

Poverty reduction in Africa: Challenges and policy options

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Abstract

The paper looks at the magnitude and evolution of poverty in sub-Saharan Africa over the period 1980–1998. It examines the spread, depth and severity of poverty for the region as well as for specific countries, in part by summarizing country case studies conducted by the African Economic Research Consortium (AERC). The review of the literature reveals that poverty rates in Africa are exceptionally high (relative to rates in other developing regions) and getting worse. In the mid-1990s, the mean head-count ratio for the whole region was 53%, with rural and urban poverty rates of 56% and 43%, respectively. Inequality in the distribution of income is also large, with a mean Gini of 49%. In some countries, rural poverty is in the range of 70–80%, and urban poverty is 50–60%.

Improvements in education, health care, maternal education, safe water and sanitation are associated with lower rates of poverty at the regional level at the regional level, as well as within countries. At the country level, some countries with high rates of literacy also have high poverty rates, a situation that contrasts sharply with the households with literate heads invariably have lower poverty rates. This suggests that although education has an independent effect on poverty reduction, its effects via interaction with other factors such as employment and empowerment may be more important. Results also show that countries with large inequalities, and that, the needed redistribution of income and assets can be effected within a relatively short time. The policy challenges in the area of poverty reduction are outlined.

1. Introduction

It is now generally acknowledged that basic human capabilities, such as leading a long and healthy life, being knowledgeable, and enjoying a decent standard of living, are important in their own right. Poor health, malnutrition, illiteracy, lack of voice, powerlessness, and social and physical isolation can be considered as measuring directly the level of deprivation that characterizes most of Africa. The facets of deprivation in Africa are many, complex and dynamic in nature. They seem to have defied (at least in recent centuries) domestic and international efforts, development strategies, and development assistance from donors.

The persistence of low human development in Africa is well illustrated by the famous World Health Organization's Strategy of Health for All by the Year 2000. Three health status indicators were to be achieved via that strategy: life expectancy at birth above 60 years; under-five mortality rate below 70 per 1,000 live births and an infant mortality rate below 50 per 1,000 live births. All countries were expected to have achieved the level of health status consistent with these indicators by the close of the second millennium. However, by 1998 only Mauritius (which accounts for only 1.5% of the total African population) was able to achieve all three targets. Cape Verde achieved the under-five mortality and the life expectancy targets but not the infant mortality target. Comoros and Swaziland were able to achieve only the life expectancy target for females (see WHO, 1999). (Refer to Annex Table A1 for a summary of indicators of well-being for sub-Saharan African countries.)

The debilitating human and economic poverty of African nations has recently been explained in terms of geography and the environment. Landes (1998: 5) quotes Streeten who noted that perhaps "the most striking fact is that most underdeveloped countries lie in the tropical and semi-tropical zones, between the Tropic of Cancer and Tropic of Capricorn. Recent writers have too easily glossed over this fact and considered it largely fortuitous. This reveals the deep-seated optimistic bias with which we approach problems of development and the reluctance to admit the vast differences in initial conditions with which today's poor countries are faced compared with the pre-industrial phase of more advanced countries". Landes himself notes the direct (heat versus cold weather) and indirect (life forms hostile to humans and pattern and distribution of rainfall) effects of tropical climates on human activities.

A prime example of the hostility of tropical environments is the historical and contemporary development there of the biggest killer worldwide: malaria. According to WHO (1999), the annual mortality rate from malaria was declining all over the world since the start of the last century, but a rise in it in some African countries over the same

period need not come as a surprise. However, even though at all periods Africa sustained high mortality rates compared with the rest of the world, up to 1970 the African mortality trend from all diseases was similar to that of the world. Thus, the rate had declined from 184 deaths per 100,000 population during the period when many African countries gained independence (1960–1970) to 107 deaths per 100,000. However, by 1990 this rate had increased to 148 deaths per 100,000 and has recently risen to 165 deaths. It is these complications that led Jeffrey Sachs to appeal to the world community to mobilize scientific knowledge and technology to help poor countries in the tropics, particularly in Africa. His justification is worth noting: “If it were true that the poor were just like the rich but with less money, the global situation would be vastly easier than it is. As it happens, the poor live in different ecological zones, face different health conditions and must overcome agronomic limitations that are very different from those of rich countries. Those differences, indeed, are often a fundamental cause of persisting poverty” (Sachs, 1999).

Apart from historical and geographic dimensions, poverty reduction in Africa, as elsewhere in the world, has a technological dimension. The technological dimension of poverty has to do with the inability of nations to invent and innovate. Western nations (in temperate zones) acquired innovative and inventive capacities over a period of time extending over centuries. African countries, in contrast, are largely in tropical zones and being relatively very young, have as yet to acquire such capacities—the acquisition of which the history of Western countries shows is possible in the long run. Regarding the capacity to innovate, the latest information on indicators of scientific progress worldwide shows that Africa entered the 21st century at a position of relative disadvantage: its share was only 0.5% in R&D expenditure, 0.8% in scientific publications, 0.2% in European registered patents and 0.1% in US patents. This state of Africa’s relative disadvantage in technical capability has its historical roots in the colonial era. The colonial masters, it is admitted by Landes (1998: 431–2), afraid of the Africans’ incipient nationalism “and contemptuous of their abilities, had not taught them much—barely enough to do the subaltern tasks of government”⁹ Much of what these subject populations learned in schools and universities of the colonial master was political and social discourse rather than science and technical know-how”. The dynamics of neglect of technical education endured long after independence in Africa. That is, in the area of Africa’s ability to innovate and equip its population with technical skills, its past has had a profoundly negative effect.

More importantly, poverty—particularly in Africa—has an institutional dimension to it. From the perspective of New Institutional Economics, an ideal growth- and development-oriented society is seen as one that: (a) would know how to operate, manage and build the instruments of production and to create, adapt and master new techniques on the technological frontier; (b) would be able to impart this knowledge and know-how to the young by formal education or by apprenticeship; (c) would employ, promote and demote workers on the basis of competence and relative merit; (d) would afford opportunity to individuals or collective enterprise and encourage initiative, competition and emulation. As corollaries to these features such an ideal society is said to have social and political institutions that would secure rights of private property and personal liberty; enforce contracts; provide stable, responsive, honest, transparent and accountable

government; allow for mobility of factors and goods; and evolve a more equal distribution of income supporting a large middle class (see, among others, Landes, 1998: 217–219). These and similar growth explaining variables have, in Western literature, been proxied by a single composite factor commonly referred to as social capital (Putnam, 1993). In a related literature, it is argued that the primary and fundamental determinant of a country's long-run economic performance is its social infrastructure, defined as the institutional framework that provides the incentives for individuals and firms to be efficient. However, no ideal measure of social infrastructure, including social capital, exists. From an institutional perspective, such a measure is partly proxied by indicators relating to the rule of law, bureaucratic quality, extent of corruption, and the risk of expropriation and repudiation of government contracts. With very few exceptions, African countries are usually found at the bottom of any ranking based on such a measure. Topping the list are the European countries, which, as we have noted, have taken a very long time to get to where they are currently.

Relevant to the realization that such institutions do not develop over short periods is the observation that what is involved in approaching an ideal society—a growth and development society—are survival struggles, some of which are sadly violent. The course of history shows that violence contributes to persistence of poverty in nations. It is thus a pertinent issue as to what can be done to avert violence during the phase of transition to a developed economy. Establishment of democratic institutions and broad-based participation in the development process may avert violence during the transition phase. The most recently available information shows that Africa (UNECA, 1999) has the highest incidence of civil strife among world regions, partly due to excessive social exclusion, and to fragile or non-existent democratic institutions.

From the foregoing discussion, it is perhaps reasonable to argue that the causes of poverty across nations are also the causes of poverty among citizens. While aggregate indicators of well-being such as mortality rates and per capita income could serve to paint the overall welfare picture when countries are the units of analysis, an accurate picture of poverty requires more micro-level information. Such information can be obtained on the basis of detailed household surveys or community mapping to produce high quality data. The most dominant approach to assembling data for poverty analysis at the individual level relies on classic household surveys, in which survey instruments are administered to households, rather than on participatory surveys in which households participate in survey design and in actual gathering of information. The household surveys are the basis for the so-called money metric approach to poverty analysis, which has recently come to dominate poverty assessments in Africa and elsewhere. The approach permits a simple numerical summary of the state of poverty in a country. This statistical aspect of the money metric approach is also the source of its major drawback in policy analysis because it hides many important qualitative dimensions of poverty.

In the dominant approach to poverty analysis, dynamic poverty is conceptualized as having a growth component (reflected by the importance of income in social welfare) and a distribution component (reflected by the centrality in social welfare of how income is distributed in society). While in some sense mechanical, the dominant approach is consistent with the historical reasons associated with the poverty of nations. It is also

useful, since it captures a number of important quantitative dimensions of poverty in poor countries such as nutritional requirements, especially when it is noted that most of the people in such countries have as a potential asset only their own labour. It has been shown, for example, that in an economy that is not wealthy in the aggregate, and where labour productivity is related to nutritional status, poverty can become dynastic, i.e., transmitted in a perpetual fashion from one generation to the next. In other words, once a household falls into a poverty trap, it can prove especially difficult to emerge from it, even if the economy in the aggregate were to experience growth in output for a while (see Dasgupta, 1999). It is needless to note that *not being wealthy* is a defining condition of African economies at the moment, despite their presumed potential wealth (World Bank, 1999).

The aim of this paper is to summarize the poverty situation in Africa as a continent, and to suggest practical measures for dealing with this debilitating and embarrassing condition. The money metric approach to poverty measurement underlies much of the analysis in the paper—the data used in the analysis being the most recent available. On the basis of results we obtain, we try to answer the question: can Africa make substantial and irreversible gains in poverty reduction over the next several decades? If so, what challenges must be overcome, and what policy options are available to countries?

At this point it is worthwhile to note the increasing international concern about the adoption of poverty reduction as the overarching objective of development. In various international conferences and policy documents such a concern is expressed in terms of an objective for the international community to “reduce poverty by half by the year 2015” (see World Bank, 2000a). A number of attempts have now been made to evaluate the feasibility of attaining this objective. This paper attempts to address this issue, specifically by focussing on poverty reduction effects of policies that improve income distribution and enhance growth.

The paper is organized into five sections following this introduction. In Section 2, which discusses income inequality in Africa and links it to poverty, is shown that Africa has an opportunity to reduce poverty over a relatively short period by altering the distribution of income and assets in favour of the poor. Section 3 describes the state of poverty in Africa, suggesting countries where antipoverty measures may be targeted. Section 4 depicts how African poverty, in terms of spread, depth and severity, has changed over time. Effects of growth and redistribution policies on poverty reduction are analyzed. In Section 5, we summarize results from country case studies on poverty in Africa sponsored by the African Economic Research Consortium (AERC). We strive in that section to identify common poverty profiles emerging from case studies and note the tentative nature of some of the results obtained. We also compare poverty profiles derived from national household surveys with results obtained with grouped data in previous studies. In Section 6, we analyze policy implications of the paper.

2. Income inequality

Africa has a high degree of income inequality among world regions. One measure of inequality in the distribution of income is the Gini coefficient (for other measures see Fields, 2000). This measure varies from zero for the case of perfect equality, where everyone in society gets the mean income, to unity, where one person gets all the income and the rest receive nothing. In addition to the Gini coefficient the shares of total income received by various population groups can also be used as measures of inequality. In this case, actual shares are compared with those that obtain under the ideal situation of perfect equality where, for example, the population and income shares are equalized. The most recent, high quality data provided in Deininger and Squire (1996a), could be used to compare income inequality in Africa with other regions. This comparison is displayed in Table 1.

