DHS Comparative Reports 6

The DHS Wealth Index

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Contents

Foreword

This comparative report on the Demographic and Health Survey (DHS) wealth index documents the background, decisions taken, and procedures used in constructing the index and provides examples of its use. Because of the timing of the report and contractual obligations, no results from the most recently conducted surveys can be provided at this time. A subsequent revision of this report will include these results.

Preface

One of the most significant contributions of the MEASURE *DHS+* program is the creation of an internationally comparable body of data on the demographic and health characteristics of populations in developing countries. The *DHS Comparative Reports* series examines these data across countries in a comparative framework. The DHS *Analytical Studies* series focuses on specific topics. The principal objectives of both series are to provide information for policy formulation at the international level and to examine individual country results in an international context. Whereas *Comparative Reports* are primarily descriptive, *Analytical Studies* take a more analytical approach.

The *Comparative Reports* series covers a variable number of countries, depending on the availability of data sets. Where possible, data from previous DHS surveys are used to evaluate trends over time. Each report provides detailed tables and graphs organized by region. Survey-related issues such as questionnaire comparability, survey procedures, data quality, and methodological approaches are addressed as needed.

The topics covered in *Comparative Reports* are selected by MEASURE *DHS+* staff in conjunction with the MEASURE *DHS+* Scientific Advisory Committee and USAID. Some reports are updates and expansions of reports published previously.

It is anticipated that the availability of comparable information for a large number of developing countries will enhance the understanding of important issues in the fields of international population and health by analysts and policymakers.

Martin Vaessen
Project Director

Acknowledgments

Executive Summary

Typically, fertility surveys and demographic and health surveys have included little information on economic status. In the past, socioeconomic status has been determined using the education level of the respondent and/or spouse, sometimes in combination with their own or their spouse's occupation. A few studies have used household construction, mostly type of flooring, as an economic indicator, and some others have combined several housing characteristics into ad hoc indexes. The DHS wealth index is an attempt to make better use of existing data in the Demographic and Health Surveys in a systematic fashion to determine a household's relative economic status.

This report documents the philosophy, history, and background of the DHS wealth index and describes the methodology employed in its construction and the decisions made about possible variations in the methodology. After discussion of the advantages and disadvantages of using a wealth index as opposed to income and expenditure measures of economic status, a comparison is made between the wealth index and the expenditure index in a particular setting. This comparison shows that the wealth index explains the same or a greater amount of the differences between households on a set of health indicators, even though the wealth index requires far less effort from respondents, interviewers, data processors, and analysts.

Comparisons are made for five selected countries in the distribution of wealth among households and for some key demographic and social indicators. Additionally, as examples, key health, education, and use of public services indicators are tabulated according to quintile of the population distribution of household wealth, and comparative results for health indicators in the poorest quintile are presented for 44 countries.

The use of the wealth index for addressing the needs of the poor is discussed and illustrated through poverty maps and nongeographic analysis. Also discussed is the joining of the wealth index to more traditional measures of poverty. Finally, suggestions are offered for extension of the DHS wealth index, both by inclusion of additional items and by refinement of the methodology of calculation.

I   Introduction

The purpose of this report is to give the background, philosophy, and construction of the wealth index based on the Demographic and Health Surveys (DHS); to compare the wealth index with other measures of economic status; and to give examples of how such an index has been and can be used.

1.1   Background

History

Socioeconomic status has been long thought to be associated with health status. Current interest in using the DHS survey for measuring health outcomes by socioeconomic status dates back to preparations for the World Health Organization's 1997 conference, "Health Equity for All in the New Millennium." Shea Rutstein, a member of the DHS staff at ORC Macro, was contacted by an organizer of the conference, Paula Braveman at the University of California, San Francisco, to discuss how DHS data could be used to measure and monitor health equity. Discussions between Rutstein and Braveman led to a host of equity differentials that were considered for the conference.

Prior to this, Rutstein had produced a rough indicator of economic status, based on assets and services (wealth index), for internal use by ORC Macro. Rutstein used this indicator as part of his presentation of measures of health equity in the DHS survey, using the then recently completed 1996 Zambia DHS. The health equity conference was also attended by Davidson Gwatkin of the World Bank, another organization that was becoming increasingly interested in poverty indicators.

Shortly after the conference, Rutstein was asked to make a presentation to World Bank staff. One of the issues discussed during the presentation was the weighting of the specific variables used to produce the index. This weighting had been done on an ad hoc basis by Rutstein. Two attendees at the presentation, Lant Pritchett and Deon Filmer, suggested that factor analysis (or principal components analysis) could be used to determine the variable weightings. Pritchett and Filmer proceeded to undertake an analysis of education based on the wealth index for India, using the 1992-93 National Family Health Survey (NFHS), a DHS-type survey. To validate the wealth index as a measure of economic status, they compared results from neighboring countries, using the World Bank's Living Standard Measurement Surveys (LSMS), for the wealth index and consumption expenditures. They concluded that the wealth index actually performed better than the traditional consumption expenditure index in explaining differences in educational attainment and attendance (Filmer and Pritchett, 2001).

Soon after, ORC Macro was awarded a contract with the World Bank to develop wealth indexes for recent surveys and to produce a set of "poverty health indicators." Reports for 44 countries were produced by Shea Rutstein and Kiersten Johnson (also at ORC Macro), together with Davidson Gwatkin, Rohini Pande, and Adam Wagstaff of the World Bank. These reports included 33 poverty health indicators for the entire country, urban and rural areas, and males and females, by quintiles of households according to wealth.

A second contract between the World Bank and ORC Macro provided for the formulation of wealth indexes for an additional 37 countries and a total of 162 health and education indicators for all 81 countries. These indexes and indicators are currently being produced. Additionally, sampling errors for each quintile and a concentration index and its standard error are also being calculated.

Equity

Fairness in health is related to several concepts: equality in health status, equality in health services, and equity in health services. A further distinction can be made for fairness at the individual and societal

levels. Our work has concerned fairness at the societal level, that is, among groups of people rather than between individuals. Equality in health status is probably impossible to achieve, even at the societal level, because of the differing environmental, cultural, and genetic factors involved; it would not be desirable if it meant reducing the health status of those who are relatively healthy. Equality in health services is a theoretical possibility, but given inequalities in health status, it is not desirable. The third concept is equity in health services, which means access to services according to need. This is obvious on an individual basis, since healthier people generally need to use health services less. On a societal basis, there can also be differing needs for services. An obvious example is equity between women and men: men do not need access to maternal health services.

On the societal level, equity in health services can be measured for several important groupings. Among those usually considered are groupings by gender, area of residence, occupation, education, ethnic and language groups, migration status, and economic status.

Thus, a main reason for constructing a measure of economic status is to ascertain the equity of health programs and other publicly or privately provided services. There are three principal indicators of economic status: household income, household consumption expenditures, and household wealth.

1.2   Household Income

For many economists, household income is the theoretical indicator of choice. However, it is extremely difficult to measure accurately for a number of reasons:

1) Many, if not most, people do not know their income or only know it in broad ranges. This lack of knowledge is especially true in less developed countries where a) there are no income taxes for most families, so that an annual accounting of income is not made, and b) many, if not most, families have self-employed earners and/or home production, and therefore costs of goods sold or produced are not recorded, no depreciation is calculated, and in the case of retail commerce, some of the goods bought wholesale are used for consumption.

2) Most people try to hide their income from interviewers, especially if the interviewers are from a government agency. Those hiding income include both poor people (to appear poorer and therefore get assistance or additional assistance) and rich people (fearful of the possibility of taxation, political repercussions, and robbery).

3) Many different members may be earners and a) do not share all of their income with the rest of the household and b) do not inform other household members of their income.

4) An earner may have several sources of income at one time or during a given period of time: a) more than one place of employment, b) sales on the side, c) illicit income, and d) obtaining goods and services through theft (such as connecting to the electrical system and bypassing the meter).

5) In many households and for many if not most earners, income is variable daily, weekly, or seasonally.

6) There is a problem of how to value home production and unpaid production of goods and services: For example, when does a garden become a principal source of livelihood? Should time taken off for personal benefit, such as building one's own dwelling, be valued as income at the going wage rate for laborers?

7) The reporting of unearned income is problematic, such as that gained through interest on loans, property rents, or gambling winnings.

For these reasons, obtaining valid information on household income requires a long and detailed interview with each member of the household over about age 12 (and sometimes younger). In the DHS setting, this process would be so time-consuming as to preclude asking questions on other topics.

