Urban-Rural Inequality in Africa

By

David E. Sahn and David C. Stifel

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Cornell University

1. INTRODUCTION

Nearly three decades ago, Michael Lipton (1976) brought to the fore the concept of an urban bias in the process of economic development. Like others before him[1], he noted the spatial differences or inequalities in poverty between urban and rural areas, and argued further that the consequential conflict between the rural and urban classes was an overriding source of struggle in poor countries – eclipsing even the well-articulated conflicts between labor and capital, and between foreign and national interests. While the domination of the urban class was seen along many dimensions, it was perhaps most importantly manifested in the form of state resource allocations that favored urban priorities at the expense of national equity and efficiency.

At the same time, arguments were made about the central role of the rural sector in economic development. John Mellor (1976), for example, highlighted the forward and backward linkages in agriculture and the critical importance of agricultural growth in producing much needed wage goods. Nonetheless, while this was a sector where employment creation could be realized through technological innovation, it suffered from relative neglect (Mellor, 1976).

Since the 1970s, development economists have placed an increased importance on the promotion of rural development in general and of agriculture as the leading engine of growth in particular. By the late 1970s, for example, Sir Arthur Lewis's thinking about the role of agriculture had shifted from his dual-sector model and its focus on the surplus of labor in agriculture (Lewis, 1954) to an emphasis on increasing the productivity of food producers and domestic demand (Lewis, 1978). As Meier (1989) put it, "agriculture must be viewed not merely as a source of surpluses to support industrialization, but also as a dynamic source of growth, employment, and better distribution of income." Bates (1981) suggested that the persistent urban biases characterized by state controls over markets that discriminated against rural households, could be explained in political economy terms in which African states appeased better organized urban constituencies.

In the past decade, the emphasis on the needs of the rural sector, and importance of rural development in the process of economic growth continued to be heard. Sahn, Dorosh and Younger (1997) and Duncan and Howell (1992), for example, observe progress in reducing rural poverty through adjustment programs that turn the terms of trade in favor of agriculture.[2] Stewart (1994) and Wagoa (1992), however, caution that such changes as promoting export-oriented agriculture may come at the expense of the food security for the poor. Cornia (1994) and Jamal and Weeks (1993) further argue that despite the apparent shift in the urban-rural terms of trade, the rural poor do not benefit due to structural constraints such as unequal land distribution, and to the fact that the poor are not sufficiently engaged in marketing agricultural goods.

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[1] See, for example, Dudley Seers who discusses the "capital city" bias in development.

[2] Thorbecke (1996) also notes the adverse effects of distorted terms of trade on agricultural production in Nigeria. Block (1994) also found that real exchange rate depreciation, along with lagged research expenditures, explain most of the improvement in total agricultural factor productivity in Africa in the mid-1980s.

While the debate on the role and relative neglect of the rural sector in economic development continues, a number of recent papers, as well as actions among international donors, have highlighted the growing concern over poverty and malnutrition in urban areas. Haddad, Ruel and Garrett (1999, p1900), for instance, argue that "for a majority of countries, not only has the absolute number of the urban poor and undernourished increased in the last 15-20 years but they have done so at a rate that outpaces corresponding changes in rural areas." Similarly, von Braun et al (1993) suggest that rural-urban gaps in living standards are declining as urban inequality is growing; Naylor and Falcon (1995) argue that the locus of attention about poverty is shifting to rural areas; and Maxwell (1998) discusses how problems such as urban malnutrition and food insecurity are often overlooked and, unlike similar conditions in rural areas, are not recognized or addressed in by policy-makers.

This paper has two objectives. The first is to address this renewed interest in urban poverty. In particular, we question the degree to which it is warranted and consistent with what the data for sub-Saharan Africa reveal about the relative importance of rural versus urban areas in terms of monetary poverty and other related living standards indicators. While we do not argue that urban poverty should be ignored, our concern is with the relative emphasis being placed on urban areas at the expense of the rural sector. One consequence of this shifting emphasis, as Lipton (2001) estimates, is that "the real level of aid to agriculture in the late 1990s was barely one-third (34.7 percent) of its level in the late 1980s (itself already well below the peak of the late 1970s)." Further, urban-oriented policies alone may not effectively reduce urban poverty given incentives for rural-urban migration (Harris and Todaro, 1970, and IFAD, 2001).

The second objective is to measure overall inequalities in measures of living standards in African countries, and to determine the extent to which these observed inequalities are a consequence of inequalities between urban and rural areas, as opposed to inequalities within urban and rural areas. This objective is differentiated from the first objective in that it measures dispersions, rather than being a measure of central tendency.. Nonetheless, to the extent that policy-makers are willing to trade higher average levels of living standards for lower inequality in the standard of living, it is worthwhile exploring overall inequality in welfare outcomes, and decomposing this inequality into components that focus policy-makers attention on the causes of the disparities.

In this analysis we take advantage of the Demographic and Health Surveys (DHS)—a series of reliable household survey data sets that are comparable over time as well as across regions—to shed light on the urban-rural disparities in welfare indicators for up to 24 African countries. As discussed in Sahn and Stifel (2001), differences in survey instruments and procedures for sampling and data collection have weakened our ability to understand changes in welfare in Africa using standard integrated household expenditure surveys. Standardization of these instruments and procedures over time and across countries for the DHS facilitates inter-temporal and inter-regional comparisons of living standards.

In light of the growing emphasis on multidimensional aspects of poverty (Sen, 1977; UNDP, 1997; Sahn, Stifel and Younger, 1999; Appleton and Song, 1999; World Bank, 2000), we analyze the levels and trends of seven non-money metric indicators of well-being in addition to a wealth index based on household assets. More specifically, we present the levels and the urban-rural differences in these indicators for each of the countries for which we have data. Then we examine the relative rates of change for urban and rural areas using an improvement index (Kakwani, 1993) that adjusts for the base level of living standards. Next, we employ simple cross-country regression analysis to examine how some potential covariates (e.g., openness, PPP GDP per capita, urbanization) affect urban-rural disparities in well-being. And, finally, we conduct urban-rural decompositions of inequality, examining the within versus between (urban and rural) group inequality for asset inequality, education inequality, and health (height) inequality.

In the remainder of the paper, we begin with a more detailed discussion of the variables that we construct, and of the methods we employ to evaluate the spatial differences in our broadly defined notion of poverty. Section 3 then provides more details about the data, including when and where they were collected. This is followed by a discussion of the results in Section 4. We conclude with some observations about the persistence of the rural/urban divide observed in the data.

2. METHODS

In this section we describe the separate indicators and methods that we use to evaluate the relative progress of urban and rural areas in the African countries with DHS data.

2.1 The Indicators

Indicator 1: Asset Poverty

While the DHS data (described in Section 3) have been collected in a large number of African countries, and have standardized survey instruments and sampling procedures, they were not designed for economic analysis.[3] Consequently, there is an absence of information on income or expenditures, the standard monetary measures of well-being. Despite this drawback, our previous work indicates that we can still construct an appropriate alternative measure of economic well-being that enables us to track poverty over time and across regions. More specifically, we construct a welfare index from households' asset information. This index is the outcome of a factor analysis of various assets about which the survey asks: household characteristics (water source, toilet facilities, and construction material) and durables (ownership of radio, television, refrigerator, bicycle, motorcycle and/or car), as well as education of the household head.

[3] An USAID-funded project administered by Macro International Inc., the DHS surveys were designed to assist governments and private agencies in developing countries to better evaluate population, health and nutrition programs.

We assume that there is a common factor, "welfare," that explains the variance in the ownership of these assets, and allow the factor analysis to define that factor as a weighted sum of the individual assets.[4]

One of the advantages of the wealth index in making inter-temporal and inter-regional comparisons is that we need not rely on what are often tenuous and suspect price deflators that are necessary to compare money metric measures of welfare. While there are obvious concerns that our asset index will not provide the same precise portrait of inter-temporal and inter-regional poverty differences as would income or consumption, we have shown elsewhere that the use of the asset index is appropriate for such analyses (Sahn and Stifel, 2000). Further, our research suggests that as a measure of well-being, the asset index performs as well, if not better, in predicting other non-income measures of well-being (Sahn and Stifel, 2001).

Since we want to compare the distributions of asset indices over survey years for each country, the datasets for each of the eleven countries for which we have at least two years of survey data and estimates of $1/day poverty rates, are pooled by country, and the factor analysis household asset indices are estimated for each pooled sample. To determine changes in poverty, we iteratively estimate poverty lines for each of the eleven countries in order to replicate the national $/day poverty rates found in the *World Development Indicators* (2001). Because the DHS survey years and years for which $1/day poverty estimates coincide for only Ghana and Madagascar, the poverty lines must be estimated iteratively for all of the other countries by assuming a linear rate of change in poverty between the two survey years.[5] Once we have the poverty lines for each country, urban and rural poverty rates are estimated for each of the survey years.

Indicator 2: Primary School Enrollment Rates

For ten African countries, the household roster section of the DHS data records age of individuals and their educational status for at least two survey periods.[6] Using this information, we estimate the percentage of children between the ages of six and fourteen inclusive in urban and rural areas who were enrolled in school at the time of the survey.

Indicator 3: Gender disparities in primary and secondary education

For the same ten countries for which we estimate changes in enrollments, we also estimate changes in the ratios of girls-to-boys enrolled in primary and secondary schools. This indicator of gender disparity in education is calculated by simply estimating in the samples of all individuals enrolled in primary and secondary schools, the ratio of girls to boys regardless of their age. These ratios (multiplied by 100) are estimated for urban and rural areas in each of the survey years.

[4] See Sahn and Stifel (2001) for a detailed discussion of the factor analysis methodology.
[5] In the case of Ghana, Kenya, Senegal and Tanzania where we have three surveys, we iteratively estimate linear regression lines through the three poverty rates.
[6] This information was not available in the first round of the DHS.

Indicator 4: Infant mortality rates

Infant mortality rates are constructed from the section of the individual survey instrument that includes birth histories of each of the women interviewed. This provides information on all live births, the ages of living children, and the dates of deaths of children who did not survive to the date of interview. Infant mortality ($_1q_0$) for a given cohort of children is defined as the simple probability of a child dying before his/her first birthday. The retrospective nature of the birth histories, however, gives rise to a censoring problem in the estimation of mortality rates. Since the birth histories are recorded for women of child-bearing age (15-49) at the time of the interview, observations on births 10 years prior to the interview do not account for children born to the cohort of women age 40-49 at that time. Sahn, Stifel and Younger (1999) find statistically significant parameters across-the-board for ten countries on the age and age squared of the mother in infant mortality regressions. Thus, uncorrected estimates of infant mortality rates become more biased as one goes back in time from the date of the survey, and are not comparable across surveys for a given time period. To avoid the censoring problem, we truncated the sample of children to only those born to mothers of age 15-39 at the date of birth, or roughly 90 percent of all children reported to have been born in each of the samples, and we extend our mortality estimates back only 10 years from the date of the survey.

Infant mortality rates are estimated for cohorts of children born in each of the ten years prior to the date of the survey for the 24 African countries with DHS data.[7] Note that we exclude from our sample all children born within one year of the survey because these observations represent censored spells (i.e., the child may still have died before his/her first birthday though after the enumerators visited the household).[8] Regression lines are then estimated through these data points to estimate linear annual rates of change in infant mortality rates. We allow these rates of change to differ across survey years and report them as such when they are statistically different.

Indicator 5: Neonatal Care

Because of the difficulty in measuring actual maternal deaths (i.e,. deaths at childbirth), we employ a proxy for the prevention of such deaths. Given that a large number of maternal deaths follow from infections, blood loss and unsafe abortion, and are thus preventable, the proportion of births attended by skilled health personnel provides a means of tracking progress in preventing them. Further, since this form of health care is a primary policy mechanism that can be employed to address maternal mortality, tracking it allows us to also track the progress of public policy toward achieving the right of women to good health. Thus, while we are unable to measure the

[7] Because of the retrospective nature of the data, we do not need more than one survey to estimate changes in infant mortality rates. Thus we have indicators of changes in infant mortality rates for all 24 countries in Sub-Saharan Africa for which DHS data are available.

