none are available), it notes that, over the same 30 years, social indicators have generally improved in SSA and that this should be taken as a sign of greater social equality. The overriding argument is that social indicators reflect human welfare priorities (like survival, immunization, literacy), which, once met, go a long way toward reducing poverty deprivation and inequality. This is particularly the case of basic needs that can be met through publicly provided social goods, which, by definition, can make everyone just as well off in terms of their consumption regardless of personal income differences. This paper acknowledges the improvement in social conditions in SSA and illustrates it by configuring alternative "social pyramids" that have moved for most of the past 30 years in the right direction.

A simple welfare status model is formulated and tested across countries to establish that social indicators tend to be correlated with poverty status, which would point to a similar relationship over time (whether or not income statistics improve). From this perspective, the indisputable improvements in social indicators in SSA over the past few decades would have to be viewed as more relevant than the less clear setbacks to income growth and distribution.

However, this perspective also means that, since the mid-1990s, poverty is getting worse and the pyramids are moving in the wrong direction. The sad reality is that social indicators in the region are being set back by the HIV/AIDS pandemic, which will generate greater and more dehumanizing poverty in the years ahead even if meaningful economic growth is achieved.

As underscored by the multiplicity of "pyramid" representations, poverty and inequality time trends in SSA can thus best be described as disconcerting in that they remain arguably illusive and definitely disturbing.

## I. INTRODUCTION

The ongoing globalization debate has raised awareness of international social equity issues, in particular as regards a wide range of perceptions of regional winners (Köhler, 2000) and losers (Stiglitz, 2002) from this mega trend. Sub-Saharan Africa (SSA) is at the center of this debate (Mandela, 2000) because social conditions there are the harshest and have shown the least improvement (Lopes, 2002). The persistence of widespread poverty in SSA and of widening income inequalities in many parts of the world is viewed by many as *the* moral pitfall of globalization that brings into question its very foundation—the open-economy market system (John Paul II, 2001). From this perspective, the question is not whether the citizens of poor countries are better off (even if only marginally) with globalization, but whether globalization has meaningfully alleviated suffering during their life spans?

Answering this question as regards SSA does not require more than opened eyes to what is happening there. It is plainly and sadly evident that, globalization or no globalization, poverty is widespread in SSA and that every second it causes countless human beings to die or become developmentally handicapped for life for lack of health care and education opportunities. For them, globalization has made little difference.

With this tragic reality in mind, we seek in this paper to discuss what can and cannot be statistically ascertained about contemporary poverty and inequality in SSA. In the absence of conclusive income statistics, we try to draw some insight from a historic trend of improvements in the region's social indicators and forewarn of the setback that an imminent reversal in that trend will regrettably entail.

## II. RECENT ATTEMPTS AT ESTIMATING TIME TRENDS FOR POVERTY AND INEQUALITY IN AFRICA

### Data shortcomings and regional estimates

The estimation of income, wealth, or consumption for poverty analysis purposes requires extensive household surveys and sophisticated statistical inference techniques, which are often simplified or overlooked (Deaton, 1997). This is especially the case in SSA countries, where statistical priorities and resources are very limited, making regional data scarce and unreliable (Kiregyera, 1987). In addition, the use of nationally compiled data (reflecting different collection procedures and margins of error) leads to inconsistencies in international comparisons and regional aggregations (Deaton, 2001). Still, the effort must be made to obtain cross-country estimates of poverty and in its 2003 print edition of the *World Development Indicators* (World Bank, 2003), the World Bank manages to present estimates “from the best available grouped data” of income distribution (Gini coefficients and income or consumption quintiles) for 30 (of 48) sub-Saharan African countries. Such coverage would, at first sight, appear to be reasonably representative of regional trends.

However, closer scrutiny of the WDI's figures by checking its source computerized databank (World Bank, 2003-04) shows that the income distribution statistics lack the frequency and timespan necessary to conclusively discern any historic trends (Table 1). In fact, for all but 2 of

the 30 countries, there is only one single data point (mostly between 1993 and 1998). The two exceptions are Rwanda, which, oddly, has data for two consecutive years (1984–85), and Ethiopia, which has data for 1981 and 2000 (the earliest and latest data points in the dataset). In statistical terms, this means that there is not a single instance of national data adequately spanning, say at least every 10 years, actual income-distribution observations, and that regional extrapolations of time trends can thus not be made on the basis of representative national evidence.

Table 1. Sub-Saharan Africa: Availability of National Income Distribution Statistics, 1981–2001

Number of years for which data are available	Countries (years of data availability)
2	Ethiopia (1981, 2000), Rwanda (1984, 1985)
1	Ghana, Madagascar (1999); Burkina Faso, Burundi, The Gambia, Zambia (1998); Kenya, Malawi, Mozambique, Nigeria (1997); Cameroon, Uganda (1996); Cote d'Ivoire, Lesotho, Mauritania, Niger, Senegal, South Africa, Zimbabwe (1995); Guinea, Mali, Swaziland (1994); Botswana, Central African Republic, Guinea-Bissau, Namibia, Tanzania (1993); Sierra Leone (1989)
0	Angola, Benin, Cape Verde, Chad, Comoros, the Democratic Republic of Congo, the Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Gabon, Liberia, Mauritius, Sao Tomé and Príncipe, the Seychelles, Somalia, Sudan, Togo
Source: World Bank, <i>World Development Indicators</i> electronic database, 2004.	

In the absence of alternative, internationally consistent data sources, economic analysts have, on occasion, developed their own expanded datasets by drawing on other relevant information to supplement the WDI. The most comprehensive such attempt is a dataset put together by two World Bank economists, Deininger and Squire (1996), who, using published references with identifiable income survey sources, gathered information on Gini coefficients and the top and bottom income quintiles for 108 countries, including 24 SSA countries.<sup>2</sup> However, out of the 24, 15 had only one data point (that is, one single annual observation for all of 1960–95), and six had between 2 and 4 data points that were less than five years apart (Table 2). Thus, only three countries (Mauritius, Tanzania, and Zambia) had more than one data point meaningfully spanning a large enough time period to assess changes in income status. Such a paucity of data for SSA countries stands in sharp contrast to the much higher frequency and longer time spans of the series for the non-SSA countries in the same data set. In any event, Deininger and Squire

<sup>2</sup> The fact that fewer SSA countries were covered in the Deininger and Squire dataset (24) than in the 2003 WDI (30) may be due to belated additions to WDI data since the mid-1990s, when, presumably, the Deininger and Squire dataset was put together. Such belated additions may underscore unspecified problems of statistical consistency.