1.3   Household Consumption Expenditures

One proposed alternative is using consumption expenditures as a proxy for income. This is based on the basic economic division of income by use: $Y = C + S + T$ (where Y is income, C is consumption, S is savings, and T is taxes). It presumes that savings and taxes are almost nil or are proportional to income so that the distribution of income does not change with the level of income and that savings do not vary among households at the same level of income. These presumptions are clearly not true, but household consumption expenditures are often used as a proxy for household income so that measures have a monetary value.

Measuring consumption expenditures has many of the drawbacks of measuring income.

1) Expenditures are made by the different members of the household. Alcoholic beverages may be bought by the adult males, and foods and cosmetics may be purchased by the adult females. Children may also buy food and snacks. Adolescents may spend a large amount of their own earnings on CDs, music equipment, and clothing. However, household consumption expenditures typically are obtained from one adult household member who is at home when the interviewer arrives, and expenditures by other members may be omitted or misstated.

2) Most expenditure surveys have been conducted to ascertain a market basket of goods and services in order to calculate a consumption price index. This approach uses a set number of items that are usually consumed daily, such as foods. However, for proper assessment of economic status, a much more extensive list of items needs to be included, many of which are large and irregular or with few periodic payments. Examples are purchases of vehicles and household appliances, holiday and birthday gifts, and school uniforms and textbooks, as well as payment of school fees.

3) Even with a long list of consumption items, there are questions as to what period of time should be covered (e.g., the past 24 hours or past seven days for foods, the past 30 days for other items such as payment for electricity and phone service, or purchases of clothing).

4) Whether to include other expenditures is still being debated: should all health expenditures, only routine health expenditures, or no health expenditures be included in overall expenditures? Should loan payments be included? Should large irregular expenditures, such as those for festivals, weddings, and funerals, be included? What about purchases of construction materials for one's own dwelling?

A common problem with both household income and consumption expenditures is their volatility. Income is very changeable in less developed countries, on both a seasonal and random basis. Households try to maintain core and nondiscretionary consumption expenditures in periods of declining income, but not discretionary expenditures. However, the economic status of households is better measured by discretionary expenditures, which may be more volatile than income itself. Since health outcomes and behaviors are probably more related to "permanent income" than current income, both measures of current income and current expenditures will not properly represent underlying differentials in health (Friedman, 1957).

1.4   Household Wealth

As a measure of economic status, wealth has several advantages. It represents a more permanent status than does either income or consumption. In the form that it is used, wealth is more easily measured (with only a single respondent needed in most cases) and requires far fewer questions than either consumption expenditures or income.

Philosophy of the Wealth Index

Wealth or its equivalent, net assets, is a theoretically measurable quantity. One can imagine making a list of all assets (including both physical and monetary assets), assigning them a value based on the market, depreciating them, and summing the values. The same can be done for debts, and then the debts can be subtracted from the assets to determine net assets. However, this procedure has the same problems as income and expenditures. Fortunately, there is another way to measure relative wealth that can be used to ascertain a household's relative economic status.

Wealth can be considered as an underlying unobserved variable. One then needs to have indicator variables that are associated with a household's relative position in the distribution of the underlying wealth factor. DHS surveys have collected a number of such indicator variables, usually for purposes other than ascertaining economic status, but which are thought to be correlated with a household's economic status. Figure 1.1 shows how certain goods and services may be associated with an underlying wealth scale.

Figure 1.1 Assumed distribution of assets and services
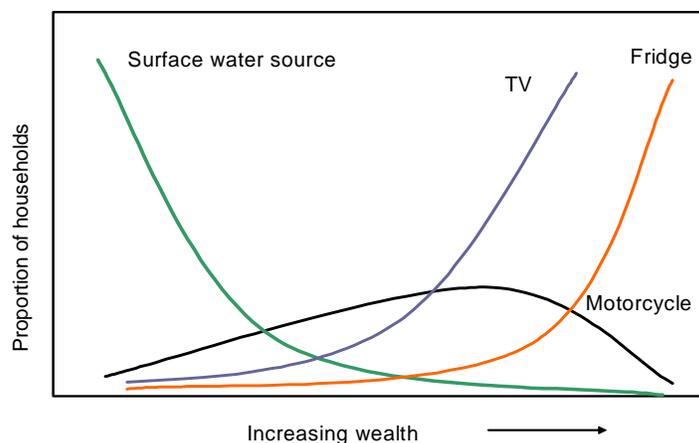
In this figure, the proportion of households having a TV and a refrigerator (fridge) increases with increasing household wealth, while the proportion of households with a surface source (pond, lake, stream) of drinking water declines. The relationships are not linear, however, as indicated in the figure. Some goods or services, such as motorcycles, may have an intermediate relationship, at first increasing and then decreasing in prevalence, as wealth increases.

Table 1.1 shows the usual assets and services collected in DHS surveys.

Table 1.1 Assets and services usually asked about in DHS surveys	
Type of flooring	Refrigerator
Water supply	Type of vehicle
Sanitation facilities	Persons per sleeping room
Electricity	Ownership of agricultural land
Radio	Domestic servant
Television	Country-specific items
Telephone	

Information on each of these items was collected for purposes other than determining wealth. Flooring type is associated with diarrhea in young children as are water supply and sanitation facilities. Television and radio were included to ascertain who was able to receive mass media health messages. Vehicle possession and type are related to emergency medical transportation possibilities. Having a nonelectric source of lighting and having several persons per sleeping room are thought to be related to increased transmission of respiratory illness. Two other indicators of wealth are generated from other variables: 1) household ownership of agricultural land (from type of land worked by respondent and her spouse), and 2) presence of a domestic servant (from type of occupation of respondent and her spouse and their relationship to the head of the household, i.e., being unrelated).

1.5   Economic Status versus Socioeconomic Status

There are two other principal types of variables that are normally associated with socioeconomic status: type of occupation and level of education. These two types of variables were deliberately left out of the set of indicator variables for the wealth index so that a pure economic variable could be determined. Also, education and occupation each have their own effects on health status and use of health services, which may offset low economic status. Certain occupations provide health insurance, and higher levels of education allow for increased capacity of home care through knowledge gained from books and other materials.

1.5.1   Establishing a Poverty Line

To determine who is poor, a poverty line needs to be established. There are many ways in which poverty lines have been determined. A consideration that needs to be made is whether poverty is relative or absolute. In reality, both concepts are valid and useful. A person who would not be considered poor in one country may still be economically (and politically) disadvantaged in another because other people may have a higher economic position. Another consideration is whether national or international standards should be used. These decisions depend on how the poverty indicators are to be used. Table 1.2 shows the different combinations and associated criteria.

Table 1.2 Bases of poverty lines		
Poverty line	National criteria	International criteria
Absolute poverty	Minimum wage	$1.00 per person per day of purchasing power
	National minimum calorie consumption	Internationally determined minimum calorie consumption
Relative poverty	National percent distribution	International percent distribution

Most countries have a national poverty line based on household income. In the United States, for example, the poverty line is based on a baseline food market basket providing a minimum number of calories multiplied by the inverse of the recommended proportion of expenditures on food to total income for varying family sizes. This poverty line was established many years ago and is adjusted by the consumer price index. One of its drawbacks is that the calorie needs and the market basket to supply them have not changed since their inception. (See Appendix A for a summary of the development of the poverty line in the U.S. by Gordon Fisher.)

Other countries use the minimum wage as the basis for an absolute poverty line. However, in most countries the minimum wage is politically determined and adjusted infrequently for the effects of inflation. The World Bank's "dollar-a-day" criterion is also arbitrary. In many countries, almost no one would be considered poor under this criterion: a family of four would have to have income of less than $1,460 per year. Another problem is that there is no adjustment for differences in publicly provided and subsidized goods and services and taxation, climate differences requiring heating and additional clothing, and so forth.

A poverty line based on a national percentile distribution of households by economic status, such as wealth quintiles, is useful in assessing the reach of public health programs for both the poorer and richer sections of society. Often the poverty line is drawn at the 20th, 33rd, or 40th percentile. A set poverty line based on a national distribution is useful for comparison across countries and often shows similar results for health measures in different countries. The national quintile distribution can be made compatible with a national absolute poverty line if data are available on the percentage of the population below the absolute poverty line. This same percentage can then be used in a distribution of households on a relative index basis, such as the wealth index.