[8] Sahn, Stifel and Younger (1999) find remarkably close infant mortality rate point estimates within countries where there exist more than one survey and where there is overlap among the yearly estimates. This suggests that the quality of these recall data is very good.

output (maternal deaths) we can and do measure changes in an input into reducing maternal mortality (births attended by skilled health personnel).

This indicator of the quality of neonatal care is recorded in the maternity section of the individual survey instrument in the DHS. In this section, all women are asked about births within the five years prior to the survey, including who was present at the birth. If a doctor, a nurse, a midwife and/or a "trained health professional" was present at a birth, then the mother is recorded to have received neonatal health care from skilled health personnel for that particular birth. Since there are many mothers in the samples with more than one birth recorded in the five years prior to the surveys, it is possible (and observed) for some women to have births that were both attended and not attended by trained professionals. The percentage of births attended by skilled personnel is estimated for cohorts of children born in each of the five years prior to the date of the survey for the 24 countries with DHS data.[9] Regression lines are then estimated through these data points to estimate linear annual rates of change, and to predict the percentage of births attended by skilled health personnel in the survey years.

Indicator 6: Use of reproductive health services

The DHS data have a wealth of information on knowledge and use of contraceptives. Each woman in the individual survey instrument is asked detailed questions about contraceptives as well as her current reproductive status. This permits us to estimate the share of women in need of reproductive health services who have knowledge of modern contraceptives and who use them. Two issues need clarification here. First, we define women who need access to modern contraceptives as those who are fecund and do not currently want to get pregnant. To do this, we drop from our sample of women those who are declared infecund or are menopausal, and those who report desiring to have children. This leaves non-menopausal women who either want no more children or report wanting a child but after two or more years (i.e., desiring to space the births). Second, modern contraceptives are defined as the pill, IUD, injections, diaphragm, foam, jelly, condom, sterilization (male or female), and Norplant™ or other implants.

The percentages of women in need of access to reproductive health services who use modern contraceptive methods are estimated for urban and rural areas in the 13 African countries with at least two DHS surveys.

Indicator 7: Child malnutrition

The indicator of nutritional status of children used in this paper (and available in the DHS) derives from anthropometric measurements made for children under age five. From these measures, along with reported ages of children, a normalized measure of height-for-age can be constructed as follows,

[9] As with the mortality data, only one survey is necessary to estimate changes in the quality of neonatal care because of the retrospective nature of the maternity data.

$$z\text{-}score = \frac{x_i - x_{median}}{\sigma_x},$$

where x_i is the height for child *i*, x_{median} is the median of that measurement for a healthy and well-nourished child from a reference population of the same age and of the same gender, and σ_x is the standard deviation from the mean of the reference population. Note that the z-score for the reference population has a standard normal distribution in the limit. Thus, a child has a probability distribution on the expected value of a z-score. If more than 2.5 percent of a given population has z-scores that fall two standard deviations below the mean of the normal population (zero), then there is said to be malnutrition in the country.

As recommended by the World Health Organization (WHO, 1983), the standard reference population used here is that of the United States National Center for Health Statistics. Studies such as Martorell and Habicht (1986) that found that less than 10 percent of worldwide variance in height is due to differences in genetics or race among children of the same sex under the age of ten, help to establish the appropriateness of using such a reference population.

The height-for-age z-score (HAZ) is an indicator of a child's long-term nutritional status. Children who are "stunted" are those whose past chronic nutritional deprivations leave them shorter than expected for their age and gender cohorts in the reference population. We limit ourselves to estimating malnutrition as the percentage of the sample of children with HAZ scores below –2 (i.e., stunting rates).[10] Stunting rates are estimated in urban and rural areas in the 14 countries that have at least two DHS surveys with an anthropometry section.

Indicator 8: Malnutrition of Women

The indicator of nutritional status of adult women used in this paper (and available in a subset of the DHS) is the body mass index (BMI), also known as Quetelet's Index. The BMI for a particular individual is calculated as her weight (kg) divided by the square of her height (m^2). Degrees of underweight, or wasting, are defined as "chronic energy deficiency" (CED) based on BMI levels. As recommended by the WHO (1995), the 17.0-18.49 range indicates mild thinness, 16.0-16.9 indicates moderate thinness, and all values less than 16 indicate severe thinness. Our measure of malnutrition among women incorporates all three grades, using 18.49 as the cutoff to estimate the share of women in a population who are wasted. We refer to this as BMI malnutrition, and estimate it in urban and rural areas in the 7 countries for which BMI measures were made in at least two DHS surveys.

[10] We follow the standard practice of not subtracting the 2.5 percent of the population expected to have z-scores less that –2, and note that this does not affect the estimated changes in malnutrition.

2.2 Measuring Improvement

To assure that we capture the economic significance of changes in the various welfare indicators, we first, look at changes in percentage terms and compare urban and rural areas. Second, we adopt Kakwani's axiomatic approach to measuring performance in living standards by using achievement and improvement indices (Kakwani, 1993). This approach accommodates the view that a further improvement of the living standard of a region where the standard is already at a high level signifies an achievement greater than that of another region with an equal increase, but starting at a lower base. An extreme cross-country example illustrates why this is important when we consider regional changes in poverty. According to the World Development Indicators (1998), the infant mortality rate in Uganda dropped from 109 to 99 deaths per thousand live births between 1970 and 1996, respectively. Over the same period, the infant mortality rate in Japan fell from 13 to 4 deaths per thousand live births. In both cases, the mortality rates dropped by approximately 10 deaths per thousand live births. Nevertheless, one would be hard pressed to argue that Uganda's advances, while not negligible, are on par with Japan's (Sen, 1981). To avoid reaching conclusions about performance based on changes without consideration of the initial levels, we appeal to Kakwani's improvement index.

Kakwani's improvement index can only be applied to measures of welfare that have upper and lower bounds, or for which such bounds can be reasonably defined. For many measures of living standards, there exist some well defined limits. For example, if we define some measure of infant mortality that indicates improvement as it increases (e.g. I (IMR)= 1000 – IMR, where IMR is the infant mortality rate), then there are clear upper and lower bounds. We shall call the upper bound $\overline{M}$, and similarly $\underline{M}$ shall denote the lower bound. Kakwani (1993) shows that if we define an achievement index as follows,

$$f(x_t, \overline{M}, \underline{M}) = \frac{\ln(\overline{M} - \underline{M}) - \ln(\overline{M} - x_t)}{\ln(\overline{M} - \underline{M})},$$

where x_t is the increasing welfare measure at survey date t (we'll refer to time periods 1 and 2), then we can construct an improvement index as follows,

$$\begin{aligned} Q(x_1, x_2, \overline{M}, \underline{M}) &= f(x_2, \overline{M}, \underline{M}) - f(x_1, \overline{M}, \underline{M}) \\ &= \frac{\ln(\overline{M} - x_1) - \ln(\overline{M} - x_2)}{\ln(\overline{M} - \underline{M})}. \end{aligned}$$

This index ranges from –1 to 1, where –1 indicates the worst possible outcome (upper bound to lower bound), and 1 indicates the best possible outcome (lower bound to upper bound). It is also increasing in x_2 and decreasing in x_1. Further, it is additive and gives greater weight to improvements for a region that has a higher initial welfare level.

We apply this improvement index to all of our welfare indicators at the national, urban and rural levels to compare changes over time.[11]

2.3 Inequality Decompositions

In addition to examining levels and trends in urban-rural gaps, we also explore levels of national inequality, decomposing them into between and within urban and rural group inequality. Our inequality decompositions are limited to three of our indicators above: the asset index, child nutrition and schooling. It is simply not possible to measure inequality, let alone decompose it, for the other discrete variables analyzed above.

We use the Theil entropy measure ($\alpha = 1$) as our measure of inequality for all three variables because it is decomposable by groups. The Theil index is defined by:

$$I = \frac{1}{N}\sum_{i=1}^{N}\frac{x_i}{\mu}\ln\left(\frac{x_i}{\mu}\right)$$

where N is the sample size for the given country, x_i is the variable of interest (e.g., asset indices, educational attainment, or standardized heights) for individual or household i, and μ is the sample mean of the variable at the national level.

The Theil entropy measure in turn can be decomposed into the sum of within and between region contributions. The within region contribution is defined as

$$\mathrm{W} = s_{urban} I_{urban} + s_{rural} I_{rural} \ ,$$

where s_i is the share of the sum of the variable in region i relative to the national sum, and I_i is the Theil inequality index of region i. And the between region contribution is defined as,

$$\mathrm{B} = s_{urban}\ln\left(\frac{\mu_{urban}}{\mu}\right) + s_{rural}\ln\left(\frac{\mu_{rural}}{\mu}\right)$$

where μ_i is the sample mean of the variable for region i (i = urban, rural).

2.3.1 Asset Index Decompositions

An issue that arises with respect to this exercise in the case of the asset index, is that the mean and variance of the distribution of indices are arbitrarily defined by

[11] The value of improvement index is that it captures the degree of difficulty in any achievements that are made. We note, however, that this is not consistent with equity-favoring national social welfare functions when comparing achievements between urban and rural areas. Such social welfare functions place greater weight on similar absolute achievement levels in the "poorer" regions, rather than in the "richer" regions (as the improvement index does).

assumption to be zero and one. There are two consequences of this for our measurement and decomposition of inequality. The first is that any positive finite transformation of the values of the household indices does not change the information provided. For example, adding five to the value of the index for each household will maintain the rank ordering of households, giving us the same information as the untransformed set of asset indices. The only difference between the two is the identifying assumption (necessary for estimation) that the value of the mean of the distribution is now five instead of zero. The problem is that this shift in the distribution reduces inequality as measured by any Lorenz consistent measure (e.g., the Theil).[12] Nonetheless, we proceed with estimating levels of inequality for our asset index, not because we are inherently interested in them, but because we can decompose them to determine the share of inequality attributable to levels of inequality within urban and rural areas, and to levels of inequality between urban and rural areas. We ran sensitivity tests to get a sense of how much the decompositions change with the degree to which the distributions are shifted. We found them to be robust to within 5 percentage points of the shares of inequality attributable to between and within contributions for shifts up to 5 standard deviations.

The second consequence is that the asset index takes on negative values. Since the Theil index is defined over positive real numbers, we cannot measure inequality using the unadjusted values of the asset index. To resolve this problem we simply shift the distribution by an amount sufficient to transform all the values to be positive—i.e., we add just more than the negative value of the smallest number to each household's index value. Again, although shifting the distribution in this manner reduces the level of inequality, our sensitivity tests mentioned previously suggest that the shares of inequality attributable to within- and between-group inequality are little affected.

2.3.2. Health and Education Decompositions

Before discussing our measurement and decomposition of education and health inequality, we emphasize that we examine pure inequalities in these measures—often referred to as univariate inequality—not socio-economic inequalities in health and education, which measure inequality in these outcomes by a measure of income of some other indicator of socioeconomic status. Indeed, most of the literature on health and education inequality explores how health differs across various socio-economic dimensions (e.g., Wagstaff et al., 1991; Contoyannis and Forster, 1999; van Doorslaer et al., 1997; Filmer, 2000). Another, albeit small set of papers focus on univariate inequality in health and education (Pradhan, Sahn and Younger, 2002; LeGrande, 1987; Thomas, Wang and Fan, 2000; Gakidou, Murray and Frenk, 2000), not the correlations between health status and other socioeconomic indicators, or the "gradient," as it is commonly termed. Perhaps the simplest way to distinguish what we do in this paper from the traditional approach is that our "univariate" approach orders individual well-being by health status or education attainment, not income levels, and describes the inequality in health status across this health ordering.