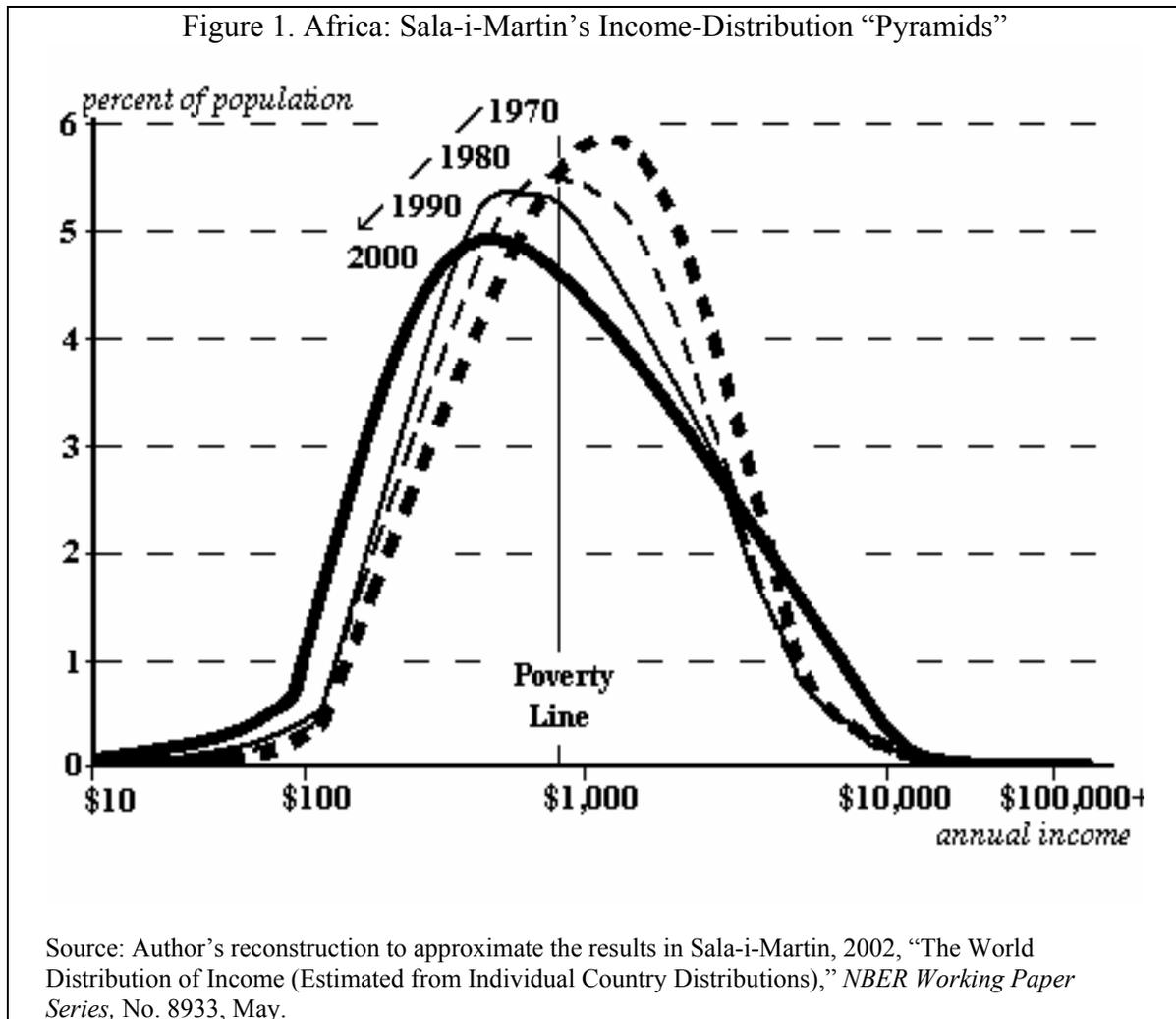
concluded that, in SSA, inequality was high by global standards, but had decreased since the 1960s. Similar findings of slowly falling poverty and inequality in the region as a whole, but with differences in progress and occasional setbacks in individual countries, have been reported in other published research, including recent works by Sutcliffe (2003), Melchior and Telle (2001), and Sahn and Stifel (2000).

	1960s	1970s	1980s	1990s	total
<b>Income data observations</b>	2	6	16	16	40
<b>Countries (years of data availability)</b>	Sierra Leone (1968); Tanzania (1969)	Gabon (1975, 1977) Seychelles (1978) Sudan (1971) Tanzania (1975) Zambia (1976)	Botswana (1986) Cameroon (1983) Cote d'Ivoire (1985, 1986, 1987, 1988) Ghana (1988, 1989) Lesotho (1987); Mauritius (1980, 1986) Mauritania (1988) Nigeria (1986) Rwanda (1983) Seychelles (1984) Uganda (1989)	Central African Republic (1992) Ghana (1990, 1992) Guinea-Bissau (1991) Kenya (1992) Madagascar (1990) Mauritius (1991) Niger (1992) Nigeria (1991, 1992) Senegal (1991) South Africa (1992) Tanzania (1993) Uganda (1992) Zambia (1991), Zimbabwe (1990)	24
Average Gini Coefficient	49.90	48.19	43.46	46.95	46.05
Source: Deininger, Klaus and Lyn Squire, 1996 "A New Data Set Measuring Income Inequality," <i>World Bank Economic Review</i> , Vol. 10, (September), pp. 565–91.					

### The contrarian pyramids

More recently, and based largely on the Deininger and Squire data set, Sala-i-Martin (2002) reached the opposite conclusion, that is, that, over the past 30 years, poverty and inequality have increased in Africa (including four North African countries). For his calculations, Sala-i-Martin supplemented the Deininger and Squire dataset with additional WDI data (presumably updates) managing to gather at least two years of income distribution data for the period 1970–98 for eight SSA countries (no information on the time span of each country's two data points was provided). For each of those eight countries plus four north-African countries, he estimated income-distribution density functions for two or more of the reference years 1970, 1980, 1990, and 1998 (depending on data availability). He then aggregated the available density functions into one "Africa proxy," which he extrapolated to another 35 SSA countries by algebraic integration around known GDP per capita figures and, where available, single income distribution data points for some of the countries. His results show poverty and inequality increasing over time, as powerfully underscored by income-distribution curves that he compares

to “pyramids” that widen and shift to the left over time, as tentatively reconstructed in Figure 1. The underlying trend of growing impoverishment and inequity reinforces common perceptions (Ayittey, 1992) of widespread misery, social indifference, and corruption in Africa, which Sala-i-Martin suggests may be selfishly perpetuated by rich, power-holding elites. More effectively than any income statistics, the perversely shifting pyramids provide a bleak post mortem of contemporary socioeconomic developments in Africa that, in subsequent work, Sala-i-Martin (with Artadi, 2003) reiterates and deems “the economic tragedy of the XXth century.”



While the undeniable reality of poverty in SSA makes it impossible to disagree with Sala-i-Martin’s somber assessment (and to feel any less indignant), we would argue that his sweeping conclusion of a regional setback is not evident. First, on technical grounds, the supporting statistical evidence (that is, actual income distribution data) is, at best, inconclusive. Second, and more important, there are additional considerations concerning poverty and inequality in SSA.

As to the data, Sala-i-Martin's expedient proxying approach to overcome the dearth of statistics for SSA countries is most likely biased by two sampling procedures:

- First, the inclusion of four North African countries (Algeria, Egypt, Morocco, and Tunisia) in the "Africa" group may well have biased the pyramid results, which entailed extensive extrapolations for the majority of SSA countries with few or no data. The North African countries do not share SSA's socioeconomic contexts and have their own region-specific income stagnation and inequality issues (Adams and Page, 2003). The bias of their presence may have been further magnified by the higher frequency of observations for these countries than for the few SSA countries with some data.
- Second, and as acknowledged by Sala-i-Martin, there is a strong "Nigeria bias." Since Nigeria is one of the few SSA countries for which there are actual data and since the regional aggregations were weighted by population size, Nigeria must have heavily influenced the extrapolated results.<sup>3</sup> Nigeria is quite possibly the one country in Africa where per capita income decreased between 1970–98, despite higher production of its main output (oil) and the absence of national armed conflicts. We would thus hesitate to use Nigeria as a proxy for other SSA countries, given its controversial record of economic mismanagement, alleged corruption, and social exclusion, which Sala-i-Martin himself acknowledges in another of his recent works (with Subramanian, 2003).