1.6   Issues Regarding An Index of Economic Status

There are several issues that can be raised regarding an index of economic status, particularly, a wealth index. These concern the handling of publicly provided goods and services, the direct effects of the indicator variables that make up indexes, adjustment for differing household needs based on size and age distribution, and the use to which the index will be put. Some of these issues also pertain to household income and consumption indexes.

1.6.1 Public Services

Certain services that could be included among the indicator variables are usually publicly provided, such as electricity and piped water. The question is whether they also reflect the economic status of a household or whether only privately acquired assets and services should be included. In the DHS wealth index, publicly provided services are included with the following reasoning: 1) Wealthy households will tend to reside in areas that provide such services, both through their decision of where to live and because of political pressure to provide these services, and 2) the provision of publicly provided services increases economic position by lowering the costs that would otherwise be incurred (such as candles and kerosene for lighting) and allowing greater productivity (such as better use of the time taken to get water).

1.6.2 Individual Effects

Indicator variables can have their own direct effects over health and the use of health services; for example, poor sanitation is associated with an increased prevalence of diarrheal disease. Almost every indicator variable in the existing DHS surveys was included for its direct effect, rather than for measuring economic status. Thus, the question is raised as to whether the effect is due to overall economic status or to direct effects of the component indicators. This would be a problem with the use of very few indicator

variables, and the correlation of the indicator variables with the index is not very high when more than a few are used. Moreover, correlation of the indicator variables with the health outcome variables is not high, and many of the outcomes and services to be analyzed, such as family planning services, fertility rates, and vaccination rates, are not directly related to indicator variables. Upcoming DHS surveys may include variables that specifically measure economic status and are not directly related to health status and services (see below).

1.6.3 Equivalization—Adjusting for Household Needs (Size and Age)

The size and age structure of households affect their needs. Total household income and consumption expenditures need to be adjusted for size and age structure to properly represent the household's economic position. A household with twice the income but with twice the number of members is not twice as well off. However, the relationship between size and income or expenditure is not lineal. This is because many goods and services can be shared among the members (e.g., appliances, heating, lighting) and because children, depending on their ages, place smaller demands on many goods and services (e.g., food, space, transportation).

It is less clear that a wealth index needs to be equivalized (adjusted for size and age distribution of the household through the calculation of the number of adult equivalent members). Most of the assets and services included as indicator variables are shared between household members, and most are just indicators of possession of at least one or none, rather than quantities. Examples are type of flooring, type of water supply, type of sanitation, and possession of a vehicle. A few component variables, such as number of rooms or number of sleeping rooms, need to be adjusted for household size but most do not. An unpublished investigation, conducted by Rutstein and Johnson of ORC Macro and Wagstaff of the World Bank, showed that dividing the wealth index score for each household by its number of adult equivalent members distorted the economic status distribution and its associations with health status and services, resulting in unreasonable results. Therefore, the index or the majority of its component indicators were not equivalized.

1.6.4 What Are We Trying to Measure?

The employment of a relative index of economic status such as the DHS wealth index depends on the intended use of the index. There are two principal uses for a measure of economic status with regard to health programs: the ability to pay for health services and the distribution of services among the poor.

The ability to pay for health services has been a prime concern of health economists who desire to rationalize services through the charging of user fees. The measures utilized for this purpose are the proportions of income or expenditures that health expenditures make up and the income elasticity of health expenditures. For these purposes an absolute monetary measure of economic status is appropriate. However, information obtained by estimating mean amounts of health expenditure according to a relative index, such as according to wealth quintile, can provide much useful information to policymakers on how to allocate fees.

The distribution of health services to the poor can be determined by a wealth index as well as or better than an income or expenditure index. This is because of the lower volatility of wealth as compared with that of income and expenditures. In analyzing the distribution of health services (and publicly provided health services), only the relative aspect of economic status is used.

2   Construction of the DHS Wealth Index

There are several steps to the construction of the DHS wealth index: determination of indicator variables, dichotomization, calculation of indicator weights and the index value, and calculation of distribution cut points.

2.1   Indicator Variables

The selection of indicator variables is relatively straightforward. Almost all household assets and utility services are to be included, including country-specific items. The reason for using a broad criterion rather than selected items is that the greater the number of indicator variables, the better the distribution of households with fewer households being concentrated on certain index scores. Generally, any item that will reflect economic status is used.

Two additional items are constructed for most surveys: whether there is a domestic servant and whether the household owns agricultural land. The first is constructed by examining the occupation of interviewed members who are not related to the head of the household. If the respondent or spouse works as a domestic servant and is not related to the head, then the household is considered to have a domestic servant. The second is also based on interviewed members. If any interviewed member (related to the head or not) or interviewed member's spouse works his or her own or his or her family's land, then the household is considered to own agricultural land.

Many indicator variables are categorizations. To determine the weights and apply them to form the index, it is necessary to break these variables into sets of dichotomous variables. Figure 2.1 shows an example of the presumed relationship between type of toilet facility and type of flooring with the underlying wealth scale.

Figure 2.1 Underlying Unmeasured Wealth Scale
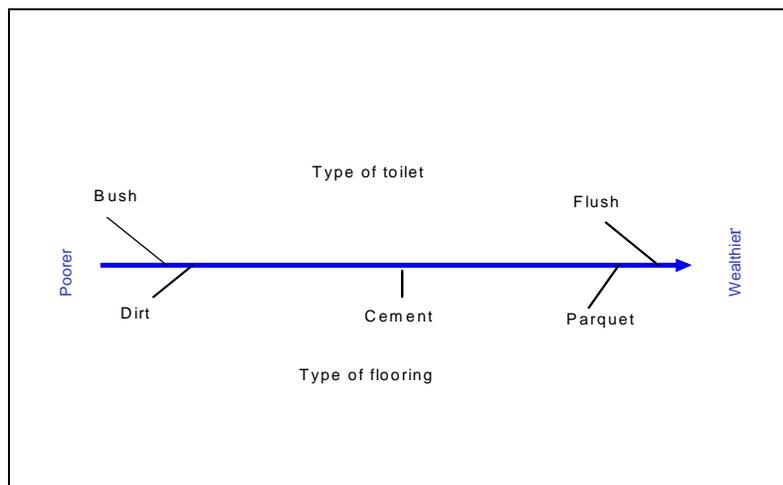
Many times there is no obvious ordering of the categories. For example, are wealthier people more likely to use carpeting or ceramic tiling than parquet? A possibility would be to collapse these categories into a single one, but doing so would decrease the distinctions that could be made between households on the index. Some categories are routinely collapsed in constructing the DHS wealth index. The category "surface water" includes supplies of drinking water from "river," "pond," and "stream," since differences between these categories have more to do with location of source than wealth. Sometimes an indicator

variable is combined with another to form combination categories, which are then dichotomized. This is the case for the variable "shared toilet." The categories of flush toilet and latrine are split by whether they are shared with other households, doubling the number of dichotomies used. However, the category "bush, field" is not split by whether it is used by other households.

As indicated above, the number of sleeping rooms (or total rooms if there is no variable for sleeping rooms) is divided into the number of household members as an equivalization.

It can be seen that the determination of specific indicator variables is somewhat of an art, depending on knowledge of conditions in each country. Sometimes variables need to be removed from the set of indicators in order for the resulting wealth index to make sense. Such is the case for "having a dacha" in the Central Asian Republics. While the term "dacha" is used for the country house of rich Russian families, it can also represent a small cottage or even just a rural garden plot with a small shed that many poor families have as a means of extending their income. When "dacha" was included in the set of indicator variables for the Central Asian Republics, the resulting index changed sign, with wealthier people having lower (negative) index scores than poor people (positive). The anomalous relationship was investigated by consulting with country natives, who recommended excluding this variable. With "dacha" removed, the index righted itself.

2.2   Construction of the Index

There are various ways to assign weighting values to the indicator variables. Ad hoc weights, such as assigning "1" for a bicycle, "3" for a motorcycle, and "5" for a car or truck, work to a certain extent, but they are arbitrary with regard to researcher and are difficult to assign when the wealth ordering is not readily apparent. For this reason, Filmer and Pritchett recommended using principal components analysis (PCA) to assign the indicator weights, the procedure that is used for the DHS wealth index. DHS uses the SPSS factor analysis procedure. This procedure first standardizes the indicator variables (calculating z-scores); then the factor coefficient scores (factor loadings) are calculated; and finally, for each household, the indicator values are multiplied by the loadings and summed to produce the household's index value. In this process, only the first of the factors produced is used to represent the wealth index. The resulting sum is itself a standardized score with a mean of zero and a standard deviation of one.