[12] Note that any multiplicative change in the values of the household indices leaves inequality unchanged.

In the case of education, we build upon the previous work of Thomas, Wang and Fan (2000) and Lopez, Thomas and Wang (1998) who develop the concept of an education Gini index based on attainment data of the labor force population. They point out that education inequality is an important indicator for looking at the distribution dimension of human capital and welfare and is an important complement of measures of the average stock of education. They conduct an analysis of education inequality, both conducting an international comparison of education inequality, as well as examining how education inequality has changed over time.

Inequality in health is measured by the inequality in standardized heights of children, in keeping with our use of child height as an indicator of well-being. Height inequality, however, presents a special challenge, since, as discussed at considerable length by Pradhan, Sahn and Younger (2002), we must deal with the fact that in a perfectly healthy population, there is genetic variation in the height potential of individuals (Carr, 1988). As such, there will always be variations in children's heights, standardized for age and gender, even in a healthy population with complete health equality. To respond to this concern, we use measurements from a healthy population to establish genetically determined variation in heights of children. We then assess the extent to which inequality of heights in our sample, conditional on gender and age, differs from the inequality observed in the healthy reference population to quantify health inequality. By implication, there will be no height inequality as we measure it if all children are well-nourished.[13]

3. DATA

The Demographic and Health Survey (DHS) program has conducted over 70 nationally representative household surveys in more than 50 countries since 1984. With funding from USAID, the program is implemented by Macro International, Inc. In this study, we use 43 of the surveys for 24 Sub-Saharan African countries that have cross-sectional surveys available. The DHS surveys are conducted in single rounds with two main survey instruments: a household schedule and an individual questionnaire for women of reproductive age (15-49). The household schedule collects a list of household members and basic household demographic information and is used primarily to select respondents eligible for the individual survey, though in later waves of the survey, information was also collected on educational status and attainment of all household members. The individual survey, *inter alia,* provides information on household assets, reproductive histories, health, and the nutritional status of the women's young children. The quality of the data is generally good with improvements made over successive rounds.

[13] In this analysis, we take the National Center for Health Statistics reference population as representative of the healthy population. According to the World Health Organization, the NCHS population is globally representative of healthy, well-nourished children, regardless of ethnic or racial characteristics, thus providing the basis for our assumption that the distribution of standardized heights in that population represents only genetic variation (WHO, 1983).

In the first wave of DHS surveys (DHS I), co-resident husbands of women successfully interviewed in the individual survey were generally also interviewed in half of the clusters. This practice was changed in the later waves (DHS II and III) to have a nationally representative sample of men, by interviewing all men aged 15-49 living in every third or fourth household.

Although the designs of the surveys are not entirely uniform over time and across countries, efforts were made to standardize them, so that in most cases they are reasonably comparable.[14] The DHS program is designed for typical self-weighted national samples of 5,000 to 6,000 women between the ages of 15 and 49. In some cases the sample sizes are considerably larger, and some areas are over- or under-sampled. Household sampling weights are used to account for over- and under-sampling in various regions within surveys. Since all regions are sampled in the DHS surveys, with the exception of Uganda, we make the surveys nationally representative through the use of sampling weights. Districts in northern Uganda were not included in the 1988 survey because of armed conflict.

Table 1 shows the 24 African countries with DHS data and the years in which the data were collected. It also shows which indicators are available for each country. For example, all of the indicators are available for Burkina Faso, Ghana, Kenya, Madagascar, Niger, Nigeria, Tanzania, Zambia and Zimbabwe. Cameroon has all of the indicators except asset poverty because there are no estimates for $1/day poverty for this country available in the *2001 World Development Indicators*, and as such an absolute percentage of the population living in extreme poverty cannot be estimated using the asset index. Further, Mali has all of the indicators except those concerned with enrollments. This follows because the 1987 data was collected in the first wave in which no information was recorded on the education of the household members.[15] For the nine countries with only one survey, indicators are only available for changes in infant mortality and neonatal care.

4. RESULTS

4.1 Urban-Rural Gaps in Living Standards

Table 2 presents the absolute urban-rural differences in our various welfare indicators for the last survey year in each of the countries for which we have data.[16] A quick perusal of the numbers—most of which are positive and quite large in magnitude—illustrates that standards of living in rural areas almost universally lag far behind urban areas. For example, in 6 of 12 countries the asset index poverty headcount is more than

[14] In addition to the standard set of survey instruments, country-specific questions are asked.
[15] Note that this also affects Ghana, Kenya and Zimbabwe. But since each of these countries has three surveys, two of which were in the second or third wave when information on educational status and attainment was included in the household roster, changes in enrollments can be estimated. Although Senegal has two later wave surveys, information on education is not available in the 1992 data.
[16] See Appendix A for the specific urban and rural levels.

50 percentage points greater in rural areas than in urban areas. Moreover, the smallest urban-rural difference is 30 percentage points—the case of Kenya. Enrollment rates in urban areas are dramatically higher than in rural areas. This is especially so in Burkina Faso and Niger. In the former, the urban enrollment rate was 69 percent, whereas it was only 18 percent in rural areas. The comparable numbers for Niger are 55.5 and 14.6. Kenya, once again, shows the smallest urban-rural disparity, with Zimbabwe not far behind.

Like enrollments in general, the ratio of girl-to-boy enrollments is far higher in urban than rural areas in most countries. This is particularly so in countries where enrollment rates are generally low, such as Burkina Faso and Niger. We also note that in rural Madagascar, the girl-to-boy enrollment ratio is 96, better than the 85 recorded in the urban areas. This situation is a reversal of what was observed in the earlier Madagascar survey data, a point we will come back to later when we look at changes over time.

In 5 of the 24 countries, infant mortality rates are higher in urban areas: Benin, Burundi, Chad, Rwanda and Zambia. This finding is not consistent with all of the other indicators for these countries. We are hard pressed to explain this finding, other than to note that in the particular cases of Burundi and Rwanda, part of the story may be attributable to the influx of rural refugees from continued ethnic conflicts. In addition, the higher rates may reflect the impact of higher rates of HIV/AIDS in urban areas, which is a particularly large problem in these countries.

The spatial differences in access to neonatal care are also very large. In Burundi, for example, skilled health personnel attend 83 percent of births in urban areas. Contrast this with the 16 percent estimated for rural areas. The smallest difference is in Nigeria, where the urban and rural figures are 59 and 36 percent, respectively. Nutritional status of children and adults is also far better in urban than in rural areas. In Zimbabwe, for example, more than twice the share of children are malnourished in rural (34 percent) than urban areas (15 percent). Similarly, adult undernutrition among women as measured by the body mass index shows far greater rates of wasting in rural than in urban areas.

Clearly, the living standards of those living in rural areas lag far behind those living in urban areas. The logical question then is if this is just a transitory stage in which the rural sectors are catching up to the urban sectors. We attempt to shed light on this question of convergence by presenting in Tables 3 and 4, the relative improvements in achievements. In particular, we indicate with a “Yes” if the achievements of urban areas for each of the indicators exceed those of the rural areas as measured by the actual percentage change in Table 3, and by the Kakwani achievement index in Table 4. For example, based on the data presented in Appendix Table A1, in Mali the actual urban poverty headcount ratio fell by over 7.4 percentage points and the rural by 6 percent; and the Kakwani improvement indices for urban areas was 5.04, and 1.39 in rural areas. Since the urban decline is larger, both in absolute terms and using the index, a “Yes” is recorded in the first column of both Table 3 and 4 for Mali, indicating that the gains made in urban areas exceeded those of rural areas. Another example is Ghana where urban poverty fell by 8.8 percentage points while rural poverty fell by a much larger 18

percentage points over the decade between 1988 and 1998. But because urban poverty in Ghana as measured by our asset index was initially considerably lower in urban areas (15.6 percent) than in rural areas (72.9 percent), the gains from declining urban poverty were more of an achievement than those from declining rural poverty despite that the former was half the size of the latter. As such, the urban achievement index for Ghana was 17.9 compared to the rural achievement index of 6.2, so that in Table 4, we show a "Yes", but in Table 5, a "No".

The results in Tables 3 and 4 suggest that there is no discernable pattern of living standards in rural areas improving at rates greater than in urban areas, or conversely, as suggested in Haddad et al. (1999), that living standards in urban areas are declining at faster rates. In fact, in 7 of the 12 countries for which we have figures, the achievements in poverty reduction are greater in urban areas. If we look at simply the absolute changes, the declines in urban poverty are greater in urban areas for 6 of the 12 countries. We also find that in 4 of the 10 countries, urban achievements are greater in terms of increased enrollment rates and greater access of girls to education, both in absolute terms and using the index. While relative gains in terms of infant mortality rates and BMI malnutrition were greater in rural areas among our sample countries, in the majority of countries, urban women gained more access to reproductive health services at rates greater than for rural women. This set of results does not give any indication of a clear pattern or indication of rural living standards converging to those of urban dwellers.

4.2. Modeling the Urban-Rural Gaps

Next we report the results of some simple regression models where we seek to explain the gap in our welfare indicators between urban and rural areas. We estimate the following models,

$$\ln DIFF = \alpha + \beta_1 \ln T + \beta_2 \ln URB + \beta_3 \ln GDP + \beta_4 CFA + \beta_5 CRA*\ln URB + \mu.$$

The dependent variable DIFF, is the natural log of the difference in the urban and rural values of the indicators. Regressors include the log of economic openness[17], T; the log of the degree of urbanization, URB; the log of GDP per capita in purchasing power parity terms; a dummy variable that takes on the value of 1 if a country is part of the CFA zone; and an interaction between the CFA dummy and URB. The betas (β) are a set of coefficients that can be interpreted as elasticities, and mu (μ) is the standard error term.

There is considerable similarity in the results of the models of the differences in the poverty headcount, enrollments, the girl-to-boy enrollment ratios and infant mortality rates that appear in Table 4. In all cases the urbanization dummy variable is positive and significant. For example, in the poverty headcount model, the parameter estimate of 0.610 implies that a 10 percent increase in the degree of urbanization is associated with the urban-rural difference in poverty increasing by 6 percent. The parameter estimate in

[17] This variable is obtained from Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.0, Center for International Comparisons at the University of Pennsylvania (CICUP), December 2001. Openness is defined as export plus imports divided by GDP.

the enrollment model implies that a 10 percent increase in the urbanization rate will increase the difference in enrollments between urban and rural areas by nearly 17 percent. While these associations need to be interpreted with some caution, they can be interpreted as suggesting that in more urbanized countries the balance of power and influence magnifies the gaps between the urban and rural living standards.

The PPP GDP per capita variable is also negative in all the models and statistically significant at standard levels of confidence in all but the IMR model. This association implies that as countries grow richer the gap in welfare between urban and rural countries diminishes. Perhaps one reason that the expected decline in the large urban bias did not materialize over the past few decades is the poor growth performance of African economies.

Although the CFA dummy is also significant in all the models, it is negative in the poverty headcount and IMR models and positive in the other two. The interaction between the urbanization and CFA variable indicates that in all of the models, the positive effect of the urbanization variable on the gaps in urban-rural living standards in CFA countries is less than in non-CFA countries. However, the impact of the urbanization variable is not significantly different from zero in CFA countries, despite the large positive effect of the urban-rural gap in the rest of Africa.

Despite our prior that more openness benefits rural households more than urban households, the economic openness variable is significant in none of the models. We estimated similar models for child and adult malnutrition, but all of the parameter estimates were insignificant. We also caution that given the few degrees of freedom in these models, as well as the potential limitations of the specification due to a range of econometric concerns (e.g., correlation between error terms and regressors, reverse causation, etc.), the interpretation of these findings should be made with care. In fact, we suggest that the models should be viewed as indication of correlation, not causation per se.