Table 1: Income inequality measures by world regions

Region	Gini coefficient	Share of top 20%	Share of middle class	Share of bottom 20%
Africa	51.0*	50.6	34.4	5.2
East Asia and Pacific	38.1	44.3	37.5	6.8
South Asia	31.9	39.9	38.4	8.8
Latin America	49.3	52.9	33.8	4.5
Industrial Countries	33.8	39.8	41.8	6.3

Source: Deininger and Squire (1996a: Tables 5 and 6).

*Adjusted Gini coefficient as in Deininger and Squire (1996a: 582).

It is clear from Table 1 that for all regions, inequality in the distribution of total expenditure (income) is lowest in South Asia, which also has the lowest Gini coefficient (32%). Furthermore, the richest 20% of the population there receive 40% of the total income (the smallest share compared with all other regions) and the income share of the poorest 20% is 9% (the highest for all regions). At the other extreme is Africa, where income distribution is the most unequal in the world as reflected by the highest Gini coefficient of 51%. However, in terms of the unadjusted shares, Latin America ranks as the region with the highest income inequality. The share of the richest 20% of the population in Latin America is 53% of total income compared with 51% in Africa. Also, in Latin America, the poorest 20% receive only 4.5% of total income compared with 5.2% in Africa. Thus, based on expenditure shares, Africa ranks as the second most

unequal region in the world (after Latin America), though the difference between the two regions might not be statistically significant. In view of the information in Table 1, poverty and inequality in the distribution of income and assets appear to be closely linked.

In addition to the overall high inequality in Africa relative to other world regions, there exists a high variance of income distribution among African countries themselves. The high income inequality countries in Africa (Gini coefficients in parentheses) include South Africa (58.4%), Kenya (57.5%), Zimbabwe (56.8%), Guinea Bissau (56.2%), Lesotho (56%) and Senegal (54.1%). At the other extreme, low income inequality countries include Ghana (33.9%) Niger (36.1%) and Côte d'Ivoire (36.9%).

For a number of African countries quantitatively important changes in inequality have been observed. Despite a general observation that income inequality does not display a time trend, a number of countries have experienced rather large changes in the distribution of income over fairly short periods of time. In this respect, a "quantitatively small" time trend is defined as an annual change of less than 1% of the country's reference Gini coefficient. For a sample of seven African countries for which data are available, Table 2 shows important changes in the Gini coefficient over relatively short periods of time.

Table 2: Changes in the distribution of expenditure for a sample of African Countries (time periods in parentheses)

Country	Gini (%) (1 st year)	Gini (%) (2 nd year)	Change in Gini over period (%)	Annual rate (%) change in Gini (%)
Côte d'Ivoire	41.22 (1985)	36.89 (1988)	-4.33	-3.63
Ghana	35.90 (1988)	33.91 (1992)	-1.99	-1.42
Mauritius	39.63 (1986)	36.69 (1991)	-2.94	-1.53
Nigeria	37.02 (1986)	41.55 (1992)	4.53	1.94
Tunisia	43.00 (1985)	40.24 (1990)	-2.76	-1.32
Uganda	33.00 (1989)	40.78 (1992)	7.78	7.31
Zambia	43.51 (1991)	52.0 (1996)	8.89	3.79

Source: Deininger and Squire (1996b) database.

From Table 2 it is clear that four of the seven African countries recorded a large decline in expenditure (income) inequality over a period of five years. The largest decline of 4.3 percentage points in the Gini coefficient is recorded for Côte d'Ivoire over a period of only three years at a fairly high annual rate of decline of 3.6%. The remaining three countries recorded notable increases in expenditure inequality over a period of three to five years.

The highest increase of 7.8 percentage points, over a three-year period, is recorded for Uganda with an annual rate of increase of the Gini coefficient of 7.3%. Zambia also recorded quantitatively important increases in its Gini over a five-year period of 8.9 percentage points with an annual rate of increase of 3.8%. In view of the short periods of time over which these distributional changes have occurred, it is not exactly clear what might have been their sources. It is especially puzzling given that the underlying structural factors generally affecting inequality are not likely to have undergone drastic changes

over such short periods. One possible hypothesis worthy of testing is that macroeconomic policy is the source of the changes. Almost all of the countries under review experienced such macro policy changes during the indicated time periods. However, the precise ways in which macro policy changes affect income inequality are not theoretically well known. This, of course, is an important policy issue as its clarification would inform the design and implementation of macroeconomic policy programmes.

Another hypothesis worth testing is that there exists no significant difference in income inequality between rural and urban sectors. Expenditure distribution profiles for the rural and urban sectors in sub-Saharan Africa are not much different despite the relatively high inequality picture painted for the continent. A summary of the sectoral distribution of expenditure by quintile groups is presented in Table 3. The Gini coefficients shown in Table 3 are adjusted to reflect inequality in income distribution.

Table 3: Income distribution in rural and urban Africa in 1990

Sector	Share of lowest 20%	Share of second lowest 20%	Share of third lowest 20%	Share of fourth lowest 20%	Share of top 20%	Gini coefficient
Rural	5.95	10.43	14.75	21.19	47.68	47.90
Urban	5.56	9.75	14.10	20.75	49.84	50.19

Source: Based on World Bank African Development Indicators 1998–1999.

The summary in Table 3 displays a picture of a fairly high unequal distribution of expenditure in rural Africa. The mean share of the lowest 40% of the population is only 16% of total expenditure, implying a shortfall of 24% of total income, while the mean share of the top 20% of the population is about 48% with 28% of total expenditure accruing to this group as a bonus. The share of the top 20% in total expenditure is eight times that of the poorest 20% of the rural population. This state of inequality is summarized by an expenditure in Gini coefficient of 41.3%, which when adjusted to reflect inequality in the distribution of income rises to 48%.

Not surprisingly, African rural inequality differs from one country to another. High rural inequality countries include the Central African Republic (with a Gini coefficient of 70.5%), Guinea Bissau (63.9%), Swaziland (57.8%), South Africa (57.3%) and Niger (57.2%). On the other hand, low rural inequality countries include Ghana (with a Gini coefficient of 35.7%), Côte d'Ivoire (37.1%), Senegal (37.2%), Guinea (39.2%) and Mauritania (39.9%).

Like the expenditure distribution profile in the rural sector, Table 3 shows a fairly high unequal distribution of expenditure in the urban sector of Africa. The mean share of the lowest 40% of the urban population is only 15.3% of total expenditure, implying a shortfall of about 25% of total expenditure entitlement under conditions of complete equality. On the other hand, the mean share of the top 20% of the urban population is almost 50% with 30% of total expenditure accruing as a bonus to this group. The share of the top 20% in total expenditure is about eight times that of the poorest 20% of the

urban population. This state of inequality is shown by a mean Gini coefficient of about 44%, which when adjusted to reflect rural income inequality becomes 51.0%. Urban inequality also differs from one country to another. High urban inequality countries include Swaziland (with a Gini coefficient of 68.9%), South Africa (59.7%), Central African Republic (57.8%), Kenya (55.1%) and Ethiopia (54.9%). On the other hand, low urban inequality countries include Ghana (with a Gini coefficient of 39.5%), Mauritania (41.4%), Nigeria (42.7%) and Niger (42.7%). Comparing the two sectoral distributions in Table 3 (rural versus urban), it can be seen that for all inequality measures, they are generally of the same magnitude.

Despite disagreement on the existence of a stable trade-off between development and inequality, African countries are on the rising inequality phase of the well known Kuznets curve (Kuznets, 1955). A stylized observation of development studies is that over a long time horizon during which a structural transformation of poor countries is to take place, distribution must get worse before it can get better, which is the famous Kuznets hypothesis. What is involved in the hypothesis, is the expected effect of growth on inequality, and hence the idea of the trade-off between the two. The evidence is not conclusive, however, and some quarters believe that this effect can go either way and is contingent on a number of other factors, most notably the prevailing social institutions.

While at the empirical level there has been haste to provide evidence that the Kuznets hypothesis is not valid, a lot of theoretical political economy has been able to establish the possibility of the existence of such a relationship between growth and inequality in the long run. Moreover, a number of empirical contributions have found support for the hypothesis. See Ali and Elbadawi (1999) for a summary of the theoretical and empirical literature on this issue. However, the empirical contributions differ with respect to the data sets available on income distribution; with respect to the measure of inequality used as dependent variable; and with regard to the mathematical forms of the estimated equations. In one such relationship, where an African dummy is included, it is shown that inequality begins to decline after a level of real GDP per capita of \$1,566 (in 1985 PPP dollars) has been reached (see Ali and Elbadawi, 1999). Annex Table A2 shows that only four countries in the sample (Botswana, Côte d'Ivoire, Lesotho and Tanzania, which account for about 26% of the population of the sample in 1998) will be in the declining inequality phase by 2015. The majority of African countries (74% of the population of the sample) will not be able to get on to the declining phase of inequality by the year 2015, given their recent development performance.

3. The state of poverty

High levels of deprivation characterize both rural and urban areas in Africa. These indicators of deprivation at the aggregate level are confirmed by results from household budget surveys for a sample of 21 African countries (World Bank, 1999). The results are reported in Table 4 for rural and urban sectors and they include education indicators (a set of primary enrolment rates and a set of literacy rates) and health indicators (access to sanitation and access to clean water).

Table 4: Major characteristics of rural and urban sectors in Africa in the 1990s

Indicator	Rural sector	Urban sector
Average household size (persons)	06.34	05.71
Population below 15 years (%)	47.80	44.06
Net primary enrolment (%)	36.50	62.59
Male primary enrolment (%)	40.59	65.65
Female primary enrolment (%)	33.06	60.40
Literacy rate (%)	36.37	57.65
Male literacy rate (%)	45.63	66.25
Female literacy rate (%)	28.26	49.60
Female headed households (%)	19.14	47.60
Heads in agro-pastoral activities (%)	76.98	17.56
Access to sanitation (%)	40.94	77.80
Access to piped water (%)	18.75	70.70

Source: World Bank (1999).

According to the survey results, the rural sector in Africa accounts for 75% of the total population. The sector is characterized by a fairly young population, where on average 48% of the population is below the age of 15 years. But countries differ: six countries have youth percentages higher than the average: 50% for Uganda, 49% each Burkina Faso and Gambia, 48% for Guinea, and 47% each for Niger and Senegal. The sector is characterized by medium-sized households of 6 persons per household. Relatively higher rural household size is recorded for Gambia and Senegal (11 persons) and Mali (9 persons).

Table 4 also shows a fairly high degree of deprivation in the rural sector of sub-Saharan Africa. Only 36.50% of the rural children of primary-school age (6–13 years) are enrolled in primary education. The net primary enrolment ratio for male children is higher (40.59%) than for female children (33.06%) reflecting an aspect of gender bias.

Similarly, the average literacy rate (the proportion of the population above the age of 15 years who are able to read and write) is only 36.4%, with male literacy (45.6%) being higher than female literacy (28.3%). As usual, the average picture hides a lot of variation among countries. Tanzania, Swaziland and Uganda, for instance, have made commendable progress in rural education. The literacy rate for Tanzania is 72% (with male literacy rate of 73% and female literacy rate of 71%), while the rate for Swaziland is 71% (with male literacy rate of 81% and female literacy rate of 62%). Finally, the literacy rate for Uganda is 59% (74% for males and 47% for females). At the other extreme are Mali (with an overall literacy rate of 4% and male and female literacy rates of 7% and 1% respectively), Guinea (7% overall literacy rate, with male literacy of 13% and 2% for females) and Guinea-Bissau (12% overall rate, with 22% and 4% for males and females, respectively). Given the centrality of education in the development process, these literacy rates show a very high level of deprivation in some parts of Africa.