The bottom line is that, even counting Nigeria, the pyramids are supported by very partial and discontinuous actual data—8 SSA countries with at least two data points and 20 countries with a single data point; ideally, we would have 43 countries with four data points each (for 1970, 1980, 1990, and 1998). Such a limited sample size is statistically insufficient to conclusively estimate both the medians and the dispersions of four unknown dynamic distributions, and, thus, to make inferences about the shaping and evolution of the income-distribution pyramids.

To sum up, Sala-i-Martin's contrarian results, so poignantly illustrated by the widening pyramids of poverty and inequality, strike a chord in the globalization discussion and add a new dimension to the general sense of frustration with economic and social policy in Africa. Our caveat that the data he used may not have been statistically conclusive is not meant to devalue his well-meaning and interesting work or his indisputable message on the grim plight of Africans. As we will attempt to do next, our intention is mainly to set the stage to argue that there may be more to poverty and inequality in SSA than what can be inferred from unreliable income statistics.

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<sup>3</sup> Nigeria is Africa's most populous country, with about 18 percent of the continental population. We estimate that it may have represented 37 percent of the combined populations of the countries with data that served as the basis for extrapolations to the SSA countries for which there were no data.

*Mkosefu wa mali si maskini*  
“Lacking money does not mean you are poor”  
Swahili proverb from Kenya

### III. A BROADER ASSESSMENT OF POVERTY CONDITIONS IN SSA: THE RELEVANCE OF SOCIAL INDICATORS

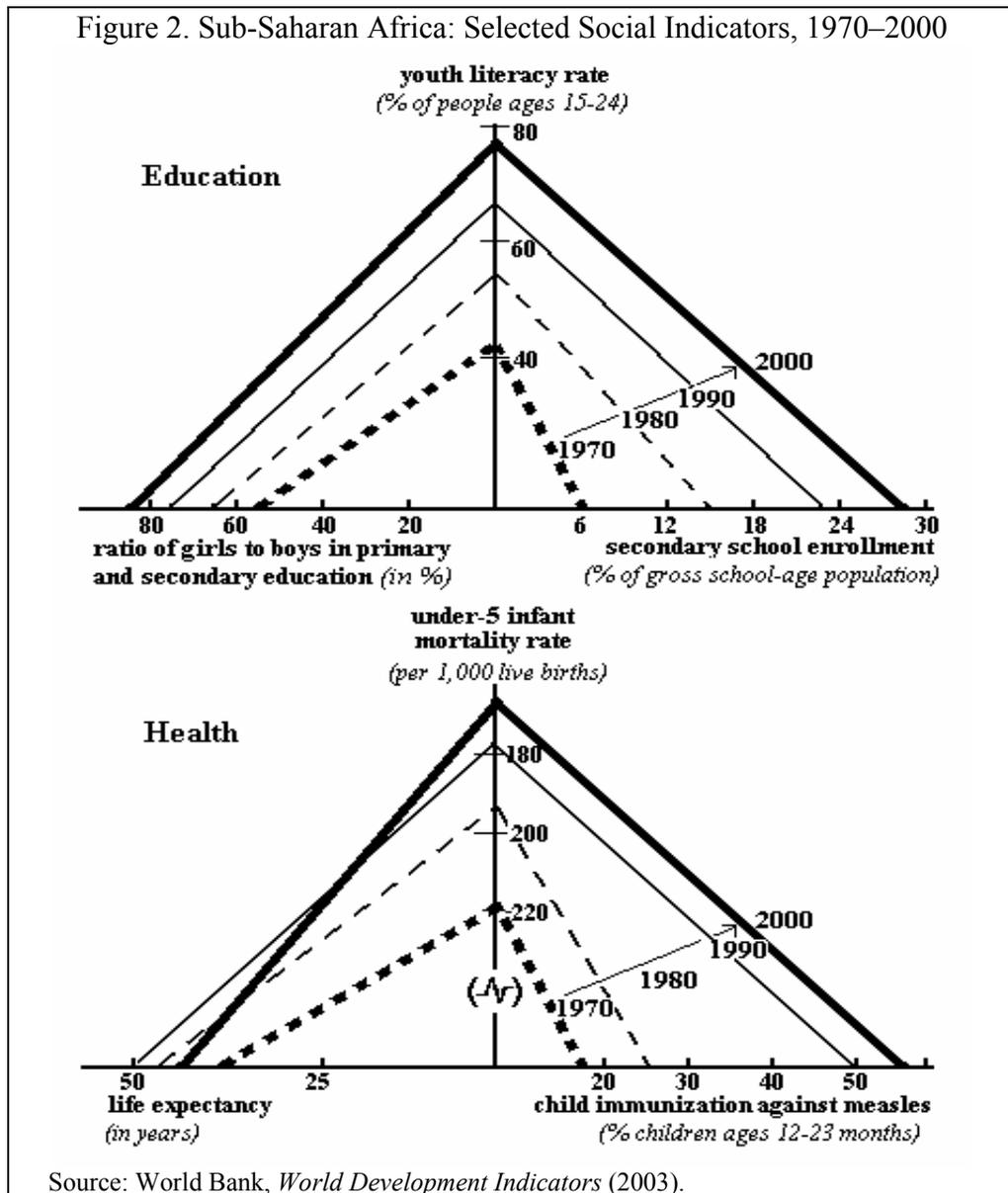
#### Nonincome poverty alleviation

Poverty in SSA amounts to an overwhelming state of deprivation of some of the most basic human survival needs—food, water, clothing, shelter, and minimal health care and education. For statistical purposes, when an individual’s income is below a threshold deemed minimum to meet those needs, (say US\$1 or US\$2 a day), then he or she is considered “poor” (or “absolute poor” when poverty is so widespread that some differentiation among the poor themselves is necessary). However, not all such needs go unmet because of a lack of income. State provision or private charity may take care of some of those needs, especially the most basic ones. For example, international food aid and public health services can keep alive those who have no income at all and are seriously ill. In fact, if a good is publicly provided free of charge and is available to all, then people with no income can consume as much as anyone. This consideration is key to a more insightful assessment of poverty conditions in SSA.

It stands to reason that if some of the most essential goods and services become increasingly available to the poor, not only is their state of poverty-related deprivation lessened, but so is their inequality relative to others who already had access to such goods and services. For example, when a newly opened health clinic makes it possible to immunize a previously vulnerable poor child, then he or she achieves full equality as regards immunity from that disease with all other vaccinated children (rich or poor). Moreover, the newly immunized child’s life expectancy can be expected to be prolonged, closing the gap relative to the longer life expectancies of wealthier children. In our view, and given the life or death implications of poverty in SSA, such an improvement in the expectancy and quality of life for a whole population is a more meaningful sign of progress with social equity than a quantitative improvement in a conceptualized indicator of income distribution (say, the Gini coefficient). Similarly, other improvements in access to vital goods and services (such as clean water, electricity, basic schooling, and medical assistance) imply less suffering for the poor and a reduction in underlying inequality vis-à-vis the people who can afford those goods and services on their own.