2.3   Construction of Quintiles

For tabular analysis with the DHS wealth index, quintiles are used. These quintiles are based on the distribution of the household population rather than on the distribution of households. The distribution is population based because it is thought that most analyses are concerned with poor people rather than poor households. Quintiles are used instead of other percentiles as a compromise between limiting the number of categories to be tabulated and adequately representing the relationship between wealth and the phenomenon of interest. Other percentiles can be just as easily determined as quintiles.

The cut points in the wealth index at which to form the quintiles are calculated by obtaining a weighted frequency distribution of households, the weight being the product of the number of de jure members of the household and the sampling weight of the household. Thus, the distribution represents the national household population, where each member is given the wealth index score of his or her household. The persons are then ordered by the score, and the distribution is divided at the points that form the five 20-percent sections. Then the household score is recoded into the quintile variable so that each member of a household also receives that household's quintile category.

One distribution is used for all tabular analyses, rather than separate ones for different analyses, such as quintiles of births for infant mortality or quintiles of currently married women of reproductive age for

contraceptive prevalence rates. A single distribution eliminates confusion that multiple distributions would entail, with having, say, a poor child living with his or her not poor mother. A consequence, however, is that terms such as "the poorest 20 percent of children" or the "richest 40 percent of women" should not be used because they are inaccurate. Rather, "children from the poorest quintile of the household population" is preferred.

For nontabular analyses, such as correlations and multivariate analyses, the individual household score can be used directly, as well as the quintile value.

2.4   Variations

Other procedures have been suggested instead of PCA. One is to use the inverse of the proportion of households with an asset or service as the weight for the indicator. The thinking behind this procedure is that the costlier an item, the wealthier a household needs to be to possess one, giving the highest weights to the least possessed assets. Presumably, "negative assets," such as "having a dirt floor," would be used as inverses (i.e., "not having a dirt floor"). One of the problems with this weighting scheme is that certain assets, such as motorcycles, may be rare since better substitutes, such as a car or truck, are possessed by wealthier households. Additionally, certain items, such as drinking water from a spring, are rarely used, and when they are used, it is usually by poorer people.

An alternative that may be promising is hierarchical ordered probit (HOPIT) analysis (Ferguson et al., 2002). This procedure also assumes that there is an underlying unmeasured scale. Depending on its position on this scale, a household will possess an asset or use a service. For example, on a scale from 0 to 1, households with a position of 0.8 or more would have a refrigerator, and those below 0.8 would not; similarly, households at or above 0.3 would have electricity, and those below would not. Thus, each indicator has its position on the scale, which determines the weight of the indicator when calculating a household's score. "Negative assets" are inverted in this procedure.

2.5   Alternative Measures of Economic Status

Although theoretically and practically superior, the wealth index does not produce results that are similar to either an income- or expenditure-based index. Such a comparison has been done by both Filmer and Pritchett, and Montgomery and others (Montgomery et al., 2000). Montgomery and others concluded that the wealth index was not a good proxy for income. However, the wealth index was never meant to predict household income, so its utility in producing differentials by economic status was not properly evaluated. As indicated above, Filmer and Pritchett concluded that a wealth index produced a better analysis of education differentials by economic status than did an expenditure index.

As part of the 1997 Guatemala Health Demand and Expenditure Survey (linked to the 1997 Guatemala DHS), household consumption expenditures were collected in an investigation of health expenditures in the four altiplano departments of Guatemala (Instituto Nacional de Estadística, 1999a and 1999b.) Since this survey also had questions on assets and services, the two measures could be compared. This comparison is described in section 2.6.

2.6   Wealth versus Expenditure: Guatemala

The expenditure index is based on household expenditures for goods and services with varying reference periods. The individual items were converted into average monthly expenditures for each, and then they were summed. There are two types of expenditure indexes: those based on the household total and those based on per-member expenditures. The total index was used in the published analysis of household health expenditures in Guatemala. For comparisons with the wealth index, quintiles of households were

formed from 1) the distribution of total expenditure per household and 2) the total divided by the number of household members (de jure household population), then formed into quintiles of the distribution of the household population by per member expenditure. Table 2.1 shows the distribution of households when grouped into population quintiles by total monthly household expenditures (in quetzales—about 6 quetzales per US$).

Table 2.1 Monthly household expenditure and number of households by quintile of household total expenditure, Guatemala Health Demand and Expenditure Survey, 1997				
Quintile of household total expenditure	Mean expenditure (in quetzales)	Number of households	Standard deviation	Mean number of household members
Q1: 0-530.69	384.58	523	105.79	4.1
Q2: 530.70-734.09	634.34	516	59.05	5.5
Q3: 734.10-971.39	843.85	517	66.30	6.0
Q4: 971.40-1350.79	1,140.68	509	106.04	6.4
Q5: 1,350.80 or more	2,040.73	497	696.81	6.6
Total	999.10	2,562	650.79	5.7
6 quetzales = US$1				

This table shows that larger households are concentrated in the higher quintiles, so that the quintiles represent a combination of increased economic status and more members, rather than just economic status.

Table 2.2 shows the expenditures divided by the number of household members and then divided in fifths of the household population. This table shows that the number of members is greater in the poorer households when taken on a per member basis.

Table 2.2 Monthly per-member household expenditure and number of household members by quintile of per-member household total expenditure, Guatemala Health Demand and Expenditure Survey, 1997				
Quintile of household total expenditure	Mean per-member expenditure (in quetzales)	Number of household members	Standard deviation	Mean number of household members
Lowest	69.07	2,939	14.31	7.5
Second	104.68	2,937	9.42	6.7
Middle	139.16	2,937	10.84	6.1
Fourth	190.28	2,938	2,0.39	5.3
Highest	368.56	2,937	165.63	4.3
Total	174.34	14,688	129.5	5.7
6 quetzales = US$1				

The wealth index for this survey was calculated with the items in Table 2.3.

Table 2.3 Items in Guatemala Health Demand and Expenditure Survey wealth index

Assets	**Services**
Radio	Electricity
Television	Water supply
Telephone	Toilet facility
Refrigerator	
Vehicle	**Flooring**
Bicycle	
Motorcycle	**Ownership of dwelling**
Automobile	
Tractor	

Table 2.4 shows the mean and standard deviation of per-member expenditures classified according to the wealth index. The number of households is almost equal in each quintile even though the quintiles are based on population rather than households. The mean number of members per household is fairly constant across the wealth quintiles, except for the lowest, which was not the case for either total or per-member household expenditure quintiles.

Table 2.4 Monthly per-member household expenditure and number of household members by quintile of per-member household total expenditure, Guatemala Health Demand and Expenditure Survey, 1997

Wealth index quintile	Mean per-member expenditure	Number of household members	Standard deviation	Mean number of household members
Lowest	115.19	2,969	63.77	6.5
Second	132.35	2,979	71.56	5.7
Middle	143.70	2,916	77.79	5.5
Fourth	176.75	2,945	93.19	5.5
Highest	306.73	2,888	191.14	5.5
Total	174.34	14,688	129.15	5.7

Table 2.5 shows the households cross-classified by quintiles based on per member expenditures and based on wealth. If all households were classified in the same quintiles for each measure, only the diagonal cells would be filled. According to this tabulation, however, only 36 percent of the households are classified in the same quintile by both measures, and 28 percent of households are classified differently by more than one quintile. Therefore, wealth is not a straight proxy for per-member expenditures.

Table 2.5 Wealth index quintiles by quintiles for per-member expenditure

Wealth index quintile	Quintiles for per-member expenditure					Total
	1.00	2.00	3.00	4.00	5.00	
1.00	159	104	84	73	39	459
2.00	109	130	110	103	64	515
3.00	81	115	128	126	82	532
4.00	39	73	112	158	148	530
5.00	5	18	50	98	354	525
Total	393	440	484	558	687	2,582

In determining which performs better, two types of comparisons evaluated performance of the indexes. The first is in regard to characteristics of the households, and the second is in regard to outcomes.

Tables 2.6 through 2.8 show how the quintiles perform with respect to three characteristics of households: percentage with a dirt floor, percentage with a television, and percentage with piped drinking water. As seen in Table 2.6, for quintiles based on the expenditure measures, one out of four households in the highest quintile have dirt floors. This is not the case for the quintiles based on the wealth index, which produces a greater distinction between quintiles. Similarly, Tables 2.7 and 2.8 show that the distribution of households with regard to television and piped water, respectively, is much more believable for quintiles based on wealth than those based on total or per-member expenditures, reinforcing the better distinction of economic status by the wealth index.[1] These altiplano departments are considered among the poorest in Guatemala; therefore, it is surprising to see almost half of the poorest households in the poorest region have piped water and more than one in ten have television sets when classified according to expenditures.