Access to piped water and sanitation, a proxy for rural health achievement, paints a similar picture of a very high degree of deprivation in rural Africa. Only 19% and 41% of the rural population have access to piped water and sanitation, respectively. The highest access to piped water (53% of the population) is recorded for South Africa, followed by Djibouti (45%), Côte d'Ivoire (41%) and Kenya (40%). The lowest access is recorded for Guinea (only 1% of the population) followed by Uganda and Guinea-Bissau (2% for each). The highest access to sanitation is recorded for Tanzania (92% of the population), followed by South Africa (77%), Kenya (75%) and Uganda (75%).

Like the rural sector, the African urban sector is characterized by a fairly young population where on average 42% of the population is below the age of 15 years. Six countries have urban youth percentages higher than the average: 50% for Niger, 47% for Sierra Leone, 46% for Guinea Bissau and Uganda, 44% for Guinea, and 43% for Burkina Faso. The urban sector is also characterized by medium-sized households of 5.7 persons with no noticeably higher household size recorded for any country. Not unexpectedly, Table 4 reflects a medium degree of deprivation in the rural sector of Africa compared with that prevailing in the urban sector. Thus, for example, 62.6% of African urban children of primary-school age (6–13 years) are enrolled in primary education, compared with 36.5% in the rural sector. A slight gender bias in education is also evident in the urban sector, where the net primary enrolment ratio (66%) for male children is higher than for female children (60%). Literacy rate data also confirm the picture of medium rural deprivation compared with the urban sector. The average urban literacy rate is 58%, with a male literacy rate of 66% and a female literacy rate of 50%, which are considerably higher than the rural rates. As expected, the average picture hides a lot of variation among countries. Madagascar, Kenya, Swaziland and Tanzania have made commendable progress in urban education with respective literacy rates of 96% (97% rates for males and 95% for females); 92% (95% for males and 88% for females); 87% (where gender equality is achieved with 87% literacy); and 82% (89% for males and 76% for females). As already noted, exceptional deprivation is evident for Mali, with a literacy rate of 2% (male literacy rate of 3% and female literacy rate of 1%), Guinea with a literacy rate of 7% (13% for males and only 2% for females), and Guinea-Bissau with a literacy rate of 12% (22% for males and only 4% for females).

Urban access to piped water and sanitation, a proxy for health achievements, paints a contrasting picture to that of a high degree of deprivation in the rural sector. On average, 70% and 77% of the urban population have access to piped water and sanitation, respectively. The highest access to piped water (99% of the population) is recorded for South Africa followed by Kenya (90%), Niger (90%), Mauritius (88%) and Swaziland (86%). The lowest access is recorded for Guinea-Bissau (26% of the population) followed by Uganda (35%). The highest access to sanitation is recorded for Swaziland (97% of the population), followed by Tanzania (96%), Uganda (95%), Senegal (93%), Burkina Faso (88%) and Guinea (86%). The lowest access is recorded for Djibouti (only 19%).

More than half of sub-Saharan Africa's population lives on an average income of less than \$20 per person per month. The rural poor contribute 80% to African poverty, and live on an average income of \$16 per person per month. The capability to enjoy a decent standard of living can be looked at in terms of money metric measures of poverty. In this context, the relevant measure of the standard of living for countries in Africa is usually taken as per capita consumption expenditure (including the consumption of own production). Given agreement on such a standard of living there are a number of methods to determine the threshold of deprivation below which people are identified as poor. This threshold is commonly known as the poverty line. The commonly used approach to determining the poverty line for countries in Africa is the cost-of-basic-needs method. The method involves identifying a basket of basic goods and services (food, shelter and health) necessary to lead a decent life in a given social context. Required quantities of these goods are then appropriately priced to arrive at a monetary value that defines the poverty line. In recent years, it has been increasingly recognized that the poverty line varies among countries and also within the same country over time. A simple measure of poverty is the ratio of the poor identified by a poverty line to the total population. This is the well-known head-count ratio. It is the most widely used and easily understood measure of poverty. Other popular money metric measures of poverty include the poverty gap ratio, which takes into account the extent to which consumption by the poor falls below the poverty line, and the squared poverty-gap ratio, which measures the severity of poverty.

The choice of poverty lines is to a large extent arbitrary. For international comparisons, two alternatives are available: *absolute* and *relative* poverty lines. An "absolute" poverty line is set so as to maintain a constant purchasing power across countries, whereas a "relative" poverty line is allowed to vary with a country's average income. A common practice is to set the poverty line at a common percentage of median income, say, 50% of each country's median income. For the purpose at hand, it is the relative approach that is relevant. The poverty line we use is thus allowed to change with income (see Ali and Thorbecke, 2000). Table 5 reports a summary picture of poverty in Africa at the close of the 1990s. The figures shown in the table are simple averages for the countries in the sample. Further, the overall poverty results are weighted means for the urban and rural sectors with the weight of the rural sector being 75% of the total population. The poverty profiles that emerge from the table are similar to those reported in the literature (see Fields, 2000).

Table 5: Poverty in Africa in the 1990s

Poverty Indicator	Rural sector	Urban sector	Overall
Head-count ratio (%)	55.58	43.03	52.30
Poverty-gap ratio (%)	23.42	16.12	21.50
Squared poverty-gap ratio (%)	13.26	08.28	11.96
Mean expenditure (\$/person/year)	408.56	958.95	551.00*
Mean poverty line (\$/person/year)	324.57	558.44	441.50*

Source: Own calculations.

From the summary in Table 5, it is clear that Africa entered the present century with pervasive rural poverty: nearly 56% of the rural population is below the poverty line of approximately \$325 per year per person. African rural poverty is also unevenly spread, as reflected by a poverty-gap ratio of 23%, and severe, as reflected by a squared poverty-gap ratio of 13%, which is many times larger than severity indexes for similar regions in the world. To further appreciate the extent of African poverty it should be noted that the average income of the poor in rural Africa amounts to only \$163 per person per year, which is half of the poverty line. Thus, on the average, every poor person in Africa is living on less than half the designated poverty line income of US\$325 per year per person.

The spread, depth and severity of rural poverty in Africa differ among countries. In terms of all measures, Ghana ranks as the country with the least rural poverty (a head-count ratio of 29%, a poverty-gap measure of 6.01% and a squared poverty-gap measure of 1.8%). At the other extreme is Central African Republic, which ranks as the country with the highest poverty (78% of its rural population is living below a poverty line of \$280 per person per annum, and it has a poverty-gap measure of 45.7% and a squared poverty-gap measure of 31.9%).

Nine countries have a rural poverty incidence in excess of 60% (Burkina Faso: 68%; Central African Republic: 78%; Djibouti: 71%; Ethiopia: 63%; Guinea: 61%; Guinea-Bissau: 72%; Mali: 63%; Tanzania: 65%; Zambia: 74%). Similarly, nine countries have a poverty-gap ratio greater than the mean (Burkina Faso: 26.2%; Central African Republic: 46%; Djibouti: 32%; Guinea-Bissau: 43%; Mali: 26%; Mauritania: 37%; Swaziland: 28%; Tanzania: 25%; Zambia: 37%).

Table 5 also shows that Africa has an exceptionally high incidence of urban poverty: 43% of the urban population of Africa is living below a poverty line of \$558 per year per person. Urban poverty is deep, as reflected by a poverty-gap ratio of 16%, and severe, as indicated by a squared poverty-gap ratio of 8.3%, both of which are much higher than indexes for other regions of the world. To further appreciate the extent of this poverty, it should be noted that the average income of the urban poor amounts to only \$352 per person per year or \$29 per person per month.

As usual, the summary picture of the spread, depth and severity of urban poverty in Africa hides a lot of differences among countries. For all poverty measures, South Africa ranks as the country with the least urban poverty (a head-count ratio of 29.51%, with a poverty-gap measure of 0.73% and a squared poverty-gap measure of .09%). At the other extreme, Swaziland ranks as the country with the highest incidence of urban poverty

with 58% of its urban population living below the poverty line of \$649 per person per year. Niger is the country with the worst depth of poverty (with a poverty-gap ratio of 17.2%), while Guinea-Bissau ranks as the country with the worst urban poverty in terms of severity (with a squared poverty-gap measure of 9.4%).

Widespread urban poverty, where half or more of the urban people are living below the relevant poverty lines, is evident in six countries: Central Africa Republic (with a head-count ratio of 50%), Ethiopia (53%), Guinea-Bissau (53%), Swaziland (59%), Tanzania (50%) and Zambia (54%). The distribution of countries with respect to the mean depth of poverty is such that nine countries also have a poverty-gap ratio greater than the mean (Burkina Faso: 18%; Central African Republic: 24%; Ethiopia: 20%; Guinea-Bissau: 24%; Kenya: 16%; Swaziland: 33%; Tanzania: 17%; and Zambia: 22%). Moreover, seven countries have a squared poverty-gap ratio greater than the mean: Burkina Faso (9%), Central African Republic (15%), Guinea-Bissau (15%), Madagascar (9%), Swaziland (23%), Tanzania (8%) and Zambia (11%).

Recent research has shown that the incidence of African poverty is more sensitive to growth than to changes in inequality, while the depth and severity of poverty are more sensitive to changes in inequality than to growth (Ali and Thorbecke, 2000; UNECA, 1999). In this regard, an important policy question to ask about poverty in African countries is, how sensitive is poverty to growth in mean income and to changes in income inequality. The answer could be obtained by looking at the question in terms of the elasticity of any poverty measure with respect to relevant policy instruments. Such elasticities, averaged over the countries in the sample, are reported in Table 6.

Table 6: Responsiveness of African poverty to growth and distribution

Poverty index	Rural		Urban	
	Elasticity with respect to mean expenditure	Elasticity with respect to the Gini coefficient	Elasticity with respect to mean expenditure	Elasticity with respect to Gini coefficient
Head-count ratio	-1.17	0.34	-1.24	0.84
Poverty-gap ratio	-1.66	1.67	-1.84	2.82
Squared poverty-gap ratio	-1.99	2.97	-2.23	4.72

Source: Own calculations.

In terms of sensitivity to its determinants, African rural poverty exhibits a pattern that is now becoming stylized for the three poverty measures used. Thus, for example, the head-count ratio is relatively more responsive to growth in income than to changes in the distribution of income. A 1% increase in mean income would lead to a 1.17 percentage point reduction in poverty, while a 1% decrease in the Gini coefficient would lead to a 0.34% reduction in poverty. At the other end, when measured in terms of the squared poverty-gap, African rural poverty is more sensitive to changes in income inequality than in mean income. An increase in mean income of 1% reduces poverty severity by 2 percentage points, while a reduction in inequality by 1% reduces it by nearly 3 percentage

points. On the other hand, the *level* response of African urban poverty is more regular than that for rural poverty, in the sense that poverty is more sensitive to income distribution than to growth except for the head-count measure. The elasticity of poverty measures with respect to the Gini coefficient is greater than the absolute value of the elasticity with respect to mean income. Moreover, the magnitude of the response is higher for urban poverty than for rural poverty.

Africa entered the new millennium with the highest poverty among world regions. In Table 7, African poverty is compared with that in other developing regions using similar methodology and data sets. The results shown in Table 7 are weighted by population shares of the countries in each region. To facilitate comparison of variation of poverty within regions we also report the standard deviations of various poverty measures.