The recognition that improved social conditions have an equalizing effect is not exactly novel and has long served as the rationale for more and better-targeted public social spending (Musgrave and Musgrave, 1973). Yet, the contribution of improved social conditions has all too often been ignored in the sweeping assessments of human development in SSA that use the stagnant income statistics to play up the pity and outrage that have come to dominate the public discussion on social welfare in the region.

It is therefore with some measure of relief that we can say that access to crucial social goods and services has improved in SSA over the past 30 years, as demonstrated by consistent improvement in social indicators for much of the continent (Lopes, 2002). This trend is illustrated in Figure 2, which shows the evolution over the past 30 years of three health and three education welfare indicators selected for their paramount relevance in terms of human survival and quality of life prospects. These indicators point to significantly better social conditions in 2000 than in 1970, with all but one improving consistently over that period. The exception was life expectancy, which improved through the early 1990s, but has since been set back by the HIV/AIDS pandemic in SSA (this tragic twist and its implications are discussed at length below).



Although additional social indicators could have been used to confirm the regional improvements, we believe these six illustrate the point sufficiently. Moreover, the two groupings of three indicators lend themselves to triangular shaped graphs that serve as a visual comparison with Sala-i-Martin's (2002) pyramids. Unlike the latter, these social indicator pyramids have expanded in desirable directions over the past four decades and are underpinned by relatively extensive national data, which confirm for most individual countries the overall regional improving trends (exceptions having to do with periods of major armed conflict). These alternative pyramids give some consolation that in SSA over the last 30 years not all has been bad news for the poor and that at least some progress toward social equality has been achieved as regards access to basic health and education services.

The real life significance of these trends should suffice to dispel any doubts about the relevance of social indicators for assessing poverty and inequality in SSA. Simply put, even if, as Sala-i-Martin (with Artadi., 2003) calculates, price-adjusted per capita GDP in SSA fell by 11 percent (US\$200) between 1974 and 1998, wouldn't a 20 percent decline in infant mortality (some one million lives saved every year), a fivefold increase in youths getting a secondary education, greater equal opportunity for girls, and other comparable improvements in basic social indicators represent major progress in reducing the hardships associated with poverty? If we believe that human survival and healthier, better educated lives are paramount, the answer has to be yes.

In the same vein, other welfare indicators of material consumption in Africa have also evolved positively over the past 30 years and in ways that have directly or indirectly improved the living standards of the poor. This is the case with Africans' visibly greater access to communications services (motorized transport, TV broadcasts, phone services) and many modern basic manufactures (clothing, soap, plastics, construction materials) that have become more affordable and allowed the poor increased comfort and opportunities. This is not to say that living conditions in SSA do not remain substandard, but rather to stress that world progress has not completely bypassed the continent and that it must have brought greater consumption opportunities for the poor and qualitative improvements to their lives.

To sum up, an assessment of poverty and inequality that takes into account survival priorities and the lessening of human suffering cannot rely solely on income statistics and ignore what happens to welfare levels, in particular those underscored by social indicators. Such indicators should qualitatively complement the quantitative poverty and inequality criteria that are based solely on income levels. And while one would expect income levels and social indicators to evolve in tandem, they have not done so in SSA over the past 30 years. Whether incomes remained stagnant or fell in the countries in the region, there is compelling evidence that social indicators improved markedly on the continent. While these improvements may, to some extent, reflect an increasing contribution of (and dependency on) humanitarian external assistance, the bottom line is that Africans are enjoying better (even if still inadequate) social conditions than 30 years ago, as evidenced by key health and education indicators.

### A conceptual framework with social outcomes

To support our argument that social indicators are paramount for gauging poverty, we will next attempt to (i) formulate a linkage between them and poverty and inequality levels, and (ii) test that linkage for SSA countries. The underlying hypothesis is that improved social indicators and falling poverty go hand in hand, even when the latter can be measured only in terms of income. This is plainly evident in real world comparisons between industrial and developing countries, and can also be observed in SSA by comparing richer and poorer countries (Lopes, 2002). The greater challenge is to make the case that poverty and inequality can improve due to better social conditions even during periods when personal incomes may be stagnant or falling.

To that effect, we define the benchmark “poverty threshold” not as an income-based measure, but rather as a consumption-based one that *explicitly* takes into account social goods (and services) that are publicly provided. The stipulation of public provision is useful in that (i) it should, in principle, give priority to just the kind of basic social goods that can most improve the lives of the poor and lessen their inequality, and that (ii) such goods ought to be nonexcludable or generally available, and thus reasonably likely to reach the poor. When that is the case, poverty-related deprivation is alleviated by the direct provision of the goods themselves and by the freeing up of income that the poor would otherwise would have spent to obtain some of those goods from other sources.

In simple modeling terms, (1) the hypothetical poverty threshold ( $P^*$ ) takes the form of a minimum consumption basket comprising goods—like health and education services—that may be publicly provided but that can otherwise be purchased ( $G^*$ ), and all other goods that can only be purchased privately ( $C^*$ ); and (2) at a given point in time, the corresponding individual poverty income constraint ( $Y_t$ ) is defined in terms of subminimum consumption levels ( $G_t, C_t$ ) of the two types of goods:

$$(1) \quad P^* = G^* + C^*, \text{ and}$$

$$(2) \quad Y_t = G_t + C_t, \quad \text{with either } G_t \text{ and } C_t \text{ or both defined as subsets of } G^* \text{ and } C^*$$

Stipulating also that any given income is fungible to be spent between  $G$  and  $C$  goods, over time the budget constraint of the poor will be eased by any extra provision of  $G$  goods ( $\bar{G}$ ):

$$(3) \quad Y_{t+1} = G_{t+1} + C_{t+1} = G_t + C_t + \bar{G}_{t+1} \quad \text{(provided there is no saturation with the consumption of } \bar{G}_{t+1}\text{)}$$

This basic formulation denotes the intuitive connection between the public provision of social goods and poverty reduction, including how a given level  $\bar{G}$  of social spending can lift out of poverty those whose initial income shortfall relative to the poverty line was less than or equal to  $\bar{G}$ . Moreover, to the extent that  $\bar{G}$  is available in the same amount to everybody, it would tend to reduce income variances and, therefore, inequality, in period  $t+1$  relative to period  $t$ .

Ideally, to estimate the impact of  $\bar{G}$  on poverty and equity, one would seek to adjust the personal income constraints of the poor for the  $\bar{G}$  contribution. However, in practice, this is not easy.<sup>4</sup> While estimates of  $\bar{G}$  can be made on the basis of its money cost (say, social budgetary allocations), what ultimately matters is whether consumption opportunities do, in fact, expand. To put it more simply, more money spent on social programs may be a good sign, but there are no guarantees that the poor are benefiting. This could be due to failures in the delivery of  $\bar{G}$ , such as those caused by misinformation or mismanagement.

Another possibility, in line with the consumption-based definition of poverty, would be to undertake consumption surveys that adequately take into account the publicly provided goods  $\bar{G}$ . However, the lack of statistics for SSA countries may well be even more of a problem for household consumption surveys than it is for income estimates (Christiaensen et al., 2003).