Table 2.6 Percentage of households with dirt as the principal floor					
	Quintile				
Index	Lowest	Second	Middle	Fourth	Highest
Total expenditures	78	71	62	49	24
Per-member expenditures	82	75	64	57	27
Wealth	97	85	70	35	4

Table 2.7 Percentage of households with a television					
	Quintile				
Index	Lowest	Second	Middle	Fourth	Highest
Total expenditures	11	24	33	50	74
Per-member expenditures	11	20	31	41	67
Wealth	1	4	23	64	93

Table 2.8 Percentage of households using piped water in dwelling for drinking					
	Quintile				
Index	Lowest	Second	Middle	Fourth	Highest
Total expenditures	47	53	56	58	73
Per-member expenditures	48	55	53	58	66
Wealth	12	50	56	75	86

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[1] It must also be considered that these assets and services are in part used to form the wealth index so we would expect a better performance of the wealth index when judged against these assets. However, the lack of distinction by the expenditure-based indexes is surprising and indicates that they are not adequately representing different underlying economic statuses.

Figure 2.2 compares the contraceptive prevalence rate according to the expenditure indexes and the wealth index. Figure 2.3 compares the proportion of births attended by a physician according to the indexes. In both cases, the wealth index gives a distinction in outcome that is as good as or greater than that of the expenditure-based indicators, and the results are similar for the per-member expenditure index.

Figure 2.2
Percentage of Women Using a Contraceptive Method
by Type of Measure of Poverty
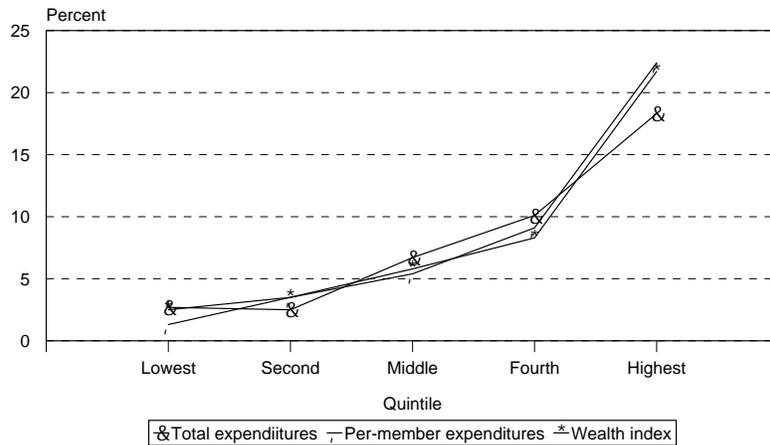
Figure 2.3
Percentage of Births Attended by a Physician by Type of
Measure of Poverty
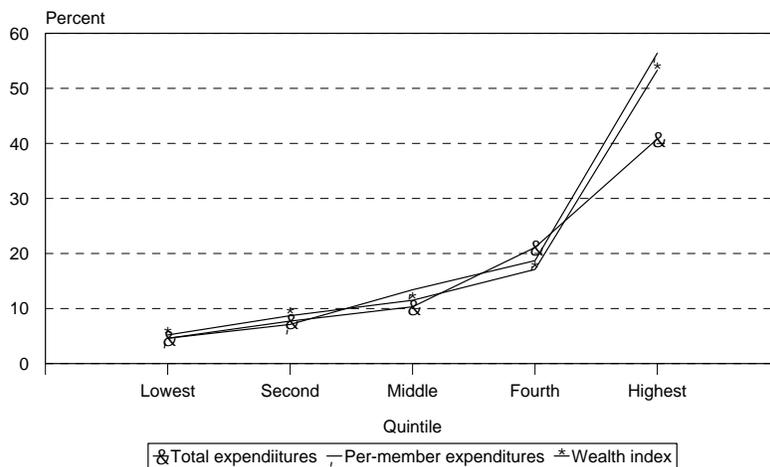
Thus, it can be seen that compared with expenditure measures, the wealth index is the easiest measure of economic status to collect and produces superior, more believable results and equal or greater distinctions in health outcomes.

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3   Who Has What?

Figures 3.1 through 3.5 show the distribution of households by the value of the wealth index for five selected country surveys (one for each world region): Egypt 1995, India 1992-1993, Kenya 1998, Peru 1996, and Uzbekistan 1996. The differences in distribution between countries are quite clear. In Kenya 1998 and India 1992-93, the indexes are skewed to the right, with the majority of households below the mean value and a long tail above. In Egypt 1995, the opposite is true: the distribution is somewhat skewed to the left, with a long tail at the lower end of the distribution. In Peru 1996 and Uzbekistan 1996, the wealth distribution is not skewed but appears to be bimodal with the number of households with middle values less than the number with higher or lower values on the index.

Figure 3.1

Distribution of household wealth index scores

Egypt 1995

Std. Dev = 1.01
Mean = -.02
N = 10759.28

HH wealth index score

Cases weighted by HHWEIGHT
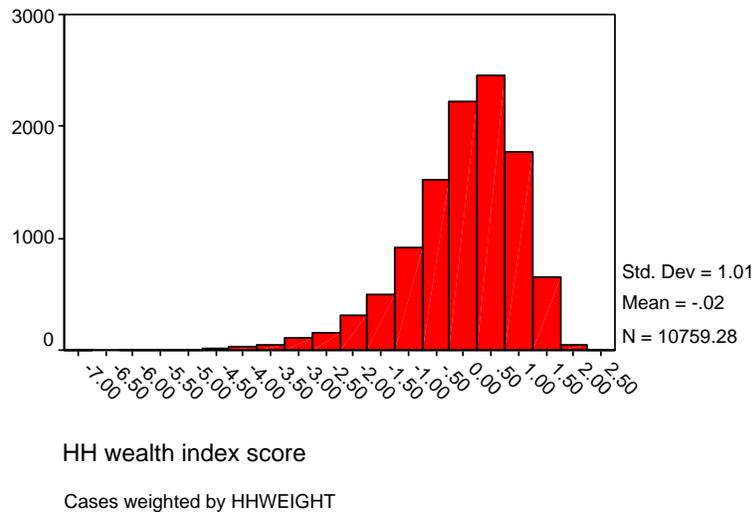
Figure 3.2

Distribution of household wealth index scores

India 1992-93

Std. Dev = .95
Mean = -.18
N = 88544.43

HH Wealth index score

Cases weighted by HHWGT

15
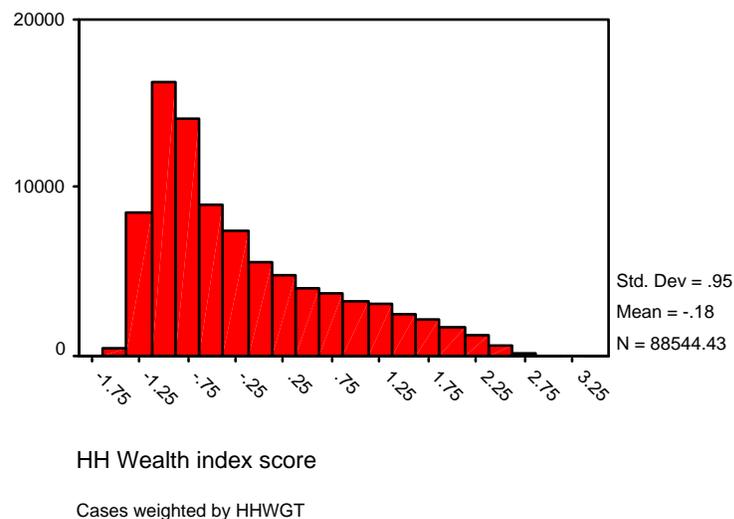
Figure 3.3

Distribution of household wealth index scores

Kenya 1998

Std. Dev = 1.08
Mean = .06
N = 8379.88
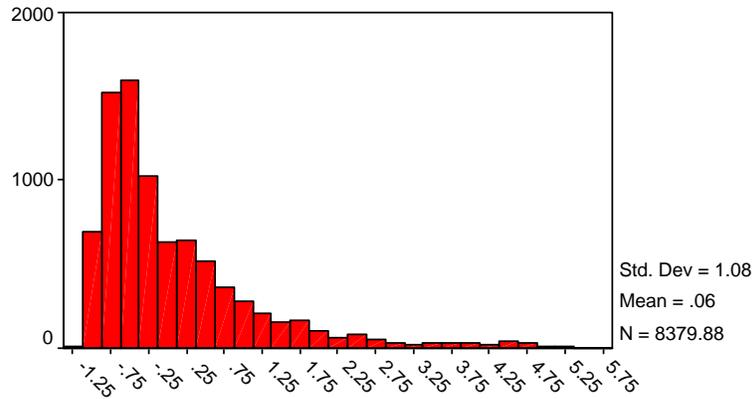
WLTHSCOR