Table 7: Poverty in world regions: A comparison

Region	Number of countries	Per capita expenditure (\$)*	Head-count ratio (%)	Poverty-gap ratio (%)	Squared poverty-gap ratio (%)
Africa	18	96	53.52 (3.60)	22.66 (1.62)	12.73 (0.93)
Latin America	16	241	40.60 (9.11)	18.30 (3.70)	10.43 (2.06)
Asia	8	101	30.49 (5.10)	9.60 (1.51)	4.44 (0.68)

Source: Ali and Elbadawi (1999).

It has been shown (Ali and Elbadawi, 1999) that there are significant differences in poverty rates between Africa and the other regions; Table 7 makes it clear that Africa has the highest rates of incidence, depth and severity of poverty in the world.

4. Trends in poverty

There is general agreement in the literature that poverty increased in the continent over the period spanning the 1980s and 1990s. Lack of relevant data, however, is a constraint to establishing this result conclusively for the region as a whole. In what follows, we report two examples of increased poverty, Nigeria and Côte d'Ivoire.

Nigeria

The data for this subsection are taken from Canagarajah, Ngwafon and Thomas (1997). The available data pertain to two comparable national consumer surveys. The grouped distribution of expenditure associated with this data set is summarized in Table 8.

Table 8: Income distribution in Nigeria by decile shares: 1985/86 and 1992/93 (percentages)

Year	Income deciles (poorest to richest)									
	1	2	3	4	5	6	7	8	9	10
1985	2.43	3.81	4.81	5.83	6.99	8.49	10.35	12.75	16.55	27.99
1992	1.33	2.66	3.84	5.09	6.37	7.98	10.16	13.23	17.96	31.37

Source: Canagarajah et al. (1997: 13, Table 4.1).

As the data in Table 8 imply, income inequality in Nigeria has increased over the period under consideration (see also Section 5). This is indeed confirmed by an increase in the Gini coefficient from 38.1% in 1985 to 44.9% in 1992, a large increase in inequality over a relatively short period of time (Table 9). Following Canagarajah et al. (1997) we take the poverty line as a proportion of income of the relevant year. According to our calculations the weighted average per capita income in constant 1985/86 naira is N603, implying a poverty line of N404, while that for 1992/93 is N973 with a poverty line of N532.

Table 9: Poverty measures for Nigeria, 1985 and 1992 (percentages)*

Year	Head-count	Poverty-gap	FGT-P(2)	Gini coefficient
1985; $\mu=603$; $z=404$	41.92	14.93	6.98	38.07
1992; $\mu=793$; $z=532$	46.80	21.42	12.66	44.93
$P_{t+n} - P_t$	4.88	6.49	5.68	6.86

*Note that μ (mean income) and z (poverty line) are in 1985/86 naira as in Canagarajah et al. (1997) and P denotes a poverty measure.

Thus, according to our results, and taking into account the change in the poverty line due to a change in mean income, poverty in Nigeria during the period under consideration increased according to the three poverty measures. This is in contrast with the results reported in Canagarajah et al. (1997). As is well known, the total change in poverty (as shown in the last row of Table 9) can be decomposed into a growth component and a distribution component. This decomposition, however, is sensitive to the method used. The most widely used method is due to Datt and Ravallion (1992), where the poverty line is held constant at its level in the base year. This is the method used in Canagarajah et al. (1997), but Datt and Ravallion method overestimates the contribution of growth to the reduction of poverty (see, for example, Ali, 1998, and Ali and Thorbecke, 2000). An alternative method allows the poverty line to change with income. (Refer to Annex B for the poverty decomposition methodology.)

To undertake the decomposition analysis we need the simulated poverty measures P^* (for the growth effect) and P^{**} (for the distribution effect). The simulation results are reported in Table 10.

Table 10: Simulated revised poverty measures for Nigeria: 1985 and 1992 (percentages)

Simulation	Head-count ratio	Poverty-gap ratio	FGT-P(2)	Gini coefficient
$P^{92^*}; \mu=793; z=404$: (C-Approach)	28.26	8.53	3.42	38.07
$P^{92^*}; \mu=793; z=532$: (A-Approach)	41.99	14.96	7.00	38.07
$P^{92^{**}}; \mu=603; z=404$	46.74	21.39	12.64	44.93

Note: C-Approach (C-A) keeps z constant as in Canagarajah et al. (1997) and A-Approach (A-A) is an alternative decomposition method that allows for the change in corresponding z as in Ali (1998).

Table 10 is self-explanatory. The first row gives the simulated poverty measures for the growth effect holding the poverty line constant as in Canagarajah et al., while the second row gives the results based on the alternative method, where changes in the poverty line are taken into consideration. The third row, dealing with the simulated poverty measures for the distribution effect, is common to both methods. The resulting decomposition results are reported in Table 11.

Table 11: Revised decomposition of poverty change in Nigeria: 1985 and 1992 (percentage points)

Poverty change	Head-count ratio	Poverty-gap ratio	FGT-P(2)
C-A: Total change	$35.57 - 41.92 = -6.35$	$15.12 - 14.93 = 0.19$	$8.42 - 6.98 = 1.44$
C-A: Growth effect	$28.26 - 41.92 = -13.66$	$8.53 - 14.93 = -6.4$	$3.42 - 6.98 = -3.56$
Distribution effect	$46.74 - 41.92 = 4.82$	$21.39 - 14.93 = 6.46$	$12.64 - 6.98 = 5.60$
C-A: Residual	$-6.35 + 8.44 = 2.31$	$0.19 - 0.06 = 0.13$	$1.44 - 2.04 = 0.60$
A-A: Total change	$46.80 - 41.92 = 4.88$	$21.42 - 14.93 = 6.49$	$12.66 - 6.98 = 5.68$
A-A: Growth effect	$41.99 - 41.92 = 0.07$	$14.96 - 14.93 = 0.03$	$7.00 - 6.98 = 0.02$
A-A: Residual	$4.88 - 4.90 = -0.02$	$6.49 - 6.49 = 0.00$	$5.68 - 5.62 = 0.06$

Source: Own calculations.

Thus, according to the Datt–Ravallion method (C-A) in Table 11, poverty in Nigeria declined over the period 1985/86–1992/93 by 6.35 percentage points for the head-count ratio, but increased marginally according to the poverty-gap ratio by 0.19 points and increased by 1.44 points for the squared poverty-gap ratio. In these poverty changes, the growth effect was such that it reduced poverty by 13.67 points for the head-count measure, by 6.4 points for the poverty-gap ratio and by 3.56 points for the squared poverty-gap ratio. The distributional effect, on the other hand, increased poverty by 4.82 points for the head-count ratio, by 6.46 points for the poverty-gap ratio and by 5.6 points for the squared poverty-gap ratio. In contrast, the alternative decomposition method shows that after taking account of the change in the poverty line, poverty in Nigeria increased over the period 1985/86–1992/93 irrespective of the poverty measure adopted. For instance, poverty increased by 4.88 percentage points when the measurement rod is the head-count ratio, by 6.49 points by the poverty-gap ratio and by 5.68 points by the squared poverty-gap measure. More importantly, it is clear from the results reported in Table 11 that these changes are accounted for almost in full by the distribution effect: 4.82 points for the head-count ratio, 6.46 points for the poverty-gap measure and 5.6 points for the squared poverty-gap measure.

Thus, growth had practically no effect on poverty in Nigeria during the period 1985/86–1992/93. This is only a preliminary result, however, since it can be explained in terms of the homogeneity assumption made about the poverty line as a constant proportion of mean income. It can be shown that if the poverty line is taken as a constant proportion of mean expenditure, then this will imply that the elasticity of the poverty line with respect to mean income is equal to unity. Hence, since the poverty line changes in the same proportion as income, the change in poverty is explained exclusively by changes in the distribution of income. Despite this caveat, the large poverty effects of distributional changes are worth noting. In particular, the effects suggest that when the poverty line is a varying proportion of mean income, changes in income distribution would be important determinants of poverty.

Côte d'Ivoire

The data set we use is the aggregate quintile distribution for Côte d'Ivoire as presented by Deininger and Squire (1996b). The quintile distribution, together with the Gini coefficient, is presented in Table 12. The changes in the distribution of expenditure (or income) as reported in the table are a shade on the high side, given that we are dealing with short-run duration. No attempt has been made in the literature to explain these distributional changes, and we assume that the reported information is accurate for the purposes of our study.¹ As we show shortly, the elasticity of the Gini coefficient with respect to income can readily be calculated.

Table 12: Distribution of per capita expenditure in Côte d'Ivoire 1985-1988 (percentages in per capita expenditure in 1985 PPP dollars)

Year	Share of quintile 1	Share of quintile 2	Share of quintile 3	Share of quintile 4	Share of quintile 5	Gini coefficient
1985	5.67	10.07	14.91	21.90	47.43	41.22
1986	7.01	10.60	14.86	21.33	46.20	38.63
1987	6.48	10.46	14.84	21.19	47.03	40.02
1988	6.78	11.18	15.78	22.18	44.08	36.89

Source: Deininger and Squire(1996b) data set, with Gini coefficients obtained by fitting a general quadratic Lorenz curve to data.

For the computation of a welfare index we follow the established convention and use real per capita consumption expenditure in 1985 PPP dollars from Summers and Heston as reported in their Internet site (see, for example, Chen, Datt and Ravallion, 1994). Given real per capita expenditure we estimated the corresponding poverty lines from an equation based on regressing 58 poverty lines on per capita expenditure for a sample of developing countries.² The estimation results (with t-values in parentheses beneath the estimates) are as shown below (z is the poverty line and m is mean income).

$$\log z = 5.181 + 0.00158\mu - 0.0000003485\mu^2; R^2 = 0.956$$

(100.9) (18.3) (-10.9)

The poverty lines generated by applying the equation above to Côte d'Ivoire data are reported in Table 13.

Table 13: Poverty lines for Côte d'Ivoire 1985–1988

Reference year	1985	1986	1987	1988
μ (1985 PPP\$)	1,048	1,056	1,065	971
z (1985 PPP\$)	635	640	645	594

Source: Own calculations based on the equation above and Summers and Heston (1991) data.

From Table 13 it is easy to show that per capita consumption expenditure recorded an annual rate of increase of 0.763% for 1985/86, and 0.852% for 1986/87, while it recorded an annual rate of decline of 8.826% for 1987/88. The poverty line increased by 0.68% for the first period and by 0.7567% for the second period, then declined by an annual rate of 7.85% for the period 1987/88. The implied elasticity of the poverty line with respect to income is 0.89.

Using the data in Table 13, the indicators of changes in welfare can be computed. Table 14 reports our estimates of poverty in Côte d'Ivoire for the period 1985–1988 using the Grootaert (1995) method (a version of the Datt and Ravallion method) and our alternative procedure.³ The standard three poverty measures are reported in Table 14, the head-count ratio (P_0), which measures the spread of poverty; the poverty-gap ratio (P_1), which measures the depth of poverty; and the squared poverty-gap ratio (or FGT (2) ratio) (P_2), which measures the severity of poverty.⁴

As is clear from Table 14, compared with our alternative method, the Grootaert method underestimates poverty for all poverty measures for 1986 and 1987 and overestimates it for 1988. Indeed, except for the two end points, the Grootaert method does not give the same qualitative direction of change in poverty as our method.

Table 14: Poverty in Côte d'Ivoire 1985–1988 (percentages)

Method	1985	1986	1987	1988
Grootaert method: (z = 635)				
Head-count ratio: P_0	39.12	37.47	37.28	38.76
Poverty-gap ratio: P_1	14.00	10.77	11.66	12.55
FGT (2) ratio : P_2	6.65	4.06	4.85	5.45
Alternative method:				
Head-count ratio : P	39.12	37.94	38.17	34.93
Poverty-gap ratio : P_1	14.00	10.98	12.06	10.87
FGT (2) ratio : P_2	6.65	4.17	5.07	4.56

Source: Own calculations.