4.3 Decomposing Inequality

We next turn to the results of our inequality decompositions using the asset index (Table 5). In the first two columns are the Gini and Theil measures for the 12 countries in our sample. Both inequality parameters show the same general pattern, with inequality being highest in Niger and Burkina Faso and lowest in Ghana and Tanzania.

Looking at the third and forth columns that present the Theil measures for urban and rural populations separately, we immediately see that inequality tends to be worse in rural areas than urban areas. The difference is particularly large in the cases of Kenya, Zambia and Zimbabwe. In all these countries, urban inequality is exceptionally low. For example, the Theil index in urban Zimbabwe is only 0.052. In contrast, Madagascar and Tanzania are the only two countries where the relative levels urban asset inequality exceeds rural asset inequality.

The fifth and sixth columns show the decomposition of total inequality into within- and between-group (urban and rural) inequality, with the last two columns presenting their respective percentage shares. The evidence here is mixed. In Ghana, Madagascar and Nigeria, within urban and rural region inequality comprises over 70 percent of total inequality. In contrast, the within shares are far smaller in Zimbabwe (only 34 percent) and Zambia (40 percent). Thus, while we observe that rural asset inequality tends to be higher than urban asset inequality, there is no generalizable picture from our decompositions that examine the relative contributions to total asset inequality of (a) inequality within urban and rural areas, and (b) inequality between urban and rural areas.

We now turn to an examination of the spatial dimensions of education inequality for our sample of 15 to 40 year olds (Table 6). Before presenting the results, we should point out that migration presents a particular problem here, since this education is a stock, acquired before the survey date in most cases. Since urban jobs by their nature require more education, you may be seeing the result of ex ante sorting rather than urban/rural inequality in the opportunity for schooling. To some extent the same for incomes, but they, at least, are flows and thus more closely related to one's present (i.e., time of survey) circumstances.

Education inequality has a large range of values. Coincidentally, it is lowest in Kenya, Zambia and Zimbabwe, the same countries where asset inequality is quite low.[18] Education inequality is also highest in the Sahelian region, the same region where levels of schooling attainment are lowest. Similar to the story of the asset inequality, the Theil indices in rural areas are larger than in urban areas in all 23 countries for which we have data. Thus, there is significantly greater inequality in the distributions of education in rural than urban areas. For example, the Theil for rural Benin is 1.40, while it is only 0.63 for urban areas. The comparable numbers for Nigeria are 0.49 and 0.22, respectively.

We next decompose total inequality into the within and between shares. The vast majority of total inequality is due to within region inequality in education (Table 7). The highest share of between-region inequality is in the same Sahelian countries of Burkina Faso (33 percent), Mali (19.4 percent) and Niger (21.3 percent). Note that in each of these countries, more than 74 percent of the adults in our samples have no education. Having said this, the between share is also relatively high in some countries in other regions, where higher levels of school attainment can be found (e.g., Central African Republic and Mozambique, with 37 and 34 percent of the samples with no education, respectively). Regardless of the country, however, we find that the within region share of total inequality in education is predominant, despite the fact that the ratio of rural to urban inequality often exceeds two. This finding reinforces the important distinction between average levels and dispersions in education attainment (and other welfare indicators). While the problem of the urban-rural gap in levels of education attainment is large, and presumably requires some attention by policy-makers to raise overall living

[18] While the education of the household head is included in the asset index, its weight is not large enough to drive these common results.

standards, those more concerned with an aversion to inequality will not see their objective effectively realized through reducing urban rural disparities. .

Turning to the decomposition of inequality in health, we find the overwhelming share of inequality in the population is represented by within region differences (Table 8). The greatest between shares are in the cases of Tanzania (6.6%) and Senegal (5.9%). Like other indicators, we find that rural inequality in health tends to be greater than urban inequality in most cases. For example, the Theil for rural Togo is 1.18, while it is only 0.60 in urban areas. However, there are exceptions such as Benin, Burundi and Rwanda, where there is greater intra-urban inequality than intra-rural inequality.

5. CONCLUDING REMARKS

In this paper we initially address the question of the magnitude of spatial differences in living standards between urban and rural households in Africa. We are motivated to examine the rural/urban divide for a number of reasons. These include the historical and evolving debate in the literature on the so-called "urban bias," as well as the more recent suggestions that the emerging challenges to poverty reduction are the swelling urban neighborhoods that are the home to a new generation of children born into urban poverty and to new migrants who have left the countryside in search of opportunity, only to find poverty and deprivation. In addition, given the aversion of policy-makers and citizens to inequality in the standard of living, we also examine overall inequality in assets, education and health and look at the spatial decomposition of these inequalities.

Our major finding is that living standards in rural areas lag far behind those in urban areas. While we expected to observe gaps, we did not anticipate such dramatic spatial differences. Furthermore, we are surprised to find no overall evidence of declining differences in urban and rural living standards. This is particularly surprising, first and foremost, since for nearly two decades, international organizations, development agencies, policy-makers and non-governmental organizations have given emphasis to rural development as the central pillar in their strategies to generate sustainable growth and poverty reduction. In this context, the past decade in particular has given rise to a growing emphasis on specific macroeconomic and sectoral policy reforms with the expectation that they would increase the livelihoods of the rural poor. These included policies such as exchange rate devaluations and trade liberalizations that were expected to turn the rural-urban terms of trade in favor of the rural areas; public expenditure reforms designed to be more progressive and targeted to the rural poor; agricultural policies that reduced explicit and implicit taxes on rural producers; and promotion of rural micro-credit intended to increase savings and investment opportunities in communities without access to formal sector financial institutions. Despite the varying commitment of governments to these reforms, the general picture of rural living standards lagging behind urban areas is quite surprising. This is even more so when we consider the rapid rate of rural-to-urban migration throughout most of sub-Saharan Africa. The expected effect of this migration would be to equalize poverty over the decades that this trend has been

observed. While the dramatic gap in living standards no doubt drives the rural-to-urban population movement, the data presented in this paper imply that there is every reason to expect the flow of people to the cities to continue and perhaps accelerate. This implies a continued expansion of urban slums and what looks to be almost unimaginable deprivation in the squalid settlements in which Africa's urban poor reside, and this is all the more reason to address rural poverty as a means of stemming the migration.

While our objective is to paint with a broad brush, doing so inevitably obscures the differences across a vast continent. There is substantial variation in the extent of the urban-rural divide among the countries in our sample. At one extreme we have Burkina Faso, where in 1999, for example, the poverty rate was 69 percentage points higher in rural areas than in urban areas, and the enrollment rate was over 50 percentage points lower in rural areas. At the other extreme we have Kenya, where in 1998, these gaps were considerably lower at 30 percentage points and virtually nil, respectively. Nevertheless, except for the handful of cases in which urban IMR rates are higher than in rural areas, the overwhelming evidence indicates the persistence of urban-rural inequalities in "poverty" and that efforts to alleviate them to date have not been successful.

We furthermore note that while our paper is about urban-rural spatial differences in well-being, standards of living within and among urban and rural areas are far from homogenous. The indicators examined in this paper differ markedly between rural regions of almost every country.[19] Likewise, when we observe changes in well-being over time in rural areas, the changes are often highly regionalized.[20] However, it also is all too remarkable that despite over three decades of recognition of the urban bias, rural areas continue to be left behind from many of the benefits of economic and social progress.

In terms of our analysis and decomposition of inequality, we limit ourselves to three indicators: the asset index, education and health. We find that in the case of education and health, the vast majority of the total inequality is attributable to the within region effects. This is particularly true for health where in most cases less than five percent of total inequality is represented by the between region share. The results in terms of the asset index are more mixed. Nonetheless, in all cases, there are indications that rural inequality exceeds inequality in urban areas. While these findings with regard to the levels of inequality for the three indicators are interesting, so too is the comparison of the inequality decompositions results with the living standards decomposition results. The latter focuses on the lower end, rather than the entire distribution of the indicators. Our findings also suggest that while policies to reduce the gap in urban-rural living standards will effectively improve well-being measured at the national level, they will not effectively reduce the overall level of inequality in health and education, and to a lesser extent asset wealth. The reason for this is that both the urban and rural distributions of

[19] We examined inter-rural differences, and indeed they are large. However, due to space constraints, we have not reported these results in this paper.

[20] See, for example, Sahn and Stifel (2000) where we present urban-rural decompositions of changes in poverty and find that the rural changes differ dramatically across rural areas.

education and health are extremely disbursed, relative to the difference in their central tendencies.

One important limitation of our paper is that we look at urban and rural populations in a static setting, without modeling the impact of the continued migration on the gap in average living standard levels, the degree of overall inequality, and the contributions of within and between region inequality to total inequality. We thus recognize that levels of standards of living and inequality in these measures are endogenous to household decisions. In the case of our analysis of the spatial dimensions of inequality, it is difficult to formulate any clear expectation of how migration will affect the levels and decomposition of inequality presented above. In terms of levels of living standards, it is reasonable to expect that given current migration trends, at some point in the future, levels will equilibrate. Nonetheless, a fundamental re-examination of development strategy, and in particular, a questioning of why we have been unable to alleviate the constraints to greater economic and social progress in rural areas needs further attention. Indeed, some of the answers may be found in understanding the voicelessness of the rural poor. Innovative initiatives intended to empower the rural poor, particularly women, through political and fiscal decentralization, social funds, and so forth are underway. Currently, however, the jury is out on these initiatives. Among other things, there are concerns about the potential for elite capture and decentralization of responsibility without a corresponding devolution of resources. Despite the promise that new paradigms of development may offer, old challenges such as rural environmental degradation and concerns over depletion of rural resources, as well as new worries such as those revolving around intellectual property rights of biotechnological advances, portend a further inability of rural people to improve livelihoods.

Finally, in our examination of the urban-rural divide, we limit ourselves to relatively objective measures of poverty and deprivation. There are a battery of other indicators—or to be more precise and to use Sen's terminology, capabilities and functionings—that we are unable to capture with our data. Notions of hope, freedom of association, and various characterizations of security and opportunity, are indeed of great importance in characterizing and measuring poverty. We ignore these indicators, not by choice, but because of the limitations of the data that we have available. The results of our urban-rural analysis could very well look different if we had data on such indicators. This would suggest an interesting research challenge—to gather and analyze such data in order to both better understand the relative difference in poverty, and to provide insights into how to more effectively combat Africa's intractable challenge of rural poverty.