Cases weighted by HHWGT

Figure 3.4

Distribution of household wealth index scores

Peru 1996

Std. Dev = 1.01
Mean = .19
N = 28122.41
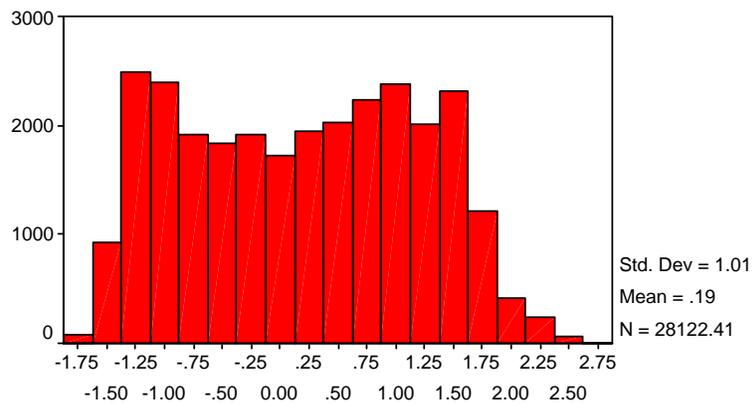
WLTHSCOR

Cases weighted by HHWGT

Figure 3.5

Distribution of household wealth index scores

Uzbekistan 1996

Std. Dev = .95
Mean = -.23
N = 3703.06

WLTHSCOR

Cases weighted by HHWGT
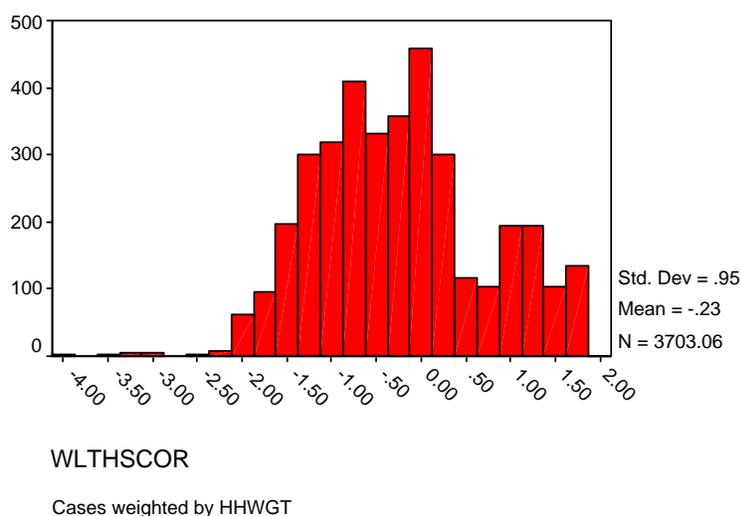
Table 3.1 shows key summary statistics for the distribution of households and household populations by the DHS wealth index for the five selected country surveys. Five summary statistics are given in this table: mean, median, mode, skewness, and kurtosis for households. The mean of the wealth index scores is close to zero since the index is standardized for households to produce z-scores. The median and mode, when compared to the mean and to each other, indicate the amount of skewing in the distribution (also measured by the skewness statistic). In Kenya and India, both the median and modal values are below the respective means; in Egypt, both are above the mean. In Peru, the median is close to the mean, but the mode is much higher; in Uzbekistan, the median is above the mean, but the mode is below.

Table 3.1 Distribution statistics and quintile cutoff values for the wealth index, selected DHS surveys, 1992-1996					
	Egypt 1995	India 1992-93	Kenya 1998	Peru 1996	Uzbekistan 1996
Mean	-0.020	-0.178	0.065	0.188	0.234
Median	0.153	-0.496	-0.344	0.223	0.375
Mode	0.815	-0.957	-0.395	1.120	0.162
Skewness	-1.135	0.972	1.965	0.017	-0.517
Kurtosis	1.911	0.004	4.563	-1.154	-0.463
Quintile cutoff values					
Lowest-second	-0.983	-0.988	-0.773	-0.927	-0.146
Second-middle	-0.313	-0.709	-0.518	-0.151	0.278
Middle-fourth	0.176	-0.213	-0.223	0.598	0.704
Fourth-highest	0.694	0.653	0.526	1.192	1.105

The skewness statistic measures the symmetry of the wealth distribution around its mean. Its values indicate the following: India and Kenya have high positive skewness (i.e., skewed to the right), Egypt has high negative skewness (skewed to the left), Uzbekistan has some negative skewness, and Peru has no skewness. Kurtosis is the measure of concentration (pointedness) of the distribution compared with that of the normal distribution. Kenya shows the highest positive value, indicating that the distribution is much more concentrated than the normal distribution. Peru has the highest negative value of kurtosis, indicating much less concentration than a normal curve. In contrast, the wealth distribution of Indian households is just as concentrated as the normal distribution.

Table 3.1 also shows the values of the quintile cutoffs, which are based on the household population, not the households themselves. The cutoff values between the lowest and second quintiles are most negative in Egypt, India, and Peru, indicating that poor people in these countries have much less wealth than others in the country, and least negative in Uzbekistan, indicating that the poor are not so relatively poor. At the other end of the distribution, the cutoff values between the fourth and highest quintiles are highest in Peru and Uzbekistan, indicating that the people in the fourth quintile are fairly well off. Visual representations of these values are shown in Figures 3.1 through 3.5. Table B.1 gives the values for all 44 countries.

For a comparison of what people have in the selected countries, the assets and services used to construct the wealth index were tabulated according to quintile of the wealth distribution. The percentage of households that have these assets and services by quintile are shown in Tables 3.2 through 3.6.

Table 3.2 Percentage of households with specific wealth indicators by wealth quintile, Egypt 1995

Indicator	Quintile (percent or number)					
	Lowest	Second	Middle	Fourth	Highest	Average
Has electricity	80.7	99.0	99.6	99.9	100.0	95.8
Has radio	30.1	56.6	64.2	77.8	94.5	64.6
Has television	43.9	79.3	87.4	94.2	98.9	80.7
Has refrigerator	2.9	18.8	54.5	91.7	99.1	53.4
Has bicycle	6.6	15.4	21.5	20.8	21.2	17.1
Room for cooking	20.5	49.6	72.0	90.4	98.9	66.3
Household goods: B&W television	42.4	73.0	67.6	49.3	22.4	50.9
Household goods: video	0.2	0.2	0.7	2.6	29.4	6.7
Household goods: electric fan	9.9	34.4	53.6	76.5	94.4	53.8
Household goods: gas/elec.stove	2.6	25.9	72.0	96.8	99.7	59.4
Household goods: water heater	0.1	0.4	2.4	16.0	89.2	21.7
Household goods: sewing machine	1.3	6.1	12.1	21.6	40.8	16.4
Household goods: auto washer	0.0	0.3	0.9	0.8	31.1	6.6
Household goods: other washer	20.9	66.5	89.3	97.3	85.3	71.8
Has car/motorcycle	0.8	2.9	4.1	6.2	26.1	8.0
Has farm/other land	43.4	38.3	29.2	14.0	11.3	27.2
Has livestock	56.9	45.5	28.0	9.8	2.8	28.6
If HH has a domestic worker not related to head	0.0	0.0	0.0	0.0	0.1	0.0
If household works own or family's agricultural land	32.6	23.0	11.3	3.3	0.9	14.2
If piped drinking water in residence	16.2	57.2	82.1	96.0	99.3	70.2
If has a well in residence	19.7	13.9	7.6	1.9	0.4	8.7
If uses river, canal or surface water for drinking	0.5	0.2	0.0	0.0	0.0	0.2
Other source of drinking water	8.4	5.3	2.9	1.2	0.3	3.6
If uses modern flush toilet	0.2	0.7	3.8	21.2	89.6	23.2
If uses a trad. flush toilet with a tank flush	0.5	0.6	1.7	3.4	1.5	1.5
If uses bush, field as latrine	21.4	3.7	0.9	0.6	0.0	5.3
If other type of latrine	4.0	0.8	0.3	0.0	0.0	1.0
If has dirt, sand, dung as principal floor in dwelling	90.1	58.6	20.6	1.7	0.2	34.2
If uses a trad. flush toilet with bucket flush	44.6	76.6	87.8	73.2	8.8	58.1
If has cement principal floor	9.2	32.6	37.5	11.2	1.1	18.3
If has other type of flooring	0.0	0.0	0.2	0.5	1.9	0.5
If uses a public faucet (piped)	31.2	16.5	5.4	0.7	0.0	10.8
If uses a traditional public well	24.0	6.9	1.9	0.1	0.0	6.6
If uses a traditional pit toilet	29.2	17.5	5.7	1.6	0.1	10.8
If has parquet or polished wood floors	0.0	0.1	0.1	0.3	4.4	1.0
If has tiles for main flooring material	0.7	8.5	41.2	85.4	83.6	43.9
If has carpeted flooring	0.0	0.0	0.4	0.8	8.7	2.0
Number of members per sleeping room[1]	3.8	3.5	3.0	2.6	2.0	3.0