Note that the two methods agree as far as the initial 1985 poverty is concerned, which is not surprising since they use the same per capita expenditure and poverty line. The reported difference between the two methods arises because the alternative method allows for the resulting change in the poverty line as mean income changes. For 1986 and 1987, where the mean per capita expenditure is higher than that of 1985, the Grootaert method underestimates poverty compared with the alternative method. The reason is simple: Grootaert would be using a lower poverty line for any given Lorenz curve. For 1988, where the mean per capita expenditure is lower than that of 1985, the Grootaert method overestimates poverty compared with the alternative method. Once again, the reason is that it is using a higher poverty line for a given Lorenz curve.

The decomposition results over the whole period 1985–1988 are reported in Table

15 for the Grootaert method and Table 16 for the alternative method. Similar results are obtained for the subperiods, but are not discussed in the text since the general results establish the proposition.

Table 15: Decomposition of poverty change in Côte d'Ivoire 1985–1988: Grootaert method (percentage points)

Poverty change	Head-count ratio	Poverty-gap ratio	FGT-P (2) ratio
Total change	(38.76-39.12) = -0.36	(12.55-14.00) = -1.45	(5.45-6.65) = -1.2
Growth component	(43.13-39.12) = 4.01	(15.99-14.00) = 1.99	(7.83-6.65) = 1.18
Distribution component	(34.39-39.12) = -4.73	(10.64-14.00) = -3.36	(4.44-6.65) = -2.21
Residual	0.36	-0.08	-0.17

Source: Grootaert (1995).

On the results in Table 15 we note the following: (a) Grootaert's method shows a decline in poverty in Côte d'Ivoire over the period 1985–1988 by about 0.4 percentage points in terms of spread as measured by the head-count ratio, by 1.45 percentage points in terms of depth as measured by the poverty-gap ratio and by 1.2 percentage points in terms of severity as measured by the squared poverty-gap measure. This slight net decline in poverty arises from a "growth" component that increased poverty for all poverty measures (as indeed is expected given the decline in mean income between the two periods) and from a distribution component, which reduced poverty for all poverty measures (as is expected given the decline in the Gini coefficient reflecting an improvement in the distribution of income). The size of the growth component in absolute terms is 11 times the total change in poverty for the head-count ratio. This size declines as the poverty measures become more sensitive to the poor: it is 1.4 times the total change in poverty for the poverty-gap measure and 0.98 times the total change for the squared poverty-gap measure. The size of the distribution component is 13 times the total change for the head-count measure and declines as poverty measures become more sensitive to the poor: it is 2.3 times the total change for the poverty-gap measure and 1.84 for the squared poverty-gap measure. The residual component is quantitatively more important compared with the total observed change in poverty in the case of the head-count ratio but becomes small for the poverty-gap measure (only 6% of the total change) and for the squared poverty-gap measure (only 14% of the total change).

The foregoing suggests that although the size of the growth component is relatively large compared with the size of the distribution component, it is not in any way dominant as has been reported in the literature (see, e.g., Grootaert, 1995). Furthermore, the following question remains: irrespective of the relative size of the growth component compared with the distribution component, does the Grootaert method overestimate the size of the growth component? Table 16 provides a preliminary answer to this question.

Table 16: Decomposition of poverty changes in Côte d'Ivoire under the alternative method: 1985–1988 (percentage points)

Poverty change	Head-count ratio	Poverty-gap ratio	FGT-P(2) ratio
Total change	(34.93-39.12) = -4.19	(10.87-14.00) = -3.13	(4.56-6.65) = -2.09
Growth component	(39.61-39.12) = 0.49	(14.24-14.00) = 0.24	(6.79-6.65) = 0.14
Distribution component	(34.39-39.12) = -4.73	(10.64-14.00) = -3.36	(4.44-6.65) = -2.21
Residual	-0.05	-0.01	-0.02

Source: Own calculations.

The following observations are evident from the results in Table 16:

- The alternative method shows a much more pronounced decline in poverty in Côte d'Ivoire, compared with the Grootaert method (Table 15) during the period under consideration. The spread of poverty declined by about 4 percentage points, the depth of poverty declined by about 3 percentage points and the severity of poverty decreased by about 2 percentage points.
- More importantly, the increase in poverty due to a fall in growth was marginal; the effect of a fall in growth on the head-count ratio was to increase it by nearly half a percentage point (the highest increase for all poverty measures), that on the poverty-gap was to increase it by about 0.2 percentage point and that on the severity of poverty was to increase it by 0.14 percentage point.
- The dominant factor explaining the decline in poverty is clearly the distributional factor, which accounts for more than the total decline in poverty. Thus, because of distributional changes during the period, the head-count ratio declined by 4.7 percentage points, the poverty-gap ratio declined by about 3.4 percentage points and the squared poverty-gap ratio declined by about 2 percentage points.
- The alternative method provides an almost exact decomposition of changes in poverty in view of the very small residuals it generates. This reinforces our proposition that the original decomposition method by Datt and Ravallion (1992) confined the effect of the changes in mean income on the poverty line to the residual component.

Thus, compared with the standard Datt–Ravallion decomposition as used by Grootaert in the case of Côte d'Ivoire over the period 1985–1988, the alternative method correctly predicts the changes in poverty, given the performance of the economy and the changes in income distribution. The size of the growth effect is shown to be overestimated by the standard approach. In our view this is largely due to the failure to take into account the changes that occur in the poverty line as the standard of living changes over time. Despite this shortcoming of the method, policy recommendations based on it were made and implemented (see, for example, World Bank, 1994). In the next section, we provide an overview of case studies undertaken in Africa with the support of the African Economic Research Consortium (AERC).

5. Case studies

AERC is contributing to a better understanding of poverty in Africa through its collaborative research project on *Poverty, Income Distribution and Labour Market Issues in Africa*. The project funds researchers from Africa to study poverty in their own countries, using national data sets, usually collected by government statistical offices or in collaboration with them. In a few instances, research teams use data they had collected prior to the project, usually with assistance from external sources. The first phase of the project, which started in 1998, focused on understanding the poverty situation in Africa through country case studies in which researchers were charged with the tasks of constructing poverty lines, identifying the poor and describing their main characteristics.

This section briefly summarizes key findings from the project to date, focusing mainly on the head-count profiles. The country case studies use different methodologies for constructing the poverty lines and profiles (see Fields, 2000). Nonetheless, in many instances, they report similar results. For example, the case studies show that poverty is concentrated more in rural than in urban areas, and in some countries it is more pronounced among female heads of households. This finding is not new, as it is frequently encountered in poverty studies undertaken in some African countries in the 1970s and 1980s using data from the mid-1970s (see, e.g., Greer and Thorbecke, 1986a; Greer and Thorbecke, 1986b; Bigsten, 1985, 1987). Looked at from a historical perspective, the finding is important because it shows the persistence of poverty along regional and gender lines. It thus raises a general issue of what causes poverty in particular regions and in certain social groups, and why targeting as a poverty eradication strategy has not been used or has not succeeded to bring down poverty.

Apart from providing informative poverty profiles, the results from the project have corroborated previous studies that poverty in Africa is a serious problem requiring urgent policy attention. The Kenyan case study yielded poverty rates that were lower than rates reported in a previous study for the rural population. The study by the Central Bureau of Statistics, (Republic of Kenya, 1996) showed that 50% and 30% of rural and urban populations, respectively, were poor in 1994. Using the same data set, the AERC study (Mwabu et al., 2000) reported that 30% of the urban population was poor in 1994 (as shown by the CBS study), but the rural poverty rate was 40%. However, both studies revealed comparatively higher rates of poverty depth and severity in rural than in urban areas. Both studies used absolute poverty lines (obtained via food-intake and cost-of-basic-needs methods) to identify the poor. The profiles from the two studies show that poverty is highest among people without any schooling, a finding that has become a stylized fact in poverty studies in Africa. The poverty rate among illiterates in Kenya is

above 50%, compared with a rate of 30% among households who can read and write. Particular family structures were shown to be associated with high rates of poverty: in 1994, polygamous families were more prone to poverty than other family structures.

The Ghanaian case study (Boateng et al., 2000) also reveals that poverty is a rural phenomenon. As in the Kenyan study, large regional disparities in the incidence and depth of poverty are found. Using socioeconomic groupings to construct poverty profiles, the study established that between 1987 and 1992 poverty was concentrated among subsistence farmers, but it was low among export crop farmers. In contrast to the findings in the Kenyan study, only marginal disparities in poverty between female- and male-headed households were detected. As in Kenya, the Ghanaian study found a strong correlation between poverty and level of schooling. Between 1987 and 1992, around 50–70% of household heads without any schooling in Ghana suffered from extreme poverty. The study finds that formal education and wage employment are the two factors that are strongly correlated with poverty reduction, a conclusion also reached in the Kenyan study.

Boateng et al. do not find a clear-cut trend in poverty in Ghana between 1987 and 1992. Using a poverty line of two-thirds of the 1987/88 mean per capita expenditure, they show that poverty declined in Ghana from a head-count index of 36% in 1987 to 33% in 1992, a result consistent with that from the World Bank study of 1995, which had used a similar poverty line. However, using minimum wage as the poverty line, Seini et al. (1997 cited by Boateng et al.) find that poverty in Ghana increased by around 6% between 1987 and 1992, and further reported much higher rates of poverty in the two years, 46% and 52% respectively.

The South African case studies (van der Berg and Borat, 1999; Leibbrandt et al., 1999; Woodlard, 1999; Leibbrandt, 1999; Borat and Leibbrandt, 1999a/b; Borat, 1999a/b; Borat, et al., (2001); Maziya, 1999; van der Berg, 1999) analysed labour markets, poverty and inequality issues using a variety of data sets and methods. In their paper on poverty profiles, the South African research team shows that poverty is highest among black South Africans irrespective of the metric used to measure poverty (except in the case of calorie intake, where the “Coloureds” have a higher poverty rate than Africans). The idea here is that for a given poverty line, say, one dollar per capita per day, different poverty metrics (consumption expenditure, income, food expenditure) can yield different poverty rates. The situation is complicated by using money and non-money metrics.

In 1993, the poverty rate among the African population was around 50%, compared with rates of 19–35% among the Coloureds, depending on the definition of poverty used (see below). In 1995, the poverty rates among the Africans were higher than in 1993 (49–54%), as was the case with rates among Coloureds, which ranged from 33% to 47%. Rural poverty rates in 1993 and 1995 were two to three times higher than urban rates, across the various poverty metrics, which included per capita consumption, total household consumption, per capita income, per capita food expenditure, per capita calorie intake, food ratio and average adult education. The authors further show that different poverty lines generate different poverty rates. A food-energy poverty line, for example, gives a national poverty rate of 40%, while an international poverty line of US\$1 (1985 per capita per day) generates a poverty rate of 26%.

Large disparities in living standards are reported by race and region. Eastern Cape has the highest poverty rate. Irrespective of the poverty line used, Africans have the highest incidence of poverty, followed by Coloureds, Indians and Whites. Female-headed households are more likely to be poor than male-headed households. In 1993, around 65% of households were headed by women, which is an exceptionally large percentage for Africa. In South Africa, more schooling is correlated with lower rates of poverty, but the difference in living standards between those households where heads have no education and those with fewer than seven years of primary education is minor. The South African poverty profile also indicates that the poor tend to suffer disproportionately more from tuberculosis, diarrhoea, fever, and physical and mental disabilities. The profile further shows that the poor, especially women, spend a large fraction of their time obtaining water and firewood.