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Table 1. Indicators of Well-Being and the Demographic and Health Surveys (DHS)

	Indicator	Asset Poverty	Enrollments	Ratio of girls-to-boys enrolled	IMR	Neonatal care with skilled personnel	Contraceptive use	Child Stunting	Adult Malnutrition
Countries									
1	Benin (1996)				X	X			
2	Burkina Faso (1992,1999)	X	X	X	X	X	X	X	X
3	Burundi (1987)				X	X			
4	Cameroon (1991, 1998)		X	X	X	X	X	X	
5	Central African Republic (1994)				X	X			
6	Chad (1997)				X	X			
7	Comoros (1996)				X	X			
8	Cote d'Ivoire (1994)				X	X			
9	Ghana (1988, 1993, 1998)	X	X	X	X	X	X	X	X
10	Kenya (1988, 1993, 1998)	X	X	X	X	X	X	X	X
11	Madagascar (1992, 1997)	X	X	X	X	X	X	X	
12	Malawi (1992)				X	X			
13	Mali (1987, 1995)	X			X	X	X	X	
14	Mozambique (1997)				X	X			
15	Namibia (1992)				X	X			
16	Niger (1992, 1997)	X	X	X	X	X	X	X	X
17	Nigeria (1990, 1999)	X	X	X	X	X	X	X	
18	Rwanda (1992)				X	X			
19	Senegal (1986, 1992, 1997)	X			X	X	X	X	
20	Tanzania (1991, 1996, 1999)	X	X	X	X	X	X	X	X
21	Togo (1988,1998)				X	X		X	
22	Uganda (1988, 1995)	X			X	X	X	X	
23	Zambia (1992, 1996)	X	X	X	X	X	X	X	X
24	Zimbabwe (1988, 1994, 1999)	X	X	X	X	X	X	X	X

Table 2: Absolute Differences between Urban and Rural Indicators

	Indicator	Asset Poverty	Enrollments	Ratio of girls-to-boys enrolled	IMR	Neonatal care with skilled personnel	Contraceptive use	Stunting	BMI Malnutrition
Countries									
1	Benin (1996)				-14.7	24.4			
2	Burkina Faso (1992,1999)	68.6	50.5	37.3	10.7	69.4	26.5	16.3	4.0
3	Burundi (1987)				-66.2	65.7			
4	Cameroon (1991, 1998)		17.7	7.8	30.3	37.5	11.7	9.9	
5	Central African Republic (1994)				41.4	52.3			
6	Chad (1997)				-20.5	35.2			
7	Comoros (1996)				6.6	30.1			
8	Cote d'Ivoire (1994)				19.7	48.1			
9	Ghana (1988, 1993, 1998)	48.0	13.9	4.8	22.8	46.4	4.7	15.3	7.3
10	Kenya (1988, 1993, 1998)	30.3	0.7	-1.0	11.8	35.9	12.9	9.6	4.9
11	Madagascar (1992, 1997)	45.3	24.3	-11.5	26.4	28.1	10.8	4.4	
12	Malawi (1992)				2.0	38.9			
13	Mali (1987, 1995)	62.0			44.7	54.1	15.8	11.4	
14	Mozambique (1997)				7.7	57.6			
15	Namibia (1992)				11.2	26.4			
16	Niger (1992, 1997)	59.1	40.9	38.9	67.8	61.7	23.1	11.7	7.5
17	Nigeria (1990, 1999)	45.9	18.4	4.8	4.8	21.5	12.0	5.5	
18	Rwanda (1992)				-30.8	39.4			
19	Senegal (1986, 1992, 1997)	42.3			56.6	50.1	22.1	15.5	
20	Tanzania (1991, 1996, 1999)	51.0	21.4	8.4	23.5	49.1	23.9	21.9	1.6
21	Togo (1988,1998)				8.8	49.1	9.7	9.2	
22	Uganda (1988, 1995)	34.7			11.9	46.8	21.5	18.3	
23	Zambia (1992, 1996)	77.3	20.5	7.3	-6.3	50.9	16.3	16.1	2.1
24	Zimbabwe (1988, 1994, 1999)	56.2	5.3	7.6	14.0	28.5	16.7	8.3	0.8

"-" indicates higher levels of welfare in rural areas

Table 3. Has Welfare Improved More in Urban Areas?

	Indicator	Asset Poverty	Enrollments	Ratio of girls-to-boys enrolled	IMR	Neonatal care with skilled personnel	Contraceptive use	Stunting	BMI Malnutrition	Total
Countries										
1	Benin (1996)				No	(Yes)				1/2
2	Burkina Faso (1992,1999)	Yes	Yes	Yes	No	Yes	Yes	(Yes)	No	6/8
3	Burundi (1987)				No	(No)				0/2
4	Cameroon (1991, 1998)		Yes	No	No	Yes	Yes	(No)		3/6
5	Central African Republic (1994)				No	(No)				0/2
6	Chad (1997)				No	(No)				0/2
7	Comoros (1996)				No	No				0/2
8	Cote d'Ivoire (1994)				No	(Yes)				1/2
9	Ghana (1988, 1993, 1998)	No	No	No	No	Yes	No	Yes	Yes	3/8
10	Kenya (1988, 1993, 1998)	No	No	(No)	(No)	(Yes)	No	No	(No)	1/8
11	Madagascar (1992, 1997)	No	No	No	No	(No)	No	No		0/7
12	Malawi (1992)				No	Yes				1/2
13	Mali (1987, 1995)	Yes			No	No	Yes	(Yes)		3/5
14	Mozambique (1997)				No	Yes				1/2
15	Namibia (1992)				Yes	No				1/2
16	Niger (1992, 1997)	Yes	Yes	Yes	No	No	Yes	(No)	(Yes)	5/8
17	Nigeria (1990, 1999)	No	No	No	No	No	Yes	(No)		1/7
18	Rwanda (1992)				No	No				0/2
19	Senegal (1986, 1992, 1997)	Yes			Yes	No	Yes	Yes		4/5
20	Tanzania (1991, 1996, 1999)	Yes	Yes	Yes	Yes	(Yes)	Yes	Yes	No	7/8
21	Togo (1988,1998)				No	Yes	Yes	No		2/4
22	Uganda (1988, 1995)	No			Yes	(Equal)	Yes	No		2/5
23	Zambia (1992, 1996)	(No)	(No)	No	No	(No)	No	(Yes)	No	1/8
24	Zimbabwe (1988, 1994, 1999)	(Yes)	(No)	Yes	No	No	No	No	(No)	2/8
Total		6/12	4/10	4/10	4/24	10/24	9/14	6/14	2/7	

(No) indicates that welfare decreased in both urban and rural areas and the rate of decrease was greater in urban areas.
(Yes) indicates that welfare decreased in both urban and rural areas and the rate of decrease was smaller in urban areas.
(Equal) indicates that welfare decreased in both urban and rural areas and the rate of decrease was the same in both.

Table 4: Have Achievement Indices Improved More in Urban Areas?

	Indicator	Asset Poverty	Enrollments	Ratio of girls-to-boys enrolled	IMR	Neonatal care with skilled personnel	Contraceptive use	Stunting	BMI Malnutrition	Total
Countries										
1	Benin (1996)				No	(Yes)				1/2
2	Burkina Faso (1992,1999)	Yes	Yes	Yes	No	Yes	Yes	(No)	No	5/8
3	Burundi (1987)				No	(No)				0/2
4	Cameroon (1991, 1998)		Yes	No	Yes	Yes	Yes	(No)		4/6
5	Central African Republic (1994)				No	(No)				0/2
6	Chad (1997)				No	(No)				0/2
7	Comoros (1996)				No	No				0/2
8	Cote d'Ivoire (1994)				No	(Yes)				1/2
9	Ghana (1988, 1993, 1998)	Yes	No	No	Yes	Yes	No	Yes	Yes	5/8
10	Kenya (1988, 1993, 1998)	Yes	No	(No)	(No)	(No)	Yes	No	(No)	2/8
11	Madagascar (1992, 1997)	No	No	No	Yes	(No)	No	No		1/7
12	Malawi (1992)				No	Yes				1/2
13	Mali (1987, 1995)	Yes			Yes	Yes	Yes	(Yes)		5/5
14	Mozambique (1997)				No	Yes				1/2
15	Namibia (1992)				Yes	Yes				2/2
16	Niger (1992, 1997)	Yes	Yes	Yes	Yes	No	Yes	(No)	(Yes)	6/8
17	Nigeria (1990, 1999)	No	No	No	No	No	Yes	(No)		1/7
18	Rwanda (1992)				No	No				0/2
19	Senegal (1986, 1992, 1997)	Yes			Yes	Yes	Yes	Yes		5/5
20	Tanzania (1991, 1996, 1999)	Yes	Yes	Yes	Yes	(No)	Yes	Yes	No	6/8
21	Togo (1988,1998)				No	Yes	Yes	Yes		3/4
22	Uganda (1988, 1995)	No			Yes	(No)	Yes	No		2/5
23	Zambia (1992, 1996)	(No)	(No)	No	No	(No)	No	(Yes)	No	1/8
24	Zimbabwe (1988, 1994, 1999)	(No)	(No)	Yes	No	Yes	No	No	(No)	2/8
Total		12-Jul	4/10	4/10	9/24	12/24	10/14	6/14	2/7	

Note: Responses in parentheses indicate conditions deteriorated at a lesser rate in urban areas

Table 5: Cross Country Regression of Urban-Rural Differences in Welfare Indicators

	Poverty Differences		Enrollment Differences		Girl-Boy Enrollment Ratio Differences		Infant Mortality Rate Differences	
	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic	Coef.	t-statistic
Log openness	-0.012	-0.04	-0.829	-0.85	0.241	0.33	-0.386	-0.83
Log urbanization	0.610	3.31	1.681	3.72	1.009	2.97	1.375	4.50
Log PPP GDP per capita	-0.329	-1.88	-1.140	-1.79	-1.033	-2.16	-0.004	-0.01
Dummy: CFA country	-1.077	-2.86	7.320	2.29	6.726	2.79	-1.602	-1.73
CFA Dummy * Log Urbanization	-0.847	-2.90	-2.183	-2.11	-1.840	-2.37	-1.369	-1.84
Constant	6.987	4.52	8.250	1.55	4.811	1.20	7.674	2.63
Log CFA Urbanization	-0.237	-0.96	-0.502	-0.55	-0.831	-1.21	0.006	0.01
Observation	22		20		20		24	
R^2	0.572		0.682		0.759		0.610	

Note: Dependent variable in logs

Table 6: Asset Inequality in Africa - Levels and Urban-Rural Decomposition

Household Asset Index

Country	Gini	Theil Measure	Rural Inequality	Urban Inequality	Within-Group Inequality	Between-Group Inequality	Within Share	Between Share
Burkina Faso, 99	0.592	0.638	0.403	0.199	0.293	0.345	46.0%	54.0%
Ghana, 98	0.453	0.345	0.301	0.201	0.244	0.101	70.8%	29.2%
Kenya, 98	0.468	0.362	0.295	0.105	0.204	0.158	56.4%	43.6%
Madagascar, 97	0.503	0.468	0.314	0.370	0.341	0.127	72.9%	27.1%
Mali, 95	0.586	0.609	0.449	0.281	0.338	0.271	55.5%	44.5%
Nigeria, 99	0.496	0.410	0.421	0.202	0.305	0.105	74.4%	25.6%
Niger, 97	0.754	1.185	0.735	0.416	0.508	0.677	42.9%	57.1%
Senegal, 92	0.511	0.441	0.416	0.198	0.260	0.181	58.9%	41.1%
Tanzania, 99	0.434	0.357	0.215	0.246	0.231	0.126	64.6%	35.4%
Uganda, 95	0.494	0.484	0.285	0.252	0.272	0.211	56.3%	43.7%
Zambia, 96	0.475	0.370	0.287	0.089	0.149	0.221	40.2%	59.8%
Zimbabwe, 99	0.494	0.413	0.327	0.052	0.141	0.272	34.1%	65.9%

Table 7: Education Inequality in Africa - Levels and Urban-Rural Decomposition

Years of Education of Working-Age Adults (age 15-40)