Given the high stakes involved in assessing welfare effects on the poor, one would want to rely on indicators that are as unequivocal as possible. And since nothing is as unequivocal as proven results, **we propose to look for visible improvements in basic social indicators as a credible sign that consumption opportunities for the poor have expanded.** The advantage of this approach is that, in regions like SSA where poverty is widespread, such basic social indicators (i) cover general populations that include the large masses of poor, and (ii) reflect some of their most pressing consumption needs that are closely tied to basic health and education status.

In other words, rather than look at  $\bar{G}$  spending that supposedly benefits the poor, we would want to focus on the outcome of  $\bar{G}$ , which, if it does benefit the poor, will improve social indicators ( $S_t$ ). Recognizing that in SSA there has been such positive (if varying across countries) correlation between public ( $\bar{G}$  - type) social spending and social indicators (Lopes, 2002), we can replace  $\bar{G}$  in the poverty constraint by an inverse hypothetical function underscoring this correlation ( $\phi(S_t)$ ).<sup>5</sup>

$$(4) \quad Y_{t+1} = G_t + C_t + \phi(S_t) , \quad \text{where } \phi \text{ denotes a correlation parameter} \\ \text{between } \bar{G} \text{ and } S_t$$

This straightforward but fundamental equation is key to a better understanding of poverty and equality trends in SSA. It tells us that when individuals living under the poverty line consume

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<sup>4</sup> A body of literature on “benefit incidence” discusses who benefits from public spending policies. A recent piece by Davoodi, Tiongson, and Asawanuchit (2003) provides a comprehensive reference on this topic.

<sup>5</sup> This formulation simplifies the fact that social spending will improve certain social indicators only after long lags (literacy rates for example). However, in other cases (immunization rates and school enrollment ratios), indicators improve, by definition, at the time the public good is provided.

more social goods, social indicators covering them will likely improve. Thus, publicly provided social goods can be as effective as gains in income in reducing poverty. In fact, they can be more effective if there are cost advantages in the public provision of social goods, as is often the case when there are economies of scale or nonprofit motivations.

Ultimately, equation (4) can be recast in terms of the shortfall in income relative to the poverty threshold ( $P^*$ ), which makes it possible to relate poverty rates ( $\rho_t$ ) inversely to income *and* to social indicators, namely,

$$(5) \quad \rho_t = f(Y_t, S_t)$$

This formulation can also be used to make the case that inequality falls as social indicators improve. To the extent that the better social indicators reflect greater homogeneity of situations within a population (such as similar life expectancies or more universal school enrollment), individual deviations from the poverty threshold (the variance of  $\rho_t$ ) would necessarily fall and, hence, inequality.

### **Cross-country statistical evidence for SSA**

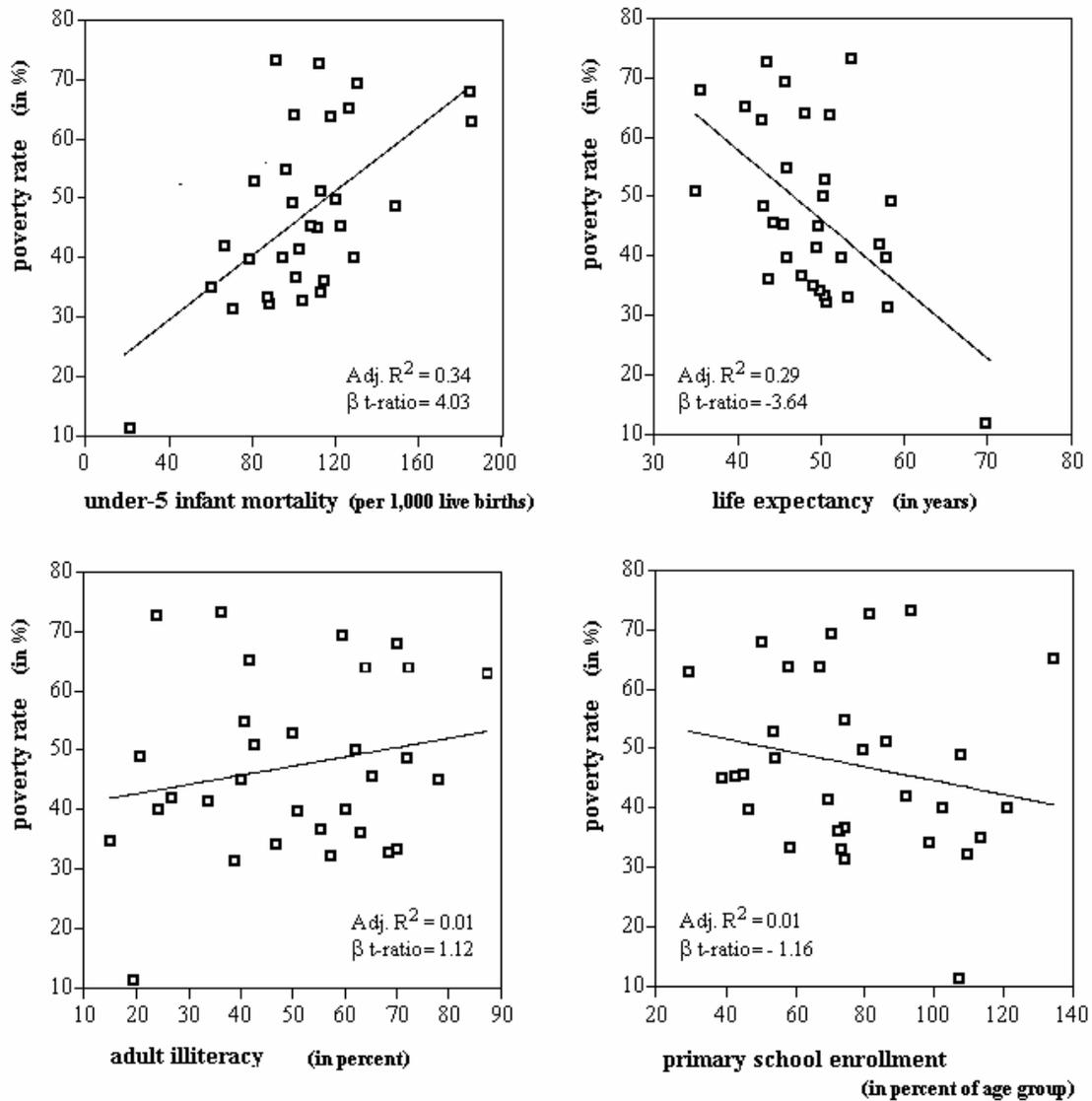
In this section, the connection hypothesized above between poverty, income, and social indicators is tentatively demonstrated, but with the unavoidable caveat on lack of data on regional income distribution. As previously mentioned, the available poverty and income-distribution data for SSA countries are too scarce and inconsistent to allow representative analysis over time (“time series”). Thus, our only option was to pool the sporadic statistics for different countries (“cross-section”) and try to ascertain a regional pattern. In this manner, we put together a dataset of consumption-based poverty rates (and Gini coefficients) for 31 SSA countries for which data were available in the World Bank’s *World Development Indicators* (2003) for various years between 1981 and 2000.<sup>6</sup>

Social indicators were available for all 31 countries for the more commonly monitored health (life expectancy, infant mortality) and education (primary school enrollment, illiteracy rate) indicators. For other indicators (hospital beds, doctors, malnutrition rates, pupil-teacher ratios), data for SSA countries are almost as sporadic as those for income distribution. We thus econometrically tested the individual correlations between the available indicators and the poverty rate and found that they ranged from virtually nil for the education indicators to reasonably significant for the health indicators. These results are best grasped by visualizing the scatter plots of the individual correlations (Figure 3).