The South African team investigated many other poverty related issues such as returns to schooling, labour market policies, effects of public expenditures on poverty reduction, determinants of poverty, and sources of inequality. With regard to inequality, it found that income inequality between races is smaller than within races. (For an analysis of differentials in incomes among racial groups in South Africa by location and gender, see Mwabu and Schultz, 2000.) The highest within-race inequality is among African households. Wage income is the most important source of income inequality in South Africa, accounting for around 71% of the overall Gini coefficient because nearly 83% of South African households rely on wage income. However, wage income in South Africa is more equally distributed (Gini is 48%!) than other types of income. In 1993, for example, income from agriculture (with a Gini of 94%) was the most unequally distributed of all income types.

The Nigerian case study (Okojie et al., 2000) used relative poverty lines based on some percentage of mean per capita consumption expenditure to identify the poor. A moderate poverty line was fixed at two-thirds of per capita consumption expenditure in each year, with the core poverty line being fixed at two-thirds of per capita food consumption expenditure. As in Ghana and Kenya, poverty in Nigeria is shown to be concentrated among the rural population. Trends in poverty are examined for the periods 1980, 1985, 1992 and 1996. Results from the Nigerian case study show that poverty increased from 27% in 1980 to 46% in 1985, declining slightly to 43% in 1992. However, as shown in the previous section, a refined method of poverty identification and decomposition (see Ali, 1998) reveals a sizeable increase in poverty in Nigeria between 1985 and 1992. This is an instance where methodological differences can produce large differences in results obtained.

In contrast to the situation between 1985 and 1992, Okojie et al. show that between 1992 and 1996 poverty in Nigeria increased from 43% to 67%. In overall terms, poverty increased substantially between 1980 and 1996. The Nigerian poverty profiles show that poverty in urban and rural areas increased, but the rate of increase was higher in rural areas. In terms of its gender dimension, poverty in Nigeria over the years (1980-1996) showed a varied trend. In 1980, for example, female-headed households (national and rural) had higher poverty rates, but in urban areas there was no difference between poverty rates between female- and male-headed households. However, in 1985, 1992, and

1996 national and rural poverty rates (as measured by the head count index) were lower in female-headed households than in male-headed households. Urban poverty shows the same trend, except in 1996 when the two poverty rates were about the same. The gender dimension of poverty in Nigeria is similar to the dimension reported for Harare in Zimbabwe where poverty rates are lower among female-headed households. Care should be exercised in interpreting this result, however, because gender might be a proxy for particular family structures and socioeconomic circumstances that are negatively associated with poverty.

As found in other studies (Greer and Thorbecke, 1986), large Nigerian families are more prone to poverty than small families. Lack of schooling is also associated with higher rates of poverty in Nigeria; in 1996, 74% of household heads without any formal education were in poverty compared with a rate of 49% for people with post-secondary education.

Although the effect of changes in inequality on poverty is not clear-cut from the results the authors present, a strong inference as to the direction of this effect is possible. In 1980, economic inequality (measured by the Gini coefficient) was about the same in female-headed households (49%) as in male-headed households (50%), and the poverty rates were not substantially different (29% for females and 27% for males). Between 1980 and 1996, the Gini coefficient was generally higher among female-headed households. For the period 1980–1996, the average Gini coefficient for females was only slightly higher than the Gini for males (49% versus 47%). In rural areas, where poverty was everywhere higher than in urban areas for the period 1980–1996, the average Gini coefficient was moderately higher (49% relative to 46%) than in urban areas. It seems that sizeable reductions in inequality among groups and across regions have a high chance of reducing poverty. This conclusion is consistent with Ali's (1998) finding that large income inequalities are a major source of poverty in Africa. It is also in line with the arguments advanced in Section 4 in support of redistribution as a key strategy for poverty reduction.

In terms of the life cycle of household members, the Nigerian case study established that poverty incidence increases with the age of the household head, with the age group 35–44 years having higher rates of poverty than other age groups. This is probably because this age group forms the majority of household heads so that the probability of poverty there is higher than in other age groups. This is also the group that is at the greatest risk of AIDS-related deaths (see e.g., Greener et al., 2000, and Lundberg et al., 2000).

As found in Kenya and Ghana, Nigerian households that engage in farming and other agricultural activities have higher rates of poverty than households in the manufacturing and service industries. Large zonal and regional poverty disparities exist in Nigeria—as in other countries—but no clear time trend emerges across the various regions.

Preliminary results from the Zimbabwean case study (Kaliyati, 2000) show high poverty rates in 1995. Applying an absolute poverty line to consumption expenditure from the 1995 poverty assessment survey, the author shows that 72% of households in Zimbabwe in 1995 were poor, with the national poverty rate among male-headed households being lower (69%) than female-headed households (78%). However, as in Nigeria, female-headed households in Harare, the capital city, have a lower poverty rate (47%) than male-headed households (57%).

The case study for Ethiopia (Shimeles et al., 2000) shows poverty profiles similar to those of Kenya, Ghana and Nigeria. From household panel data for two years (1994 and 1995), they use absolute poverty lines to show that 42% of the Ethiopian population lived in poverty in 1994, with practically no difference between urban and rural poverty rates. However, in 1995, national poverty is reported to have increased by 6% to 48%, which is an exceptional increase over a period of one year. The increase in the rural poverty rate from 41% in 1994 to 49% in 1995 also appears to be too large.

The authors augment their national panel data with data from the urban household survey collected in 1997 by the Welfare Monitoring Unit, Addis Ababa. For all urban areas, the results presented show a steady decline in urban poverty (head-count ratios) over the period 1994, 1995 and 1997. In the case of Ethiopia, poverty is shown to be lower in male-headed households in each of the three years (36–37%) compared with rates in female-headed households (44–48%). As already noted, in interpreting these results, their preliminary nature should be borne in mind.

Results from the Tanzanian case study (Semboja et al., 2000) are also preliminary. They are based on data from a rural budget survey and an urban–peri-urban budget survey within the Dar es Salaam area, both collected in 1998 by the REPOA (Research on Poverty Alleviation) Project in Tanzania. Using a relative poverty line that changes by region, they find in 1998, overall poverty in Tanzania was 56%. They report a relatively massive rural poverty incidence of 61%, compared with about 9.5% around Dar es Salaam. As in other countries, the Tanzanian study finds that schooling is associated with low rates of poverty and that the poverty rate is highest among subsistence farmers.

The case study from Cameroon (Fambon et al., 2000) shows that nearly 57% of the population was poor in 1996. Moreover, as in other countries, large regional disparities in poverty are reported, with savannah and forest regions having the highest poverty rates, 67% and 69%, respectively. Yaounde, one of the main cities, has an exceptionally high rate of poverty (61%), with the plateau region having the lowest rate (44%). Even so, the decomposition analysis shows that the contribution of Yaounde to total poverty (head-count index) is only 7.9% because it has a small share of the total population. The savanna, forest and plateau regions, together, account for 70% of total poverty in Cameroon because of large population concentrations in these areas. The case study also shows the stylized fact that poverty declines with the level of schooling.

The case study from Madagascar (Razafindravonona et al., 1999) reports poverty profiles that show a high rate of poverty in the country, as in other countries reviewed above. The national poverty rate (based on absolute poverty line) in 1993 was 65%, which declined to 63.3% in 1997. Large regional disparities in poverty rates are reported, in some regions as high as 85–86%. There were major regional changes in poverty rates between 1993 and 1997 in Madagascar. Mahajanga region experienced a poverty increase of nearly 20% between 1993 and 1997 (63.8% to 84.5%), while Toamasina region experienced a drop of 30% (from 86.7% in 1993 to 56.2% in 1997). It is worth noting that the region in which poverty declined (Toamasina) had one of the lowest Gini inequality indexes, which remained fairly steady over the two periods (43–44%). The income inequality in Madagascar is within the range reported for Nigeria (Gini indexes of 41–50), with the rural Gini coefficient being higher than for other regions (56%). The income

inequality in Antananarivo (Gini is 50%) is better than in rural areas, a pattern also found in Nigeria. Since these results are preliminary, there is need to take them with caution.

Results from case studies of other countries, which include Uganda, Benin and Mozambique, will be incorporated in a later update of this review.

The AERC case studies on poverty in Africa confirm the diversity of the poverty phenomenon across the continent. For example, although poverty is believed to be concentrated in rural areas, the case studies show high poverty rates in the urban areas of some countries. Moreover, although more education is associated with lower rates of poverty, the South African case study shows that living standards for people without education and for those with primary schooling are about the same. In Kenya, Nigeria and Ghana, poverty rates differ markedly between households in which heads have some education and households where heads have no schooling. The observation that female-headed households tend to be poorer than male-headed households cannot be generalized across the continent or across regions in the same country. In Zimbabwe, female-headed households in Harare had lower poverty rates than male-headed households. The same situation obtained in Nigeria. In Kenya, the difference in poverty rates between male- and female-headed households is not substantial.

The results about the gender dimension of poverty are not to be interpreted as suggesting that differences in living standards between men and women do not exist or are not large. What they indicate at the moment is the complexity of the task of detecting and measuring these differences.

6. Challenges and policy implications

The results presented in this paper on the spread, depth and severity of African poverty should enable policy makers to explore the challenges involved in achieving agreed upon international development goals. One such goal is that of reducing poverty by half by the year 2015. The achievement of this goal would allow Africa to begin to make irreversible progress towards a better life for all. In the formulation of this goal, poverty is measured in terms of the head-count ratio. This is indeed understandable given the wide use of this poverty measure. Additional justification for the use of the head-count ratio in formulating international goals could be based on a minimum rights approach that sees poverty in terms of deprivation of a certain minimum right to resources. If a minimum income is a basic right, then the head-count measures the number of people deprived of that right (see Atkinson 1998). However, for African countries to reduce poverty by half by the year 2015 they need to attain and sustain a GDP growth rate of 8.0% per annum, which is not a small achievement (UNECA, 1999).

Starting with 2000 as the base year, straightforward calculations show that the reduction of poverty by half in 15 years would require poverty to decline at an annual rate of about 4.62%. Using the growth elasticity of poverty (in this case it would be for the head-count ratio), it is an easy matter to calculate the required rate of growth. The growth elasticity of poverty is defined as the response of poverty to changes in mean expenditure after allowing for effects of changes in income distribution. It is an empirical elasticity that can be estimated (e.g., on the basis of panel data) or computed (assuming the existence of a long-run relationship between inequality measures and mean income). For a sample of African countries growth elasticity of poverty estimates are reported in UNECA (1999: 63). We used these elasticity estimates to calculate the required growth rates. Annex Table A2 reports these results. For the Africa region as a whole (represented by sample countries) the elasticity in question is -0.91, which is consistent with the reported sectoral elasticities for the head-count ratio. This means that for the region as a whole, the required rate of per capita GDP growth rate would amount to 5.1% per annum. With a population growth rate of 2.76%, the required rate of GDP growth will be 7.84%. The average GDP growth rate for the sample is calculated as 7.95%. Both can be approximated to a required GDP growth rate of 8% per annum. Compared with the latest performance of the region at an annual rate of growth of GDP of 4.1%, there remains a lot of growth promotion that must be done to achieve the poverty reduction target for the year 2015. Care should be taken in using these growth rates as absolute requirements for poverty reduction because they are based on assumptions of fixed proportions of production functions, and hence the resource requirements they imply are likely to be overstated. Even so, the growth

rates indicate the upper bound of the resource requirements needed to achieve internationally agreed development goals.