	Percent Without Any School				Theil Inequality Measure						
Country	National	Rural	Urban	Gini	National	Rural	Urban	Within-Group	Between-Group	Within Share	Between Share
Benin, 96	56.4	70.1	37.1	0.710	1.017	1.398	0.629	0.881	0.136	86.6%	13.4%
Burkina Faso, 99	79.2	89.0	38.3	0.853	1.721	2.374	0.582	1.153	0.568	67.0%	33.0%
Cameroon, 98	20.9	26.8	11.0	0.409	0.340	0.422	0.196	0.309	0.031	91.0%	9.0%
CAR, 94	36.9	49.5	21.6	0.574	0.634	0.864	0.380	0.546	0.088	86.1%	13.9%
Chad, 97	65.4	72.8	44.7	0.784	1.291	1.524	0.758	1.090	0.201	84.4%	15.6%
Comoros, 96	39.6	45.0	28.4	0.571	0.643	0.745	0.441	0.608	0.035	94.6%	5.4%
Cote d'Ivoire, 94	48.0	57.3	36.0	0.622	0.777	0.978	0.553	0.724	0.053	93.2%	6.8%
Ghana, 98	21.1	26.9	11.1	0.378	0.318	0.397	0.185	0.299	0.019	94.0%	6.0%
Kenya, 98	6.3	7.0	4.3	0.253	0.135	0.142	0.096	0.128	0.007	94.9%	5.1%
Madagascar, 97	22.5	26.4	12.2	0.494	0.451	0.487	0.279	0.399	0.053	88.3%	11.7%
Malawi, 92	33.2	36.6	14.3	0.522	0.537	0.587	0.245	0.498	0.039	92.8%	7.2%
Mali, 95	74.5	85.7	52.7	0.820	1.524	2.132	0.863	1.228	0.296	80.6%	19.4%
Mozambique, 97	33.5	40.8	13.5	0.547	0.582	0.686	0.264	0.493	0.089	84.7%	15.3%
Namibia, 92	13.0	15.9	8.2	0.346	0.243	0.284	0.153	0.220	0.023	90.6%	9.4%
Niger, 97	77.2	85.9	45.7	0.833	1.619	2.120	0.707	1.273	0.345	78.7%	21.3%
Nigeria, 99	26.8	32.5	14.5	0.428	0.400	0.494	0.218	0.379	0.021	94.7%	5.3%
Rwanda, 92	29.7	30.9	14.3	0.500	0.491	0.503	0.277	0.476	0.015	97.0%	3.0%
Senegal, 92	64.3	83.9	38.4	0.796	1.551	2.654	0.871	1.394	0.157	89.9%	10.1%
Tanzania, 99	18.2	21.8	8.7	0.305	0.265	0.303	0.163	0.255	0.010	96.3%	3.7%
Togo, 98	34.1	43.4	18.9	0.525	0.555	0.694	0.336	0.500	0.054	90.2%	9.8%
Uganda, 95	22.2	24.8	8.1	0.431	0.370	0.399	0.168	0.342	0.028	92.4%	7.6%
Zambia, 96	9.7	15.2	3.1	0.305	0.193	0.259	0.097	0.167	0.026	86.5%	13.5%
Zimbabwe, 99	3.7	5.3	1.3	0.202	0.091	0.116	0.042	0.080	0.010	88.8%	11.2%

Table 8: Inequality - Measures and Decomposition (Urban/Rural), Africa

Country	Gini	Theil Measure (NCHS Adjusted)	Rural Theil Measure (NCHS Adjusted)	Urban Theil Measure (NCHS Adjusted)	Within-Group Inequality (NCHS Adjusted)	Between-Group Inequality (NCHS Adjusted)	Within Share	Between Share
Burkina Faso, 99	0.0393	1.9880	2.0241	1.3855	1.9518	0.0361	98.2%	1.8%
Benin, 96	0.0342	1.2410	1.2169	1.2530	1.2289	0.0120	99.0%	1.0%
Burundi, 87	0.0343	1.3133	1.2771	1.5783	1.2892	0.0241	98.2%	1.8%
CAR, 94	0.0371	1.6386	1.7349	1.4217	1.6024	0.0361	97.8%	2.2%
Cote d'Ivoire, 94	0.0340	1.2410	1.4337	0.7108	1.1928	0.0482	96.1%	3.9%
Cameroon, 98	0.0372	1.6506	1.7590	1.3012	1.6386	0.0120	99.3%	0.7%
Ghana, 98	0.0331	1.0964	1.1325	0.8554	1.0602	0.0361	96.7%	3.3%
Kenya, 98	0.0379	1.7590	1.7229	1.6867	1.7229	0.0361	97.9%	2.1%
Comoros, 96	0.0359	1.4940	1.5422	1.3494	1.4940	0.0000	100.0%	0.0%
Morocco, 92	0.0351	1.3855	1.5060	0.8675	1.2892	0.0964	93.0%	7.0%
Madagascar, 97	0.0357	1.4458	1.4337	1.4578	1.4337	0.0120	99.2%	0.8%
Mali, 95	0.0403	2.0843	2.2048	1.6145	2.0482	0.0361	98.3%	1.7%
Malawi, 92	0.0356	1.4337	1.4096	1.2048	1.3976	0.0361	97.5%	2.5%
Mozambique, 97	0.0383	1.8072	1.9036	1.4096	1.7711	0.0361	98.0%	2.0%
Nigeria, 99	0.0495	3.6145	3.6024	3.6024	3.6024	0.0120	99.7%	0.3%
Niger, 97	0.0386	1.8193	1.8675	1.3735	1.7831	0.0361	98.0%	2.0%
Namibia, 92	0.0337	1.2289	1.1807	1.0964	1.1566	0.0723	94.1%	5.9%
Rwanda, 92	0.0339	1.2892	1.2530	1.3494	1.2651	0.0241	98.1%	1.9%
Senegal, 92	0.0339	1.2169	1.3373	0.8193	1.1446	0.0723	94.1%	5.9%
Chad, 97	0.0432	2.5181	2.6145	2.0602	2.4940	0.0241	99.0%	1.0%
Togo, 98	0.0327	1.0602	1.1807	0.6024	1.0361	0.0241	97.7%	2.3%
Tunisia, 88	0.0330	1.1325	1.1687	0.9398	1.0482	0.0843	92.6%	7.4%
Tanzania, 99	0.0320	0.9639	1.0120	0.4578	0.9036	0.0602	93.8%	6.3%
Uganda, 95	0.0346	1.3735	1.3976	1.0000	1.3494	0.0241	98.2%	1.8%
Zambia, 96	0.0355	1.4217	1.5904	1.0000	1.3614	0.0602	95.8%	4.2%
Zimbabwe, 99	0.0388	1.8916	2.0241	1.5904	1.8795	0.0120	99.4%	0.6%

Appendix Table A1: Poverty Rates & Achievement Indices

Country (DHS years)	P_0 in Year of . . . First Survey	Last Survey	Difference	Urban-Rural Differences in P_0 First Survey	Last Survey	Difference	Improvement index
Burkina Faso (1992,1999)							
National	60.5	62.3	1.8	67.0	68.6	1.6	-0.64
Urban	6.3	5.4	-0.9				3.24
Rural	73.3	74.0	0.7				-0.22
Ghana (1988, 1998)							
National	53.8	37.5	-16.4	57.3	48.0	-9.2	7.87
Urban	15.6	6.8	-8.8				17.93
Rural	72.9	54.9	-18.0				6.17
Kenya (1988, 1998)							
National	28.6	25.0	-3.7	32.8	30.3	-2.5	2.96
Urban	1.5	1.2	-0.4				6.20
Rural	34.4	31.5	-2.9				1.90
Madagascar (1992, 1997)							
National	73.2	63.3	-9.9	70.3	45.3	-25.0	3.16
Urban	14.4	29.1	14.7				-15.24
Rural	84.7	74.4	-10.3				2.80
Mali (1987, 1995)							
National	81.4	71.6	-9.9	60.6	62.0	1.4	2.81
Urban	35.6	28.3	-7.4				5.04
Rural	96.3	90.3	-6.0				1.39
Niger (1992, 1997)							
National	63.6	59.8	-3.9	58.1	59.1	1.0	1.36
Urban	14.8	11.3	-3.5				5.91
Rural	72.9	70.4	-2.5				0.75
Nigeria (1990, 1999)							
National	77.2	68.2	-8.9	53.7	45.9	-7.8	2.67
Urban	37.4	36.5	-0.8				0.49
Rural	91.0	82.4	-8.6				2.16
Senegal (1986, 1992, 1997)							
National	29.1	25.7	-3.5	34.6	42.3	7.7	2.75
Urban	7.5	0.9	-6.5				45.46
Rural	42.1	43.3	1.2				-0.59
Tanzania (1991, 1996)							
National	58.8	49.2	-9.6	50.4	51.0	0.6	3.87
Urban	20.3	11.0	-9.3				13.39
Rural	70.7	62.0	-8.7				2.86

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Appendix Table A1: Poverty Rates & Achievement Indices continued

Country (DHS years)	P_0 in Year of . . . First Survey	Last Survey	Difference	Urban-Rural Differences in P_0 First Survey	Last Survey	Difference	Improvement index
Zambia (1992, 1996)							
National	51.9	59.8	7.9	77.7	77.3	-0.4	-3.06
Urban	9.0	11.1	2.2				-4.67
Rural	86.7	88.4	1.8				-0.43
Uganda (1988, 1995)							
National	38.51	35.19	-3.3	38.3	34.7	-3.6	1.96
Urban	4.31	5.34	1.0				-4.66
Rural	42.58	40.00	-2.6				1.36
Zimbabwe (1988, 1994)							
National	33.8	40.5	6.7	49.7	56.2	6.5	-3.92
Urban	0.3	2.1	1.8				-41.24
Rural	50.0	58.3	8.3				-3.33

Appendix Table A2: Enrollment Rates for Children of Age 6-14 & Achievement Indices

Country (DHS years)	Enrollments in Year of . . . First Survey	Last Survey	Difference	Urban-Rural Differences First Survey	Last Survey	Difference	Improvement index
Burkina Faso (1992,1999)							
National	26.9	24.8	-2.1	45.9	50.5	4.54	-0.62
Urban	65.4	68.8	3.4				2.24
Rural	19.5	18.3	-1.2				-0.31
Cameroon (1991, 1997)							
National	68.4	74.5	6.1	13.1	17.7	4.60	4.62
Urban	76.7	86.7	9.9				12.08
Rural	63.6	68.9	5.3				3.44
Ghana (1993, 1998)							
National	76.0	77.2	1.2	15.1	13.9	-1.18	1.10
Urban	86.4	87.1	0.6				1.05
Rural	71.3	73.2	1.8				1.42
Kenya (1993, 1998)							
National	76.8	87.4	10.6	2.1	0.7	-1.43	13.22
Urban	78.7	88.0	9.2				12.38
Rural	76.6	87.3	10.7				13.24
Madagascar (1992, 1997)							
National	56.2	58.1	1.9	27.5	24.3	-3.19	0.95
Urban	79.7	76.7	-3.0				-2.95
Rural	52.2	52.4	0.2				0.10
Niger (1992, 1997)							
National	16.1	22.9	6.7	33.9	40.9	6.96	1.81
Urban	44.2	55.5	11.2				4.88
Rural	10.3	14.6	4.3				1.06
Nigeria (1990, 1999)							
National	56.7	64.7	8.0	24.5	18.4	-6.10	4.44
Urban	75.3	77.8	2.5				2.34
Rural	50.8	59.4	8.6				4.18
Tanzania (1991, 1996)							
National	46.5	49.6	3.1	6.7	21.4	14.63	1.30
Urban	51.8	66.7	14.8				7.99
Rural	45.1	45.3	0.2				0.08
Zambia (1992, 1996)							
National	70.8	60.2	-10.6	23.9	20.5	-3.35	-6.73
Urban	83.2	72.9	-10.4				-10.43
Rural	59.3	52.3	-7.0				-3.45
Zimbabwe (1988, 1994)							
National	84.9	83.3	-1.6	7.3	5.3	-1.94	-2.17
Urban	90.7	87.4	-3.3				-6.57
Rural	83.4	82.1	-1.3				-1.70

Appendix Table A3: Ratio of Girls-to-Boys Enrolled in Primary and Secondary Schools & Achievement Indices