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<sup>6</sup> Using the Deininger and Squire (1996) dataset would allow additional observations, but these would not be consistent with the more recent observations available for some countries in the *World Development Indicators* (World Bank, 2003). We also chose to use only one (the most recent) data point for each country, to avoid biasing the results by giving more weight to the countries that had more than one data point.

Figure 3. Correlations between Poverty and Social Indicators in Selected SSA Countries, 1984–2000



Source: World Bank, 2003–04, World Development Indicators network database (Washington).

We attempted a similar pairing of social indicators with Gini coefficients, but the results were the opposite of our hypothesis of better social indicators for more equitable contexts. This contradiction was a revealing result in itself, in that, after taking into account national income data, it indicated that social indicators are more closely related to absolute income than to income distribution. Thus, countries (like South Africa or Gabon) with higher levels of income may have better social indicators, but they also have greater income inequality. This result also reinforces our main argument that, in assessing the relative welfare of the poorest people in SSA, we should take into account more indicators than those strictly based on income, such as the Gini coefficient.

Finally, we ran an econometric test of equation (5), formulating (in logarithmic terms) poverty as a function of income (proxied by GDP per capita) and social indicators (represented by under-5 infant mortality, which revealed the best correlation with poverty of all available social indicators). Despite the oversimplification of using only two dependent variables to explain poverty, the regression statistics (6) were conclusive of the hypothesized relationship and supported our main argument that in SSA social indicators can be linked to poverty status.

$$(6) \rho_t = 1.88 - 0.125 Y_t + 0.577 S_t, \text{ where } \rho_t \text{ is the poverty rate;}$$

(1.9)\* (-1.8)\*\* (4.2)\*\*\*

$Y_t$  is GDP per capita in US\$; and  
 $S_t$  is the under-5 infant mortality rate

t-ratios in parentheses:

- \* significant at 10% level
- \*\* significant at 5% level
- \*\* significant at 1% level

$$\bar{R}^2 = 0.61; n = 31$$

DW statistic = 1.81  
F-statistic = 24.04

By establishing that social indicators tend to be correlated with poverty status across countries, one would also expect that when social indicators improve over time the poverty situation also improves (whether or not income statistics show it). From this perspective, the indisputable improvements in social indicators in SSA over the past few decades would have to be viewed as more relevant than the less clear setbacks to income growth and distribution.

We only wish we could end the paper right here on such a bright note. However, this more positive take on the past also compels us to be more reserved about recent trends and very somber about the prospects ahead.

#### IV. THE UNHAPPY ENDING

Sadly, the improving historic trend in social indicators in SSA has reversed direction since the mid-1990s as a result of the AIDS pandemic. According to estimates by UNAIDS (2004) almost 9 percent (over 25 million people) of adult sub-Saharan Africans are currently HIV positive, and at least 20 million have already died of AIDS. Moreover, infection rates in many countries are still increasing and could conceivably reach the rates of more than 30 percent already recorded in some parts of southern Africa (Haacker, 2002). The physically debilitating nature of

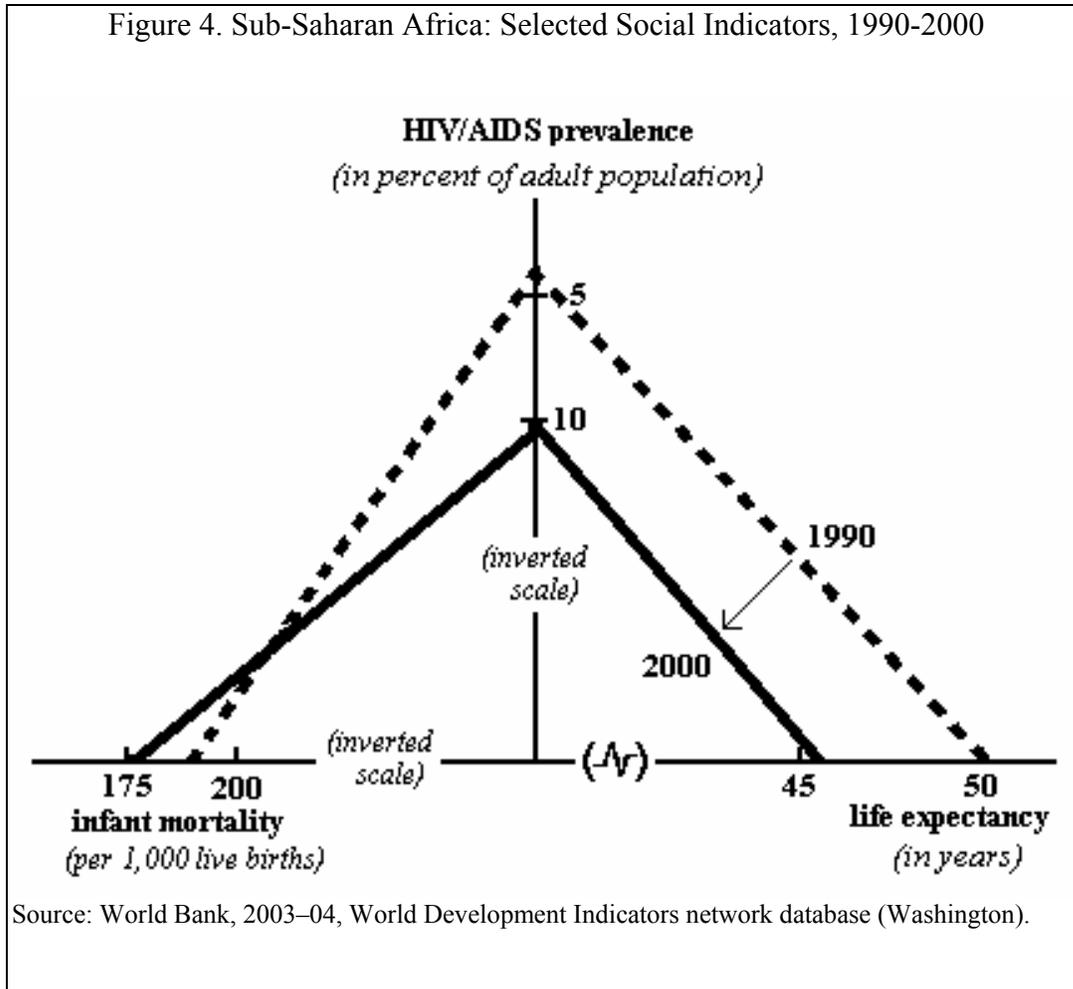
HIV/AIDS infection exacerbates poverty-related deprivation by simultaneously destroying income earning capacities and imposing unsurmountable health care needs on the sick and their relatives (Dixon et al., 2002). Those who are not infected are left with a legacy of suffering and missed opportunities that will handicap them for life and set back the prospects of the next generations. With medication available only to the less unfortunate few, AIDS has made poverty even more oppressive and inequality to reflect the ultimate dichotomy between living or dying. In the only quantified analysis of HIV/AIDS' impact on poverty and inequality that we are aware of, Greener et al. (2000) provided evidence that poverty, and to a lesser extent inequality, got worse in Botswana as a result of HIV/AIDS.