As usual, the required growth rates differ among countries. Only two African countries (Botswana and Lesotho) grew in 1998 at rates higher than the required growth rate; if they are able to sustain this over the 15-year period they will be in a position to achieve the international target of poverty reduction. Four countries registered actual rates of growth that could be considered marginal and could be enhanced to achieve the poverty reduction target. The margin we use is a difference of 2 percentage points between the latest performance and the required growth rate. The countries in question are Cameroon, Côte d'Ivoire, Guinea-Bissau and Senegal. Two countries are borderline cases in the sense that if the margin is increased slightly they may qualify for being marginal (Burkina Faso and Chad). Irrespective of recent growth performance, relatively high historic rates of growth in excess of 9% per annum are recorded for Gambia (with a required rate of growth of 9.4%), Kenya (10.7%), Mozambique (9.6%) and Niger (10.8%).

As is clear from the foregoing discussion, the required growth rates to reduce poverty by half in 15 years are relatively high, especially in view of the historical performance of African countries. Such high growth rates, however, are known to have been achieved by developing countries in other regions. As such, therefore, they signal the magnitude of the challenge facing African countries if they are to achieve the internationally agreed upon target of poverty reduction. It is in the light of such hopeful challenges that the feasibility of achieving the target should be viewed and assessed.

Given the very low per capita incomes in African countries, donors—as parties to the formulation of the international development goals—would need to support African development efforts by increasing aid flows rather than reducing them. To explore the implications for donors of achieving the poverty reduction objective, the required rates of growth can be used to calculate the required investment. We report the results of this exercise in Annex Table A3. The reported incremental capital–output ratio estimates and the average savings rates define the initial conditions of the continent at the beginning of the 21st century. These parameters, together with the required growth rates for poverty reduction, determine the development finance requirements. The table reports these estimates on an annual basis.

According to the results in Annex Table A4, the required investment rate to achieve a GDP growth rate of 8% per annum for sub-Saharan Africa would be about 46% of GDP. Given that the average savings rate is about 8% of GDP, this leaves about 38% of GDP to be covered from external sources. Noting that the average official development assistance flow is about 15% of GDP, this implies a residual development financing gap of about 23% of GDP that needs to be covered on an annual basis (Annex Table A5). These are huge amounts of resources dictated by the logic of the growth model underlying the required growth rate to reduce poverty by half. However, since in all likelihood these resource requirements are overstated (because of the special production assumptions used in the analysis), they are not meant to be taken literally. Rather, they indicate another layer of looking at the feasibility of achieving international development goals, and the nature of the challenge facing African countries and their development partners. Different countries require different amounts of external support, depending on their saving efforts

and their efficiency in using capital. But, the results are consistent with any intuitive understanding of poverty in Africa.

Preliminary results from case studies on African poverty suggest a need for country specific strategies for poverty reduction (see also Manda et al., 2000). Needless to say, a uniform poverty eradication strategy for Africa is infeasible, and unnecessary. However, broad outlines of a strategy that can be adapted by countries are needed. The poverty profiles show, for instance, that rural poverty is a common problem across countries. Thus, rural poverty eradication should be a focal policy area for most African countries. In some countries, especially Nigeria, Madagascar and South Africa, urban poverty is quite high. Such countries should collaborate in developing broad policies for combating urban poverty. Given the rapid urbanization in Africa, urban poverty reduction will be a key policy challenge for African governments in the 21st century.

The nexus among gender, poverty, inequality and schooling has not been fully explored in the country case studies or in other literature on poverty in Africa. We have established, as a general point, that a reduction in inequality has a large payoff in poverty alleviation. The mechanisms for dislodging entrenched inequalities can best be designed at the country level, an important issue that is not currently being examined in case studies. One uniform result from the case studies is that schooling is strongly associated with better living standards, i.e., with lower poverty rates. At first sight, the policy implication of this result is that African school systems should be expanded to broaden access to educational skills. Yet, experience in Africa shows that quantitative expansion in the school system is associated with high rates of unemployment among school leavers and among university graduates, a situation that itself is strongly correlated with high rates of poverty. Moreover, when everyone achieves a certain level of schooling, such as the primary level, private returns from a year of schooling at that level tend to be low or negative (Appleton et al., 1999; Mwabu and Schultz, 2000). Such a situation discourages private investments in schooling, which makes sustainability of high rates of school enrolment difficult to achieve. The process through which schooling reduces poverty needs to be better understood. Further, the mechanisms for providing and financing relevant education on a large scale need to be examined as a prerequisite for designing educational policies for poverty reduction.

The gender dimension of poverty is an issue that has received attention in virtually all case studies, and in previous poverty research in Africa. The policy concern with this issue is derived from society's preference for equitable human development. To a large extent, however, the pattern of resource allocation that determines the living standards of individuals is effected within households. Thus, an understanding of the process governing intra-household resource allocation is key in addressing gender related aspects of poverty. Furthermore, the case studies reveal that the association between poverty and the gender of the family head is not a straightforward one: low poverty among female-headed households may have nothing to do with the gender of the head. Gender of the head here would be the reason for the low poverty rates if there is a bias in favour of females, or if the female heads of families have market skills not accessible by male heads. If, instead, female heads have spouses who work in towns and remit income to the family, female heads in that case would be a proxy for high-income migrant male labour.

Thus, everything else held constant, female-headed households might be more prone to poverty even when observed poverty rates indicate otherwise. Ascribing observed poverty rates to the gender of the family head could lead to wrong policies or to inaction when action is needed.

Sections 4 and 5 of the paper show that even with the same data set, different approaches to poverty conceptualization and measurement can lead to different poverty profiles and policy prescriptions. It is difficult and probably undesirable to use the same methodology to study poverty because of data limitations, and skill differences among researchers. However, as we tried to show in Section 4, sources of differences in results obtained with different methods should be exposed, so as to facilitate objective comparisons of their policy implications.

Notes

1. One possible conjecture is that macroeconomic policies do affect the underlying structural factors determining the distribution of income in weak economies. This is beyond the scope of the current investigation, however.
2. See Ali (1997) for the details of the estimation and sample used. For a similar estimated equation see Ravallion, Datt and Van de Walle (1991).
3. Developed by Chen, Datt and Ravallion, the poverty measures are calculated by Povcal, which is a programme for calculating poverty measures from grouped data. The programme estimates two functional forms for the Lorenz curve (beta and general quadratic), and calculates for each Gini coefficients, poverty measures and the elasticities of the poverty measures with respect to mean income and the Gini coefficient.
4. Where q is the number of the poor, n is the total number of the population, z is the poverty line and y_i is income (or expenditure) of person i , u_p is the mean income of the poor: these measures are defined as: $H = q/n$; $P_1 = H(1 - u_p/z)$, $P_2 = 1/n \sum (1 - y_i/z)^2$. It is known that all these measures are special cases of the Foster–Greer–Thorbecke measure, which is defined as $P(a)$ such that a is the power to which the income gap ratio is raised.

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Annex A: Supplementary tables

Annex Table A.1: Indicators of Well-being in Rural Sub-Saharan African Countries

Country	Rural average household size	Net primary enrolment rate (%) (Number)	Male primary enrolment rate (%)	Female primary enrolment rate (%)	Literacy rate (%)	Male literacy rate (%)	Female literacy rate (%)	Female -headed households (%)	Access to sanitation (%)	Access to piped water (%)
Burkina Faso	8.1	27	32	21	12	19	6	7	16	4
Central African Republic (CAR)	4.5	37	46	28	30	47	14	24	—	1
Côte d'Ivoire	5.4	30	32	26	29	41	17	11	33	41
Djibouti	5.8	64	77	50	33	47	20	24	3	45
Ethiopia	5.1	13	17	10	19	30	8	19	5	30
Gambia	11.3	19	23	15	33	46	21	3	—	7
Ghana	4.3	61	62	60	40	54	29	26	17	14
Guinea-Bissau	6.3	—	—	—	12	22	4	43	—	2
Kenya	5.6	75	76	74	71	80	64	27	75	40
Madagascar	4.9	26	25	28	92	93	92	19	26	7
Mali	9	21	27	14	4	7	1	6	—	25
Mauritania	5	34	36	32	30	34	26	23	16	9
Niger	7.1	15	20	10	—	—	—	7	8	18
Nigeria	4.8	51	56	54	33	39	27	14	—	—
Senegal	11	22	25	20	17	30	7	14	45	30
Sierra Leone	5.9	48	53	47	27	37	19	14	—	—
South Africa	5.5	—	—	—	—	—	—	32	77	53
Swaziland	7.6	—	—	—	72	73	71	30	71	14
Tanzania	6.3	—	—	—	71	81	62	10	92	2
Uganda	4.7	—	—	—	59	74	47	25	75	2
Zambia	4.8	60	60	61	—	—	—	27	56	6
Mean	6.34	36.53	40.59	33.06	36.37	45.63	28.26	19.14	40.94	18.75
SD	1.99	19.17	19.79	19.81	25.08	24.60	26.44	10.05	30.53	16.54

Source: World Bank (1999).

Table A2: Indicators of urban well-being in countries of sub-Saharan Africa

Country	Urban average household size	Net primary enrolment rate (%) (Number)	Male primary enrolment rate (%)	Female primary enrolment rate (%)	Literacy rate (%)	Male literacy rate (%)	Female literacy rate (%)	Female -headed households (%)	Access to sanitation (%)	Access to piped water (%)
Burkina FASO	6.5	69	74	65	52	62	41	13	88	74
CAR	5.8	65	68	62	61	75	48	38		
Côte d'Ivoire	5.6	50	55	45	65	76	55	19	91	
Djibouti	6.8	68	73	63	53	71	38	22	19	81
Ethiopia	4.7	67	67	66	63	76	53	45	59	61
Gambia	6.9	49	51	47	50	62	36	16	-	68
Ghana	3.8	68	69	67	63	77	52	26	42	82
Guinea	6.9	56	65	48	27	35	20	15	86	59
G. Bissau	7.2	-	-	-	50	66	35	25	-	26
Kenya	4	84	84	84	92	95	88	28	95	90
Madagascar	5	57	57	57	96	97	95	25	67	71
Mali	8	57	58	55	2	3	1	11	-	58
Mauritania	5	58	59	57	49	58	40	28	58	88
Niger	7.2	50	54	45	-	-	-	15	77	90
Nigeria	4.5	63	66	64	62	70	53	18		
Senegal	9	63	65	61	42	51	34	27	93	84
Sierra Leone	5.6	62	72	63	38	47	28			
S. Africa	4.1							25	89	99
Swaziland	3.9				87	87	87	23	97	86
Tanzania	5.6				82	89	76	18	96	35
Uganda	3.9	-	-	-	86	91	82	39	95	35
Zambia	5.3	78	79	78	33	37	30	19	93	15
Mean	5.71	62.59	65.65	60.41	57.65	66.25	49.6	47.6	77.81	70.71
SD	1.42	9.24	8.88	10.44	22.99	22.68	24.26	10.00	22.12	23.91

Source: World Bank (1999).

Table A3: Required per capita consumption growth to reach the turning point of the Kuznet's curve

Country	Survey year	Mean consumption expenditure (\$)	Required growth rate (%)	Actual 1998 growth rate (%)*
Botswana	1986	929.2	1.8	4.72
Côte d'Ivoire	1985	839.5	2.1	3.57
Ethiopia	1982	568.2	3.1	-2.68
Ghana	1988	875.5	2.2	0.94
Kenya	1992	703.3	3.5	0.56
Lesotho	1987	722.4	2.8	4.31
Mauritania	1988	663.0	3.2	0.40
Senegal	1992	550.0	4.7	2.21
Tanzania	1991	873.6	2.5	2.78
Zambia	1990	242.8	7.7	2.93
Zimbabwe	1990	939.6	2.1	1.40

* Own estimates.