[1] Mean

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Table 3.3 Percentage of households with specific wealth indicators by wealth quintile, Kenya 1998

| Indicator | Quintile (percent or number) | | | | | Average |
	Lowest	Second	Middle	Fourth	Highest	
Has electricity	0.0	0.2	0.1	1.8	56.7	11.7
Has radio	27.4	55.3	75.7	79.0	93.9	66.4
Has television	0.0	0.0	1.2	7.5	60.3	13.8
Has refrigerator	0.0	0.0	0.0	0.0	18.7	3.7
Has bicycle	15.6	26.5	34.7	35.1	29.1	28.3
Has motorcycle	0.0	0.0	0.1	0.4	4.1	0.9
Has car	0.0	0.0	0.1	1.9	22.9	5.0
Has telephone	0.0	0.0	0.0	0.1	13.4	2.7
If HH has a domestic worker not related to head	0.0	0.0	0.0	0.5	9.4	2.0
If household works own or family's agricultural land	60.0	48.1	28.7	26.3	8.2	34.1
If piped drinking water in residence	0.0	0.8	3.4	27.6	65.9	19.5
If piped drinking water in public tap	1.1	8.0	12.2	15.6	10.0	9.4
If inside well drinking water	2.9	8.6	12.5	8.5	7.3	8.0
If uses river, canal, or surface water for drinking	71.5	61.5	46.6	26.7	6.9	42.5
Other source of drinking water	0.2	1.4	1.7	3.5	2.4	1.8
If uses shared flush toilet	0.0	0.0	0.0	1.0	14.8	3.2
If has pit latrine	56.6	77.2	87.2	81.8	34.9	67.6
If uses ventilated improved pit latrine	0.0	0.7	3.1	10.3	16.9	6.2
If uses bush, field as latrine	42.8	21.7	9.0	5.2	0.8	15.9
If other type of latrine	0.2	0.1	0.2	0.2	0.1	0.2
If has dirt, earth principal floor in dwelling	100.0	99.9	98.5	36.8	1.4	67.3
If has wood, plank principal floor in dwelling	0.0	0.0	0.2	3.4	0.8	0.9
If has cement principal floor	0.0	0.1	0.8	58.4	90.5	30.0
If has tile flooring	0.0	0.0	0.0	0.3	7.1	1.5
If has other type of flooring	0.0	0.0	0.0	0.0	0.2	0.0
If has natural material roofing	98.5	40.8	5.2	4.0	0.3	29.6
If has corrugated iron roofing	1.5	59.2	93.1	94.2	83.1	66.4
If has roofing tiles	0.0	0.0	0.0	0.1	14.3	2.9
If has other roofing	0.0	0.0	1.3	0.8	1.9	0.8
If uses rain for drinking water	0.1	0.3	1.1	2.0	2.9	1.3
If uses a public well	19.3	13.2	15.5	11.8	3.8	12.7
If has own flush toilet	0.0	0.0	0.0	0.6	32.4	6.6
Number of members per sleeping room[1]	4.6	3.6	2.7	2.6	2.5	3.2

[1] Mean

20

Table 3.4 Percentage of households with specific wealth indicators by wealth quintile, India 1992-93						
	Quintile (percent or number)					
Indicator	Lowest	Second	Middle	Fourth	Highest	Average
Has electricity	0.4	10.1	54.8	92.2	99.5	51.4
Has radio	9.4	23.6	38.8	57.6	80.1	41.9
Has television	0.0	0.2	2.6	25.5	81.9	22.1
Has refrigerator	0.0	0.1	0.2	1.0	32.8	6.8
Has bicycle	31.7	40.1	46.0	54.5	63.4	47.1
Has motorcycle	0.1	0.4	2.1	7.3	35.3	9.0
Has car	0.0	0.0	0.1	0.4	6.0	1.3
Rooms in household	2.1	2.5	2.9	3.4	3.9	3.0
Separate room used as kitchen	29.8	42.1	57.4	66.7	83.2	55.8
HH owns agricultural land	76.9	60.0	62.1	53.2	27.6	56.0
Size of nonirrigated agricultural land (acres)[1]	3.1	2.1	3.4	2.9	3.9	3.1
Size of irrigated land (acres)[1]	3.2	2.8	2.8	3.4	3.6	3.2
Own any livestock	95.2	62.4	63.9	53.6	18.5	58.7
Own bullock	48.0	28.8	30.1	19.6	4.4	26.2
Own cow	51.2	32.3	34.5	28.8	10.9	31.6
Own buffalo	34.1	25.5	31.1	29.6	8.7	25.8
Own goat	34.0	17.5	13.9	9.6	2.6	15.5
Own sheep	3.2	1.6	2.2	1.3	0.2	1.7
Own camel	0.9	0.5	0.6	0.5	0.0	0.5
Own other animal	4.4	2.9	2.5	2.0	0.8	2.5
Sewing machine	1.3	4.5	10.8	27.8	56.8	20.2
Clock/watch	15.3	36.9	53.5	80.5	97.5	56.8
Sofa set	0.0	0.1	1.0	6.2	41.1	9.7
Fan	0.2	0.9	10.2	59.8	96.1	33.4
VCR/VCP	0.1	0.5	1.0	1.3	10.7	2.7
Tractor	0.2	0.4	1.5	3.6	3.0	1.7
If household works own or family's agricultural land	89.8	88.5	88.7	88.5	87.4	88.6
If piped drinking water in residence	0.4	1.8	5.5	19.5	62.6	18.0
If piped drinking water in public tap	6.0	11.2	18.9	21.7	9.8	13.5
If well drinking water in residence	5.0	6.9	8.8	10.1	7.2	7.6
If public well for drinking water	33.9	24.9	20.9	11.7	1.9	18.7
If uses spring for drinking water	0.8	0.8	1.1	0.6	0.1	0.7
If uses river, canal, or surface water for drinking	5.6	4.3	3.3	1.8	0.3	3.1
If uses rainwater for drinking	0.0	0.0	0.0	0.1	0.0	0.0
If uses tanker truck for drinking water	0.1	0.1	0.2	0.6	0.6	0.3
Other source of drinking water	1.0	1.8	2.2	1.7	0.5	1.5
If has private flush toilet	0.0	0.2	2.2	13.3	68.2	16.8
If has public flush toilet	0.1	0.2	1.2	3.6	3.4	1.7
If uses bush, field as latrine	99.0	95.2	86.3	63.5	6.6	70.1
If other type of latrine	0.0	0.0	0.1	0.1	0.1	0.1
Residential handpump	11.0	18.2	16.9	19.7	12.8	15.7
Public handpump	36.2	29.7	22.2	12.5	4.0	20.9
Private latrine	0.7	3.5	7.1	11.6	11.1	6.8
Public latrine	0.1	0.3	1.1	1.9	1.1	0.9
Shared latrine	0.1	0.4	1.2	2.3	2.3	1.2
Electricity for lighting	0.4	10.1	54.8	92.2	99.5	51.4
Kerosene for lighting	98.9	89.3	44.5	7.6	0.4	48.2
Gas for lighting	0.1	0.1	0.1	0.0	0.0	0.1
Oil for lighting	0.3	0.2	0.2	0.0	0.0	0.2
Other lighting	0.3	0.2	0.3	0.1	0.0	0.2
Wood cooking fuel	79.5	76.0	80.5	69.8	17.6	64.7
Dung cooking fuel	14.2	15.3	11.8	10.3	2.5	10.8
Coal cooking fuel	0.7	2.3	3.5	5.3	6.3	3.6
Charcoal cooking fuel	0.1	0.2	0.4	0.5	0.7	0.4
Kerosene cooking fuel	0.0	0.2	1.5	10.3	19.6	6.3
LPG cooking fuel	0.0	0.0	0.1	1.1	49.6	10.2
Biogas cooking fuel	0.0	0.0	0.3	1.0	1.9	0.6
Other cooking fuel	5.0	5.4	1.2	0.6	0.1	2.5
House from high-quality materials	0.3	2.6	9.2	27.9	77.6	23.5
House from low-quality materials	88.8	75.5	51.9	22.9	2.9	48.4
House from mixed quality materials	10.8	21.7	38.7	49.0	19.2	27.9
If animals sleep inside house	29.4	19.4	17.8	14.1	4.1	17.0
If animals sleep outside house	65.5	42.7	45.8	39.3	14.3	41.5
Electricity for cooking	0.0	0.0	0.0	0.3	1.2	0.3
If has shared flush toilet	0.0	0.1	1.0	3.7	7.1	2.4
Number of members per sleeping room[1]	3.9	3.2	2.9	2.6	2.1	2.9