Against this overwhelming background, there has been a temptation in recent years to hail some minor economic gains in SSA as significant progress in the fight against poverty. After stalling for a couple of decades, economic growth picked up in the mid-1990s in what some hailed initially as a "turning point" (Fischer et al., 1998). While it is true that, between 1994 and 1997, real economic growth in SSA "accelerated" to 3.3 percent a year, since 1998 it has barely outpaced the rate of population growth of 2.5 percent a year. This means that the average sub-Saharan African makes, according to the World Bank (2003), barely US\$10 more a year than he or she did six years earlier. In the meantime, according to the World Health Organization (2004), his/her life expectancy has fallen by 5 years and, if HIV positive, he or she is living out his or her last days in painful physical degeneration, social exclusion, and increasing misery. Even if income indicators can statistically support assertions of lower poverty and inequality, any such pretense would have to be detached of all reckoning of the human suffering and deprivation that AIDS is causing in SSA.

Moreover, the situation will only get worse as key social indicators in many SSA countries collapse to pre-modern levels. At current rates of infection, life expectancy in some southern Africa countries is projected to fall to as low as 26 years of age by 2010 and similar setbacks are taking place in terms of the spread of AIDS-related diseases (like tuberculosis), family disintegration, and demographic disruption (Stanecki, 2002). In a tacit admission of the inevitability of these trends, none of the HIV/AIDS-sensitive social indicators was targeted to improve as part of the Millennium Development Goals (MDG) drive--an international campaign calling for qualified reductions in worldwide poverty and related social problems by the benchmark year of 2015 (Sahn and Stifel, 2003). In fact as regards HIV/AIDS itself, the goal for 2015 is the tragically realistic one of aiming for (no more than) a halt in the rate of spread of HIV/AIDS. This means that, in the absence of a medical breakthrough with a miracle cure or viable therapies, HIV/AIDS—which is now killing 2.5 million sub-Saharan Africans per year and wrecking the lives of countless more—will continue to get worse and aggravate social conditions in the foreseeable future. Meaningful economic growth, even if it happens anytime soon, can only mitigate the devastating effects of these trends on poverty and inequality.

In short, and in keeping with our "pyramids" analogy, the pyramids of social indicators in SSA are now moving in the wrong direction. This grim reality can also be illustrated in a pyramid-shaped depiction of the rise in AIDS prevalence and the setbacks to the two most directly related social indicators: life expectancy, which is falling in SSA to pre-industrial levels, and

infant mortality, which although not yet falling on a regional basis has all but stopped improving since 1995.



Moreover, there is compelling evidence for many SSA countries that other social indicators are also worsening as a result of HIV/AIDS. In Table 3, we look at three sub-regional groups of five countries underscoring low, median, and high rates of HIV/AIDS prevalence. Comparison of those countries' social indicators reveals that in high-prevalence Southern Africa not only have the survival indicators (life expectancy and infant mortality) worsened, but so have school enrollment indicators. The opposite happens in the low-incidence group of Western Africa, where HIV/AIDS may have slowed progress with social indicators but has not reversed it. Trends in the median incidence group of Eastern Africa fall in between, as would be expected. The fact that social indicators in Southern Africa had started deteriorating earlier further reinforces our prognostic that, as the incidence of HIV/AIDS worsens in SSA, so will social indicators.

Table 3 : Sub-Saharan Africa: HIV/AIDS Prevalence and Social indicators in Selected Countries, 1990-2000  
(In units indicated; peak levels in bold)

	HIV/AIDS infection 1/ (in % adult population)	Life expectancy (in years)			Infant mortality (per 1,000 live births)			Primary school enrollment (in percent of age group)			Secondary school enrollment (in percent of age group)		
		1990	1995	2000	1990	1995	2000	1990	1995	2000	1990	1995	2000
Western Africa (lower prevalence rates)													
<i>5-country unweighted average</i>		<i>48</i>	<i>50</i>	<i>51</i>	<i>123</i>	<i>116</i>	<i>105</i>	<i>43</i>	<i>52</i>	<i>61</i>	<i>14</i>	<i>16</i>	<i>21</i>
Benin	1.9%	52	53	<b>53</b>	111	104	<b>96</b>	48	57	<b>72</b>	12	16	<b>25</b>
The Gambia	1.2%	49	52	<b>53</b>	103	96	<b>92</b>	51	65	<b>73</b>	19	25	<b>34</b>
Mauritania	0.6%	49	50	<b>51</b>	120	120	<b>100</b>	...	57	<b>66</b>	14	16	<b>22</b>
Niger	1.2%	42	44	<b>45</b>	191	176	<b>159</b>	25	25	<b>30</b>	7	7	6
Senegal	0.8%	50	52	<b>52</b>	90	84	<b>80</b>	48	54	<b>62</b>	16	16	<b>17</b>
Eastern Africa (median prevalence rates)													
<i>5-country unweighted average</i>		<i>49</i>	<i>48</i>	<i>46</i>	<i>102</i>	<i>96</i>	<i>89</i>	<i>36</i>	<i>47</i>	<i>55</i>	<i>16</i>	<i>16</i>	<i>22</i>
Djibouti	2.9%	48	<b>50</b>	46	119	111	<b>102</b>	32	32	<b>32</b>	12	13	<b>18</b>
Eritrea	2.7%	49	50	<b>51</b>	102	83	<b>65</b>	24	30	<b>39</b>	...	19	<b>27</b>
Ethiopia	4.4%	<b>45</b>	44	42	131	123	<b>116</b>	20	27	<b>44</b>	14	12	<b>17</b>
Kenya	6.7%	<b>57</b>	53	47	<b>63</b>	73	77	67	62	<b>68</b>	24	24	<b>31</b>
Uganda	4.1%	<b>47</b>	44	42	93	92	<b>85</b>	...	85	<b>90</b>	13	12	<b>15</b>
Southern Africa (higher prevalence rates)													
<i>5-country unweighted average</i>		<i>58</i>	<i>53</i>	<i>43</i>	<i>64</i>	<i>66</i>	<i>78</i>	<i>88</i>	<i>88</i>	<i>80</i>	<i>47</i>	<i>58</i>	<i>56</i>
Botswana	37.3%	<b>57</b>	50	39	<b>45</b>	52	74	<b>93</b>	81	80	43	63	<b>73</b>
Lesotho	28.9%	<b>58</b>	51	41	102	97	<b>92</b>	<b>73</b>	71	70	25	31	<b>32</b>
South Africa	21.5%	<b>62</b>	58	48	<b>45</b>	45	50	<b>99</b>	98	90	74	<b>95</b>	85
Swaziland	38.8%	<b>57</b>	55	45	<b>77</b>	78	101	88	<b>94</b>	78	44	<b>53</b>	45
Zimbabwe	24.6%	<b>56</b>	49	40	<b>53</b>	60	73	...	<b>95</b>	80	<b>50</b>	47	43

Sources: World Bank, 2004, *World Development Indicators* network database; United Nations, 2004, *Report on the World AIDS Epidemic*.