Country (DHS years)	Ratio in Year of . . . First Survey	Ratio in Year of . . . Last Survey	Difference	Differences in Urban-Rural Ratios First Survey	Differences in Urban-Rural Ratios Last Survey	Difference	Improvement index
Burkina Faso (1992,1999)							
National	66.0	67.5	1.4	23.4	37.3	13.9	0.66
Urban	79.4	90.7	11.3				9.02
Rural	56.0	53.4	-2.6				-0.96
Cameroon (1991, 1997)							
National	86.2	87.0	0.7	9.1	7.8	-1.3	0.62
Urban	91.2	91.1	-0.1				-0.11
Rural	82.1	83.3	1.2				0.88
Ghana (1993, 1998)							
National	81.0	86.6	5.7	13.7	4.8	-8.9	4.28
Urban	90.0	89.8	-0.1				-0.14
Rural	76.2	85.0	8.8				5.95
Kenya (1993, 1998)							
National	98.0	93.6	-4.4	3.9	-1.0	-4.8	-5.76
Urban	101.5	92.7	-8.8				-12.84
Rural	97.6	93.7	-4.0				-5.14
Madagascar (1992, 1997)							
National	94.0	91.9	-2.1	3.2	-11.5	-14.7	-2.32
Urban	96.3	84.7	-11.6				-11.73
Rural	93.1	96.2	3.1				3.78
Niger (1992, 1997)							
National	56.3	65.8	9.5	37.9	38.9	1.1	3.96
Urban	77.0	85.8	8.8				6.14
Rural	39.1	46.8	7.8				2.38
Nigeria (1990, 1999)							
National	81.2	83.6	2.3	14.9	4.8	-10.0	1.66
Urban	91.5	86.7	-4.8				-4.45
Rural	76.6	81.8	5.2				3.37
Tanzania (1991, 1996)							
National	88.3	105.2	16.9	-10.7	8.4	19.1	26.51
Urban	80.4	111.4	31.0				84.05
Rural	91.0	103.0	12.0				17.89
Zambia (1992, 1996)							
National	92.2	88.3	-3.9	13.2	7.3	-5.9	-3.84
Urban	97.9	92.1	-5.8				-7.34
Rural	84.7	84.8	0.0				0.03
Zimbabwe (1988, 1994)							
National	90.2	91.6	1.5	4.2	7.6	3.4	1.46
Urban	93.5	97.3	3.8				4.88
Rural	89.3	89.7	0.4				0.39

Appendix Table A4: Infant Mortality Rates & Achievement Indices

Country (DHS years)	Rates of Change	IMR in Year Prior	IMR in Last Survey Year	Urban-rural differences in Year Prior	Urban-rural differences in Last Survey Year	Urban-rural differences in Difference	Improvement Index
Benin (1996)							
National	-4.6	91.6	87.0	-7.7	-14.7	-7.0	0.98
Urban	0.3	92.6	92.9				-0.06
Rural	-6.7	84.9	78.2				1.58
Burkina Faso (1992,1999)							
National	-2.6	111.2	108.6	23.1	10.7	-12.4	0.44
Urban	9.4	89.3	98.7				-1.92
Rural	-2.9	112.3	109.4				0.50
Burundi (1987)							
National	-8.4	77.6	69.2	-50.3	-66.2	-15.9	2.18
Urban	7.0	126.3	133.3				-1.02
Rural	-8.9	76.0	67.1				2.37
Cameroon (1991, 1998)							
National	**4.3**	75.2	79.5	30.7	30.3	-0.4	-1.05
Urban	-1.2	63.3	62.1				0.38
Rural	**-1.7**	94.1	92.4				0.34
Central African Republic (1994)							
National	-2.5	96.7	94.2	42.7	41.4	-1.3	0.50
Urban	-1.7	74.1	72.4				0.45
Rural	-3.0	116.8	113.8				0.50
Chad (1997)							
National	-4.6	107.8	103.2	-15.0	-20.5	-5.5	0.83
Urban	-0.2	115.4	115.2				0.04
Rural	-5.7	100.4	94.7				1.12
Comoros (1996)							
National	-3.7	68.6	64.9	10.9	6.6	-4.3	1.07
Urban	-0.4	56.6	56.2				0.15
Rural	-4.8	67.6	62.8				1.40
Cote d'Ivoire (1994)							
National	-3.1	83.3	80.2	21.1	19.7	-1.4	0.72
Urban	-2.2	66.1	63.9				0.65
Rural	-3.6	87.2	83.6				0.80
Ghana (1993, 1998)							
National	-2.6	62.3	59.8	23.4	22.8	-0.6	0.81
Urban	-2.2	42.3	40.1				1.01
Rural	-2.8	65.7	62.9				0.83
Kenya (1993, 1998)							
National	0.6	73.5	74.1	12.1	11.8	-0.3	-0.16
Urban	1.0	64.6	65.6				-0.28
Rural	0.7	76.7	77.4				-0.17
Madagascar (1992, 1997)							
National	-2.6	93.3	90.6	27.1	26.4	-0.7	0.54
Urban	-1.9	69.4	67.5				0.53
Rural	-2.6	96.5	93.9				0.51

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Appendix Table A4: Infant Mortality Rates & Achievement Indices continued

Country (DHS years)	Rates of Change	IMR in Year Prior	IMR in Last Survey Year	Urban-rural differences in IMR: Year Prior	Urban-rural differences in IMR: Last Survey Year	Urban-rural differences in IMR: Difference	Improvement Index
Malawi (1992)							
National	-0.4	146.8	146.4	5.8	2.0	-3.8	0.05
Urban	3.0	141.4	144.4				-0.40
Rural	-0.8	147.2	146.4				0.11
Mali (1987, 1995)							
National	-3.6	132.0	128.4	45.5	44.7	-0.8	0.52
Urban	-2.9	95.0	92.1				0.58
Rural	-3.7	140.5	136.8				0.51
Mozambique (1997)							
National	-10.3	120.8	110.4	21.3	7.7	-13.6	1.70
Urban	0.5	92.5	93.0				-0.10
Rural	-13.1	113.8	100.7				2.33
Namibia (1992)							
National	-2.4	59.7	57.3	9.7	11.2	1.5	0.78
Urban	-3.4	50.9	47.5				1.32
Rural	-1.9	60.6	58.7				0.61
Niger (1992, 1997)							
National	-2.9	140.1	137.1	68.5	67.8	-0.7	0.40
Urban	-2.3	80.3	78.0				0.54
Rural	-2.9	148.7	145.8				0.38
Nigeria (1990, 1999)							
National	-2.0	77.2	75.2	6.6	4.8	-1.8	0.50
Urban	-0.5	71.2	70.7				0.14
Rural	-2.4	77.9	75.5				0.59
Rwanda (1992)							
National	-2.6	88.5	85.8	-23.6	-30.8	-7.2	0.58
Urban	4.2	108.0	112.2				-0.73
Rural	-3.0	84.4	81.4				0.70
Senegal (1986, 1992, 1997)							
National	-3.0	68.3	65.3	45.3	56.6	11.3	0.86
Urban	-2.7	40.5	37.8				1.30
Rural	8.6	85.8	94.4				-1.82
Tanzania (1991, 1996, 1999)							
National	-0.9	103.8	103.0	22.6	23.5	0.9	0.16
Urban	-1.6	85.1	83.5				0.35
Rural	-0.7	107.7	107.0				0.12
Togo (1988,1998)							
National	-1.3	81.9	80.6	9.7	8.8	-0.9	0.32
Urban	-0.6	73.7	73.1				0.16
Rural	-1.5	83.4	81.9				0.36
Uganda (1988, 1995)							
National	-3.0	88.8	85.7	11.8	11.9	0.1	0.67
Urban	-3.1	75.5	72.4				0.80
Rural	-3.0	87.3	84.3				0.67

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Appendix Table A4: Infant Mortality Rates & Achievement Indices continued

Country (DHS years)	Rates of Change	IMR in Year Prior	IMR in Last Survey Year	Urban-rural differences in IMR: Year Prior	Urban-rural differences in IMR: Last Survey Year	Urban-rural differences in IMR: Difference	Improvement Index
Zambia (1992, 1996)							
National	-4.8	119.0	114.3	-1.1	-6.3	-5.2	0.78
Urban	5.1	125.0	130.1				-0.76
Rural	-0.2	124.0	123.8				0.03
Zimbabwe (1988, 1994)							
National	6.7	70.9	77.6	15.3	14.0	-1.3	-1.72
Urban	1.1	49.4	50.5				-0.42
Rural	-0.1	64.6	64.5				0.04

Appendix Table A5: Percent of Births Attended by Skilled Health Personnel & Achievement Indices

Country (DHS years)	Year Prior to Survey	Survey Year	Annual Rate of Change	Urban-Rural ratio in Year Prior to Survey	Urban-Rural ratio in Survey Year	Difference	Improvement index
Benin (1996)							
National	64.2	63.2	-1.0	23.5	24.4	0.9	-0.58
Urban	80.2	80.1	-0.1				-0.14
Rural	56.7	55.7	-1.0				-0.51
Burkina Faso (1992,1999)							
National	29.4	28.0	-1.4	68.2	69.4	1.2	-0.43
Urban	91.9	92.0	0.1				0.28
Rural	23.7	22.6	-1.1				-0.31
Burundi (1987)							
National	18.1	17.2	-0.9	67.1	65.7	-1.4	-0.23
Urban	83.2	81.1	-2.1				-2.51
Rural	16.1	15.4	-0.7				-0.17
Cameroon (1991, 1997)							
National	58.0	57.4	-0.6	37.0	37.5	0.5	-0.28
Urban	85.3	85.6	0.3				0.44
Rural	48.3	48.1	-0.2				-0.07
Central African Republic (1994)							
National	50.1	35.1	-15.0	55.2	52.3	-2.9	-5.70
Urban	79.0	74.1	-4.9				-4.60
Rural	23.8	21.8	-2.0				-0.56
Chad (1997)							
National	12.8	11.4	-1.4	36.5	35.2	-1.3	-0.35
Urban	42.0	40.1	-1.9				-0.71
Rural	5.5	4.9	-0.6				-0.15
Comoros (1996)							
National	51.5	50.9	-0.6	35.0	30.1	-4.9	-0.28
Urban	78.9	75.4	-3.5				-3.37
Rural	43.9	45.3	1.4				0.55
Cote d'Ivoire (1994)							
National	45.2	40.3	-4.9	46.2	48.1	1.9	-1.85
Urban	75.7	75.2	-0.5				-0.41
Rural	29.5	27.1	-2.4				-0.72
Ghana (1993, 1998)							
National	45.5	45.8	0.3	46.2	46.4	0.2	0.13
Urban	80.1	80.6	0.5				0.57
Rural	33.8	34.2	0.4				0.12
Kenya (1993, 1998)							
National	42.7	42.1	-0.6	35.8	35.9	0.1	-0.23
Urban	72.4	71.8	-0.6				-0.50
Rural	36.7	35.9	-0.8				-0.27
Madagascar (1992, 1997)							
National	47.6	46.3	-1.3	28.3	28.1	-0.2	-0.54
Urban	70.3	68.6	-1.7				-1.20
Rural	42.0	40.5	-1.5				-0.55

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Appendix Table A5: Percent of Births Attended by Skilled Health Personnel & Achievement Indices continued