Table A4: Required GDP growth rate to reduce poverty by half by 2015 for African countries

Country	Growth elasticity of poverty	Annual population growth rate (%)	Required per capita growth rate (%)	Required GDP growth rate (%)	Actual GDP growth rate (%)
Angola	-1.02	3.1	4.53	7.63	1.6
Benin	-1.08	2.9	4.28	7.18	4.5
Botswana	-1.08	2.5	4.28	6.78	7
Burkina Faso	-1.01	2.9	4.57	7.47	5
Burundi	-0.84	2.7	5.50	8.20	4.4
Cameroon	-1.18	2.2	3.92	6.12	5.2
Cape verde	-1.08	2.2	4.28	6.48	3
CAR	-0.86	3	5.37	8.37	5.5
Chad	-0.77	2.6	6.00	8.60	6
Côte d'Ivoire	-1.06	3.1	4.36	7.46	5.5
Ethiopia	-0.78	2.2	5.92	8.12	0.5
Gabon	-1.01	2.7	4.57	7.27	2.1
Gambia	-0.81	3.7	5.70	9.40	3.8
Ghana	-1.01	2.8	4.57	7.37	3.8
Guinea	-0.87	2.7	5.31	8.01	5
Guinea-Bissau	-0.88	2.1	5.25	7.35	5.6
Kenya	-0.58	2.7	7.97	10.67	2.7
Lesotho	-1.06	2.2	4.36	6.56	6.9
Madagascar	-0.89	2.8	5.19	7.99	3.5
Malawi	-0.76	2.8	6.08	8.88	4
Mali	-0.81	2.8	5.70	8.50	2.7
Mozambique	-0.82	4	5.63	9.63	5.9
Namibia	-1.07	2.7	4.32	7.02	4.5
Niger	-0.62	3.3	7.45	10.75	5.4
Nigeria	-0.71	2.9	5.63	8.53	2.4
Senegal	-1.08	2.6	4.28	6.88	5
Sierra Leone	-0.98	2.5	4.71	7.21	1.1
Somalia	-1.07	2.5	4.32	6.82	2.5
South Africa	-1.07	1.7	4.32	6.02	0.8

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Country	Growth elasticity of poverty	Annual population growth rate (%)	Required per capita growth rate (%)	Required GDP growth rate (%)	Actual GDP growth rate (%)
Tanzania	-0.79	3	5.85	8.85	5
Togo	-0.79	3.1	5.85	8.95	6
Uganda	-0.81	3.2	5.70	8.90	4
Zambia	-0.87	2.8	5.31	8.11	5.5
Zimbabwe	-0.87	2.8	5.31	8.11	3.5
Sub-Saharan Africa	-0.91	2.75	5.18	7.94	4.11

Source: UNECA (1999).

Table A5: Financial requirements to reduce poverty by half by 2015 in Africa

Country	Incremental capital output ratio (1970–most recent)	Required annual real GDP to reduce poverty by half by 2015	Required investment as a percentage of GDP to reduce poverty by half by 2015 (% of GDP)	Average saving rate (1970–most recent (as % of GDP)	Net ODA transfers (1970–most recent (% of GDP)	Financing requirement (as % of GDP)
Angola	4.40	7.63	33.57	22.55	4.00	7.02
Benin	3.89	7.18	27.92	3.30	10.97	13.65
Botswana	3.22	6.78	21.82	39.30	7.03	-24.51
Burkina Faso	5.12	7.47	38.27	2.57	14.83	20.87
Burundi	6.40	8.20	52.48	1.17	17.47	33.85
CAR	8.73	6.12	53.39	21.47	3.97	27.95
Cameroon	6.26	6.48	40.55	2.10	33.65	4.80
Cape Verde	5.85	8.37	48.98	0.70	14.03	33.68
Chad	5.40	8.60	46.44	-6.77	14.60	48.37
Côte d'Ivoire	6.20	7.46	46.24	19.60	4.83	15.68
Ethiopia	4.87	8.12	39.56	4.80	10.97	32.53
Gabon	6.20	7.27	45.10	43.97	2.23	-25.90
Gambia	3.89	9.40	36.58	5.80	27.03	23.11
Ghana	4.18	7.37	30.82	5.70	7.67	13.67
Guinea	7.50	8.01	60.08	14.35	11.45	-2.87
Guinea-Bissau	5.90	7.35	43.37	0.03	48.60	35.00
Kenya	10.40	10.67	110.92	19.33	8.33	67.29
Lesotho	4.78	6.56	31.35	-56.03	24.30	78.32
Madagascar	4.27	7.99	34.12	3.87	9.07	9.92
Malawi	4.67	8.88	41.46	10.23	20.33	12.03
Mali	6.19	8.50	52.64	2.73	19.20	17.07
Mozambique	7.02	9.63	67.63	-5.90	32.83	72.73
Namibia	6.25	7.02	43.86	17.07	0.80	12.09

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Table A5: continued

Country	Incremental capital output ratio (1970–most recent)	Required annual Growth rate in real GDP to reduce poverty by half by 2015	Required investment as a percentage of GDP to reduce poverty by half by 2015 (% of GDP)	Average saving rate (1970–most recent (as % of GDP)	Net ODA transfers (1970–most recent (% of GDP)	Financing requirement (as % of GDP)
Niger	4.35	10.75	46.77	6.20	14.70	40.14
Nigeria	4.00	8.53	34.12	21.27	0.43	0.45
Senegal	4.53	6.88	31.16	5.10	12.40	13.66
Sierra Leone	5.65	7.21	40.76	1.67	10.90	28.19
Somalia	4.72	6.82	32.18	-6.10	47.60	-9.32
Sudan	3.65	6.02	21.96	25.47	0.20	-3.70
Tanzania	9.40	8.85	83.17	0.65	22.05	60.47
Togo	7.14	8.95	63.89	12.90	12.30	38.69
Uganda	2.83	8.90	25.20	4.30	10.30	10.60
Zambia	9.90	8.11	80.29	14.10	17.23	48.96
Zimbabwe	3.00	8.11	24.33	17.77	4.03	2.53
Africa	5.61	7.95	45.03	8.10	14.72	22.22

**Incremental capital-output ratio refers to trends covering the period 1970–1997. ** Savings and net ODA flows refer to the average for 1975–Most recent period (in most cases 1997). All figures for Sub-Saharan Africa refer to the average of countries in the sample.*

Source: World Development Indicators (World Bank, 1999), African Development Indicators (World Bank, 1999) and Economic Report, UNECA, (1999).

Annex B: Poverty decomposition methodology

The most widely used poverty decomposition methodology is due to Datt and Ravallion (1992). The method decomposes a given change in poverty between two periods, t and $(t + n)$, into a growth component $[G(t, t+n; r)]$, a redistribution component $[D(t, t + n; r)]$ and a residual $[R(t, t + n; r)]$, where r is a reference period. Thus, the poverty measure in period t is defined as:

$$P_t = P(z / \mu_t, L_t) \quad (\text{A.1})$$

where z is the poverty line, μ is mean expenditure (or income) and L is a vector fully describing the Lorenz curve. The details of these components are as follows:

- a) Growth component: the change in poverty due to a change in the mean income while holding the Lorenz curve constant at the reference level L_r
- b) Redistribution component: the change in poverty due to a change in the Lorenz curve while keeping the mean income at the reference level μ_r

Thus, the Datt–Ravallion decomposition may be stated as:

$$P_{t+n} - P_t = G(t, t + n; r) + D(t, t + n; r) + R(t, t + n; r); \quad (\text{A.2})$$

where G and D are given by:

$$G(t, t + n; r) = P(z/\mu_{t+n}, L_r) - P(z/\mu_t, L_r) \quad (\text{A.3})$$

$$D(t, t + n; r) = P(z/\mu_r, L_{t+n}) - P(z/\mu_r, L_t) \quad (\text{A.4})$$

Datt and Ravallion (1992: 277–78) note that the residual “exists whenever the poverty measure is not additively separable between μ and L , i.e., whenever the marginal effects on the poverty index of changes in the mean (Lorenz curve) depend on the precise Lorenz curve (mean). In general the residual does not vanish. Nor can it be apportioned between the growth and redistribution components”.

On our part, we note that the time subscript on the poverty line is dropped in all of the equations, implying that Datt and Ravallion assume that the poverty line remains constant over the period of decomposition. This, it will be shown, will always lead to an overestimation of the effect of growth on poverty reduction.

Following Datt and Ravallion (1992) and Ali (1997), let P be a poverty index that is a function of a poverty line, z , mean income, μ , and an inequality of income distribution parameter, m . It is assumed that the poverty index is homogeneous of degree zero in the poverty line and mean income, so that a doubling of both the poverty line and mean income, for example, would leave the poverty index unchanged. This homogeneity property is common to the most widely used poverty measures. The poverty index can then be expressed as:

$$P_t = P(\mu_t/z_t, m_t), \text{ with } \partial P/\partial \mu < 0, \text{ and } \partial P/\partial m > 0 \quad (\text{A.5})$$

Plausible restrictions on the poverty index function are as follows: (a) its partial derivative with respect to mean income is negative, implying that for a given inequality, an increase in mean income would be expected to lead to a reduction in poverty, and (b) its partial derivative with respect to the inequality index is positive, implying that an increase in inequality, for a given mean income, would be expected to lead to an increase in poverty. Following the literature, we shall treat m in equation A.5 as the Gini coefficient.

Total logarithmic differentiation of A.5 yields the decomposition

$$dP/P = \mu [d\mu/\mu - dz/z] + v (dm/m) \quad (\text{A.6})$$

where dP/P is a percentage change in the poverty index, μ is the elasticity of the poverty index with respect to mean income and v is its elasticity with respect to the distribution parameter.

Equation A.6 can be considered as a complete decomposition of a change in poverty between a growth component and a distribution component if it is assumed that the poverty line is constant. This is indeed the assumption that is generally invoked in the literature, an assumption we consider unrealistic. If instead, it is assumed that the poverty line changes with mean income, as seems reasonable, especially in the context of growing economies, then a complete decomposition of the change in poverty can be obtained as follows (where the arguments of the elasticities are suppressed for convenience):

$$dP/P = \mu [1 - \epsilon] d\mu/\mu + v (dm/m) \quad (\text{A.7})$$

where ϵ is the elasticity of the poverty line with respect to mean income. The growth component of the change in poverty is now conditional on the size of this elasticity. In general, the poverty line is inelastic with respect to mean income (i.e., $\epsilon < 1$) and as such, for a constant degree of inequality, growth will be expected to lead to a reduction in poverty. In the Datt–Ravallion method $\epsilon = 0$ and hence, as can be easily checked from A.7, the growth component is overestimated by a factor of $\epsilon \mu$ ($d\mu/\mu$).

The implication is that to correctly ascertain the relative contributions of growth and distribution to a change in poverty, care should be taken in treating the effect of the change in mean income on the poverty line. Thus, the Datt–Ravallion decomposition should be corrected as follows:

$$P(\mu_{t+n}/z_{t+n}, m_{t+n}) - P(\mu_t/z_t, m_t) = [P^*(\mu_{t+n}/z_{t+n}, m_t) - P(\mu_t/z_t, m_t)] + [P^{**}(\mu_t/z_t, m_{t+n}) - P(\mu_t/z_t, m_t)] + R \quad (\text{A.8})$$

Equation A.8 embodies the alternative decomposition that we applied in the text for Nigeria and Côte d'Ivoire.

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