1/ Latest estimates (for 1999-2002) provided in referenced source.

Such a worsening in social indicators would appear consistent with the debilitating effects of HIV/AIDS and the opportunity costs of dealing with the disease. Those who are infected are by definition sick and thus less likely to be able to go or send their children to school or, more generally, to actively seek improvements to their lives once prospects have been shattered by the disease. In addition, the medical costs of addressing HIV/AIDS (at the household or public health levels) inevitably entail opportunity costs in terms of other personal welfare priorities or social programs, which will further reflect adversely on social indicators.

## V. CONCLUSION

Poverty in SSA is widespread, dehumanizing and made even more disturbing by lack of progress in reducing it and by ostentatious income inequities personalized by rich, dominant local elites. Under such extreme poverty conditions, social equity is first and foremost about meeting the most basic of human survival needs and, to that effect, social indicators may be more representative of progress than income indicators. Despite the political convulsions and failed economic policies of postcolonial SSA, regional social indicators have improved overall, providing some degree of consolation for a period of otherwise largely wasted policies. In what

amounts to a tragic coincidence, just as regional economic growth showed signs of coming to life in the mid-1990s, the explosion of HIV/AIDS also began setting back social indicators and future growth prospects. While it is evident that even slight improvements in income trends are a welcome development as regards poverty in SSA, the catastrophic effects of AIDS make it (morally *and* scientifically) imperative that claims of progress with poverty reduction take into account those effects on the lives of the poor. As argued in this paper, for poverty and inequality to be meaningfully falling in SSA, basic social indicators that underscore the intensity of suffering and survival prospects for the poor would have to be improving. Since the advent of HIV/AIDS, the opposite has been happening to some key indicators. SSA's "pyramids" of poverty and inequality may remain illusive as to their shape and trend, but they are definitely disconcerting as to the human suffering they still represent.

## REFERENCES

- Adams, Richard H., and John Page, 2003, "Poverty, inequality and growth in selected Middle East and North Africa countries," *World Development (U.K.)*, Vol. 31, December, pp. 2027–48.
- Artadi, Elsa V., and Xavier Sala-i-Martin, 2003, "The Economic Tragedy of the XXth Century: Growth in Africa," *NBER Working Paper Series*, No. 9865, July.
- Ayittey, George B.N., 1992, *Africa Betrayed* (New York: St. Martin's Press for the Cato Institute).
- Christiansen, Luc, Lionel Demery, and Stefano Paternostro, 2003, "Macro and Micro Perspectives on Growth and Poverty in Africa," *World Bank Economic Review*, Vol. 17, (September), pp. 317–47.
- Davoodi, Hamid R., Erwin H. Tiongson, and Sawitree S. Asawanuchit, 2003, "How Useful Are Benefit Incidence Analyses of Public Education and Health Spending?" IMF Working Paper 03/227 (Washington: International Monetary Fund).
- Deaton, Angus, 2001, "Counting the World's Poor: Problems and Possible Solutions," *The World Bank Research Observer*, Vol. 16, (September), pp. 125–47.
- \_\_\_\_\_, 1997, *The Analysis of Household Surveys: A Microeconomic Approach to Development Policy* (Baltimore: Johns Hopkins University Press for the World Bank).
- Deininger, Klaus and Lyn Squire, 1996, "A New Data Set Measuring Income Inequality," *World Bank Economic Review*, Vol. 10, (September), pp. 565–91.
- Dixon Simon, Scott McDonald, and Jennifer Roberts (2002), "The Impact of HIV and AIDS on Africa's economic development," *British Medical Journal*, vol. 324, (January), pp. 232–34.
- Fischer, Stanley, Ernesto Hernández-Catá, and Mohsin S. Khan, 1998, "Africa: Is This the Turning Point?" IMF Paper on Policy Analysis and Assessment 98/6 (Washington: International Monetary Fund).
- Greener, Robert, Keith Jefferis, and Happy Siphambe, 2000, "The Impact of HIV/AIDS on Poverty and Inequality in Botswana," *South African Journal of Economics*, vol. 68, (December), pp. 888-915.
- Haacker, Marcus, 2002, "The economic consequences of HIV/AIDS in Southern Africa," IMF Working Paper 02/38 (Washington: International Monetary Fund).

- John Paul II, (Holy Father of the Roman Catholic Church), 2001, "Economics and Ethics of Globalization," Address to the Pontifical Academy of Social Sciences, April 27.
- Kiregyera, Ben, 1987, "Types and Some Causes of Nonsampling Errors in Household Surveys in Africa," *Journal of Official Statistics/Statistika Centralbyran* (Sweden), Vol. 3 (December), pp. 349–58.
- Köhler, Horst, 2000, "Köhler Stresses Need to Work Together to Ensure that Globalization Benefits All," *IMF Survey*, Vol. 29 (October 9), pp. 321–22.
- Lopes, Paulo Silva, 2002 "A Comparative Analysis of Government Social Spending Indicators and Their Correlation with Social Outcomes in Sub-Saharan Africa," IMF Working Paper 02/176 (Washington: International Monetary Fund).
- Mandela, Nelson, 2000, "Freedom, Poverty, and Globalization," speech on receiving the International Freedom Award from the National Civil Rights Museum, Memphis, Tennessee, November.
- Melchior, Arne and Kjetil Telle, 2001, "Global Income Distribution 1965–98: Convergence and Marginalisation," *Forum for Development Studies*, vol.28, pp.75-98.
- Musgrave, Richard A and Peggy B. Musgrave, 1973, *Public Finance in Theory and Practice* (New York: McGraw-Hill).
- Sahn, David E., and David C. Stifel, 2003, "Progress Toward the Millennium Development Goals in Africa," *World Development (U.K.)*, Vol. 31, January, pp. 23–52.
- \_\_\_\_\_, 2000, "Poverty Comparisons Over Time and Across Countries in Africa," *World Development (U.K.)*, Vol. 28 (December), pp. 2132–55.
- Sala-i-Martin, Xavier, 2002, "The World Distribution of Income (Estimated from Individual Country Distributions)," *NBER Working Paper Series*, No. 8933, May.
- Sala-i-Martin, Xavier, and Arvind Subramanian, 2003, "Addressing the Natural Resource Curse: an Illustration from Nigeria," *NBER Working Paper Series*, No. 9804, June.
- Stanecki, Karen A., 2002, *The AIDS Pandemic in the 21st Century*, Report to the XIV International Conference on AIDS, Barcelona, July.
- Stiglitz, Joseph E., 2002, *Globalization and Its Discontents* (New York: Norton).
- Sutcliffe, Bob, 2003 "A More or Less Unequal World? World Income Distribution in the 20<sup>th</sup> Century?" *Amherst Political Economy Research Institute Working Paper Series*, No. 54, September.

UNAIDS, Joint United Nations Programme on HIV/AIDS, 2004, *2004 Report on the Global AIDS Epidemic* (New York).

World Bank, 2002, *World Development Indicators* (Washington).

World Bank, 2003–04, World Development Indicators network database (Washington).

World Health Organization, 2004, *The World Health Report 2004-Changing History*, (United Nations, New York).