Country (DHS years)	Year Prior to Survey	Survey Year	Annual Rate of Change	Urban-Rural ratio in Year Prior to Survey	Urban-Rural ratio in Survey Year	Difference	Improvement index
Malawi (1992)							
National	53.4	51.6	-1.8	36.6	38.9	2.3	-0.83
Urban	86.0	86.4	0.4				0.62
Rural	49.4	47.5	-1.9				-0.82
Mali (1987, 1995)							
National	38.1	39.8	1.7	54.7	54.1	-0.6	0.60
Urban	79.1	80.1	1.0				1.03
Rural	24.4	26.0	1.6				0.45
Mozambique (1997)							
National	41.8	36.5	-5.3	51.5	57.6	6.1	-1.89
Urban	84.2	87.3	3.1				4.72
Rural	32.7	29.7	-3.0				-0.94
Namibia (1992)							
National	69.1	69.0	-0.1	26.8	26.4	-0.4	-0.06
Urban	87.8	88.4	0.6				1.09
Rural	61.0	62.0	1.0				0.57
Niger (1992, 1997)							
National	17.3	17.6	0.3	62.2	61.7	-0.5	0.08
Urban	69.6	69.5	-0.1				-0.10
Rural	7.4	7.8	0.4				0.09
Nigeria (1990, 1999)							
National	42.3	42.8	0.5	22.4	21.5	-0.9	0.18
Urban	58.7	58.3	-0.4				-0.20
Rural	36.2	36.8	0.6				0.19
Rwanda (1992)							
National	26.3	26.5	0.2	41.2	39.4	-1.8	0.06
Urban	65.4	63.8	-1.6				-0.95
Rural	24.2	24.4	0.2				0.06
Senegal (1986, 1992, 1997)							
National	51.2	52.8	1.6	51.0	50.1	-0.9	0.74
Urban	84.9	85.7	0.8				1.17
Rural	33.9	35.6	1.7				0.57
Tanzania (1991, 1996)							
National	39.3	37.1	-2.2	47.8	49.1	1.3	-0.79
Urban	78.9	78.0	-0.9				-0.95
Rural	31.2	28.9	-2.3				-0.70
Togo (1988,1998)							
National	49.5	49.7	0.2	48.6	49.1	0.5	0.10
Urban	87.4	88.1	0.7				1.29
Rural	38.7	39.0	0.3				0.09
Uganda (1988, 1995)							
National	36.1	35.2	-0.9	46.7	46.8	0.1	-0.31
Urban	78.6	78.1	-0.5				-0.45
Rural	31.8	31.3	-0.5				-0.17

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Appendix Table A5: Percent of Births Attended by Skilled Health Personnel & Achievement Indices continued

Country (DHS years)	Year Prior to Survey	Survey Year	Annual Rate of Change	Urban-Rural ratio in Year Prior to Survey	Urban-Rural ratio in Survey Year	Difference	Improvement index
Zambia (1992, 1996)							
National	45.5	44.3	-1.2	51.2	50.9	-0.3	-0.45
Urban	76.6	75.9	-0.7				-0.60
Rural	25.3	25.0	-0.3				-0.09
Zimbabwe (1988, 1994)							
National	70.5	70.8	0.3	28.5	28.5	0.0	0.24
Urban	91.1	91.1	0.0				0.11
Rural	62.5	62.6	0.1				0.04

Appendix Table A6: Percent of Women* Who Use Modern Contraceptive Methods & Achievement Indices

Country (DHS years)	Year Prior to Survey	Survey Year	Annual Rate of Change	Urban-Rural Differences in … Year Prior to Survey	Urban-Rural Differences in … Survey Year	Urban-Rural Differences in … Difference	Improvement index
Burkina Faso (1992,1999)							
National	6.2	8.1	1.9	20.1	26.5	6.4	0.44
Urban	22.5	30.4	7.9				2.34
Rural	2.4	3.9	1.5				0.34
Cameroon (1991, 1997)							
National	8.4	14.4	6.0	7.8	11.7	4.0	1.47
Urban	13.0	21.6	8.5				2.25
Rural	5.3	9.9	4.6				1.07
Ghana (1993, 1998)							
National	7.3	15.1	7.8	5.6	4.7	-0.9	1.91
Urban	11.1	18.2	7.0				1.79
Rural	5.5	13.5	8.0				1.91
Kenya (1993, 1998)							
National	23.5	36.7	13.2	13.0	12.9	-0.1	4.10
Urban	34.6	46.5	11.9				4.37
Rural	21.6	33.6	12.0				3.62
Madagascar (1992, 1997)							
National	8.1	12.3	4.1	17.0	10.8	-6.2	1.00
Urban	21.8	20.1	-1.7				-0.47
Rural	4.8	9.3	4.5				1.05
Mali (1987, 1995)							
National	1.7	7.7	6.1	5.8	15.8	10.1	1.38
Urban	5.9	18.9	12.9				3.21
Rural	0.2	3.0	2.9				0.63
Niger (1992, 1997)							
National	4.2	8.5	4.3	16.2	23.1	6.9	1.00
Urban	17.7	26.7	9.0				2.51
Rural	1.5	3.6	2.1				0.46
Nigeria (1990, 1999)							
National	5.8	15.6	9.7	11.5	12.0	0.4	2.37
Urban	14.7	23.7	9.0				2.43
Rural	3.2	11.8	8.6				2.02
Senegal (1986, 1992, 1997)							
National	5.2	11.7	6.5	12.0	22.1	10.1	1.54
Urban	12.6	25.4	12.8				3.44
Rural	0.6	3.3	2.7				0.60
Tanzania (1991, 1996)							
National	10.6	21.9	11.3	13.4	23.9	10.5	2.93
Urban	20.9	38.9	18.1				5.63
Rural	7.5	15.1	7.6				1.86

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Appendix Table A6: Percent of Women* Who Use Modern Contraceptive Methods & Achievement Indices continued

Country (DHS years)	Year Prior to Survey	Survey Year	Annual Rate of Change	Urban-Rural Differences in … Year Prior to Survey	Survey Year	Difference	Improvement index
Togo (1988,1998)							
National	4.2	11.7	7.5	6.9	9.7	2.8	1.78
Urban	9.1	18.0	8.9				2.24
Rural	2.2	8.3	6.1				1.39
Uganda (1988, 1995)							
National	5.3	11.3	5.9	18.9	21.5	2.6	1.40
Urban	22.3	29.1	6.8				2.00
Rural	3.4	7.6	4.2				0.96
Zambia (1992, 1996)							
National	15.2	19.1	3.9	19.3	16.3	-3.1	1.03
Urban	24.6	27.6	3.0				0.88
Rural	5.2	11.3	6.1				1.44
Zimbabwe (1988, 1994)							
National	50.3	53.8	3.5	22.3	16.7	-5.5	1.59
Urban	65.6	65.2	-0.4				-0.25
Rural	43.4	48.5	5.1				2.06

* Women who "need" acces to reproductive health services (i.e. those not seeking to get pregnant)

Appendix Table A7: Stunting Rates & Achievement Indices

Country (DHS years)	Stunting in Year of . . . First Survey	Stunting in Year of . . . Last Survey	Difference	Urban-Rural Stunting Differences First Survey	Urban-Rural Stunting Differences Last Survey	Urban-Rural Stunting Differences Difference	Improvement index
Burkina Faso (1992,1999)							
National	33.4	37.0	3.6	15.8	16.3	0.5	-2.24
Urban	20.0	22.7	2.7				-2.74
Rural	35.9	39.0	3.2				-1.84
Cameroon (1991, 1997)							
National	25.6	29.9	4.2	14.5	9.9	-4.6	-3.32
Urban	17.0	22.6	5.6				-6.14
Rural	31.5	32.5	0.9				-0.64
Ghana (1993, 1998)							
National	29.9	26.1	-3.8	6.8	15.3	8.4	2.98
Urban	25.1	14.6	-10.4				11.66
Rural	31.9	29.9	-2.0				1.39
Kenya (1993, 1998)							
National	33.8	33.6	-0.2	13.3	9.6	-3.8	0.12
Urban	22.0	25.7	3.7				-3.36
Rural	35.3	35.2	-0.1				0.05
Madagascar (1992, 1997)							
National	54.5	48.8	-5.7	11.0	4.4	-6.6	2.41
Urban	45.0	45.2	0.2				-0.10
Rural	56.0	49.6	-6.4				2.62
Mali (1987, 1995)							
National	24.0	29.9	5.9	6.7	11.4	4.7	-4.77
Urban	19.6	21.5	1.9				-2.05
Rural	26.3	32.9	6.6				-4.89
Niger (1992, 1997)							
National	39.7	41.3	1.6	15.1	11.7	-3.4	-0.87
Urban	27.4	31.5	4.1				-3.05
Rural	42.5	43.3	0.7				-0.36
Nigeria (1990, 1999)							
National	43.2	47.0	3.8	10.5	5.5	-5.0	-1.81
Urban	35.1	43.0	7.9				-4.39
Rural	45.7	48.5	2.9				-1.33
Senegal (1986, 1992, 1997)							
National	23.3	24.8	1.5	9.2	15.5	6.3	-1.38
Urban	17.5	15.1	-2.3				3.10
Rural	26.6	30.7	4.0				-3.05

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Appendix Table A7: Stunting Rates & Achievement Indices continued

Country (DHS years)	Stunting in Year of . . . First Survey	Stunting in Year of . . . Last Survey	Difference	Urban-Rural Stunting Differences First Survey	Urban-Rural Stunting Differences Last Survey	Urban-Rural Stunting Differences Difference	Improvement index
Tanzania (1991, 1999)							
National	43.9	42.6	-1.2	7.1	21.9	14.8	0.60
Urban	38.2	24.6	-13.6				9.58
Rural	45.3	46.5	1.2				-0.56
Togo (1988,1998)							
National	29.7	22.0	-7.7	11.9	9.2	-2.6	6.53
Urban	21.2	14.9	-6.3				7.63
Rural	33.1	24.1	-8.9				6.84
Uganda (1988, 1995)							
National	44.8	39.3	-5.5	20.9	18.3	-2.7	2.83
Urban	25.8	23.4	-2.4				2.13
Rural	46.7	41.6	-5.1				2.50
Zambia (1992, 1996)							
National	40.2	42.8	2.7	13.6	16.1	2.5	-1.39
Urban	33.0	33.1	0.2				-0.11
Rural	46.6	49.3	2.7				-1.20
Zimbabwe (1988, 1994)							
National	29.1	27.1	-2.0	19.2	8.3	-10.9	1.55
Urban	14.5	21.5	7.0				-8.61
Rural	33.7	29.8	-3.9				2.67

Appendix Table A8: Rates of Female Adult Malnutrition & Achievement Indices

Country (DHS years)	Malnourishment in First Survey	Malnourishment in Last Survey	Difference	Urban-Rural Differences First Survey	Urban-Rural Differences Last Survey	Urban-Rural Differences Difference	Improvement index
Burkina Faso (1992,1999)							
National	13.6	12.4	-1.1	5.2	4.0	-1.2	2.19
Urban	9.2	8.9	-0.3				0.90
Rural	14.4	12.9	-1.5				2.77
Ghana (1993, 1998)							
National	11.3	10.6	-0.7	2.5	7.3	4.8	1.70
Urban	9.6	5.2	-4.4				15.58
Rural	12.0	12.5	0.5				-0.94
Kenya (1993, 1998)							
National	9.3	10.8	1.5	6.1	4.9	-1.1	-3.94
Urban	4.0	6.8	2.8				-13.43
Rural	10.1	11.8	1.7				-3.88
Niger (1992, 1997)							
National	17.5	19.0	1.5	6.8	7.5	0.7	-2.09
Urban	11.7	12.7	1.0				-1.99
Rural	18.5	20.1	1.6				-2.15
Tanzania (1991, 1996)							
National	8.9	8.7	-0.1	4.0	1.6	-2.4	0.42
Urban	5.7	7.4	1.7				-6.65
Rural	9.8	9.0	-0.7				1.98
Zambia (1992, 1996)							
National	9.6	8.2	-1.4	4.1	2.1	-2.0	3.97
Urban	7.4	6.9	-0.4				1.58
Rural	11.5	9.1	-2.5				6.12
Zimbabwe (1994, 1999)							
National	4.6	5.4	0.8	3.4	0.8	-2.7	-4.13
Urban	2.1	5.0	2.9				-22.12
Rural	5.5	5.7	0.2				-0.95

Malnourished defined as adults with BMI <= 18.49