[1] Mean

Table 3.5 Percentage of households with specific wealth indicators by wealth quintile, Peru 1996						
	Quintile (percent or number)					
Indicator	Lowest	Second	Middle	Fourth	Highest	Average
Has electricity	2.6	43.7	90.3	99.1	99.9	67.1
Has radio	63.7	82.3	89.0	96.2	99.4	86.1
Has television	4.3	49.6	86.4	97.0	99.8	67.4
Has refrigerator	0.0	2.3	21.5	56.0	96.1	35.2
Has bicycle	8.1	21.8	28.8	24.7	42.7	25.2
Has motorcycle	0.2	1.5	3.2	3.5	8.5	3.4
Has car	0.2	2.0	4.2	8.1	38.0	10.5
Has telephone	0.0	0.1	1.9	12.2	78.9	18.7
Has computer	0.0	0.0	0.2	0.7	14.5	3.1
If HH has a domestic worker not related to head	0.0	0.3	0.8	1.4	11.0	2.7
If household works own or family's agricultural land	60.4	25.1	6.9	2.5	0.9	19.2
Number of members per sleeping room[1]	5.0	3.9	3.5	2.8	1.8	3.4
If piped drinking water in residence	3.6	34.3	57.6	89.9	98.0	56.7
If has a well in residence	4.2	7.1	5.2	1.1	0.2	3.5
If uses river, canal or surface water for drinking	65.6	14.5	2.1	0.1	0.0	16.5
Other source of drinking water	8.1	10.2	4.5	0.8	0.1	4.7
If uses a flush toilet in residence/ private	0.0	2.2	28.3	75.9	96.5	40.7
If uses bush, field as latrine	76.6	40.4	11.1	0.7	0.0	25.8
If other type of latrine	0.4	2.2	3.3	0.6	0.1	1.3
If has dirt, sand, dung as principal floor in dwelling	92.0	84.4	44.3	6.3	0.1	45.4
If has wood, plank principal floor in dwelling	3.4	5.5	7.8	4.5	2.0	4.6
If has cement principal floor	0.3	8.7	44.5	81.8	52.5	37.6
If has other type of flooring	4.4	1.0	1.1	1.1	0.8	1.7
If rain for drinking water	0.3	0.0	0.0	0.0	0.0	0.1
If uses a public faucet (piped)	8.4	14.0	12.7	2.5	0.3	7.6
If uses a traditional public well	7.9	7.6	2.4	0.5	0.2	3.7
If uses a private latrine	19.5	44.6	36.6	10.3	0.5	22.2
If uses a public latrine	2.9	5.8	4.4	0.8	0.0	2.8
If has parquet or polished wood floors	0.0	0.1	0.5	0.9	21.0	4.5
If has tiles for main flooring material	0.0	0.0	1.0	4.4	17.8	4.7
If has vinyl or asphalt strips as flooring material	0.0	0.0	0.6	0.9	6.0	1.5
If uses water that is piped into the building	1.5	3.7	6.9	2.0	0.4	2.9
If uses bottled water	0.5	8.2	8.5	3.2	0.9	4.2
If uses a flush toilet in residence/public	0.1	2.0	10.7	10.5	2.5	5.1
If uses a flush toilet outside residence/ private	0.1	0.8	1.5	0.4	0.0	0.5
If uses a flush toilet outside of residence/public	0.3	1.6	4.1	0.9	0.2	1.4

[1] Mean

Table 3.6 Percentage of households with specific wealth indicators by wealth quintile, Uzbekistan 1996

Indicator	Quintile (percent or number)					Average
	Lowest	Second	Middle	Fourth	Highest	
Has electricity	97.6	100.0	100.0	100.0	100.0	99.5
Has radio	37.9	61.7	57.6	75.4	79.0	62.3
Has television	71.3	91.4	98.0	99.4	98.5	91.7
Has refrigerator	7.3	65.3	70.0	96.6	97.3	67.2
Has bicycle	18.2	24.6	26.0	29.8	17.1	23.1
Has motorcycle	12.8	17.5	18.2	11.4	1.9	12.4
Has car	6.3	18.2	25.5	39.9	35.2	25.0
Has telephone	2.4	6.7	26.7	33.8	72.0	28.2
If household works own or family's agricultural land	0.8	1.0	0.9	0.5	0.1	0.6
If piped drinking water in residence	3.6	19.2	63.1	95.1	98.9	55.9
If has a well in residence	26.4	22.7	13.8	3.1	0.8	13.4
If uses river, canal or surface water for drinking	10.4	7.6	1.4	0.0	0.0	3.9
If uses own flush toilet	0.0	0.0	0.2	1.7	68.8	13.9
If uses a shared flush toilet	0.0	1.1	2.4	2.6	3.5	1.9
If uses bush, field as latrine	0.1	0.0	0.0	0.0	0.0	0.0
If has dirt, sand, dung as principal floor in dwelling	53.2	19.6	9.3	0.7	0.2	16.6
If has wood, plank principal floor in dwelling	44.8	78.0	86.6	95.3	66.3	74.2
If has cement principal floor	0.9	0.6	0.3	0.1	0.1	0.4
If has other type of flooring	0.0	0.0	0.0	0.0	0.1	0.0
If rain for drinking water	0.0	0.3	0.8	0.2	0.0	0.3
If uses a public faucet (piped)	43.0	38.7	14.0	0.6	0.3	19.4
If uses a traditional public well	10.4	6.6	3.4	0.4	0.0	4.2
If uses a traditional pit toilet	99.9	98.9	97.4	95.4	27.5	84.0
If uses a VIP latrine	0.0	0.0	0.0	0.3	0.2	0.1
If has parquet or polished wood floors	0.0	0.0	0.3	0.5	8.2	1.8
If has tiles for main flooring material	0.3	0.0	0.0	0.0	0.0	0.1
If has straw or sawdust flooring	0.6	1.1	0.8	2.2	1.7	1.3
If has vinyl or asphalt strip flooring	0.2	0.5	2.7	1.1	23.3	5.5
If has carpeted flooring	0.0	0.2	0.0	0.0	0.0	0.0
If uses water from a tanker truck	2.7	4.2	3.0	0.3	0.0	2.1
If uses bottled water	0.1	0.7	0.5	0.3	0.0	0.3
If gets drinking water from a spring	3.3	0.0	0.0	0.0	0.0	0.7
Number of members per sleeping room[1]	3.1	2.5	2.3	2.0	1.8	2.3

[1] Mean

4   Who Are the Poor?

To show some of the different aspects of poverty, a few key background characteristics are analyzed in this section. Basic information on the wealth index by country is included in Appendix C. The following is a summary of the illustrative information.

4.1   Area of Residence and Region

Table 4.1 shows the percentage of households that are in urban areas, distributed by wealth quintile.

Table 4.1 Percentage of urban households in each wealth quintile, by region						
	Quintile (percent)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	4	7	14	38	81	31
Near East and North Africa	23	36	54	80	94	60
Europe and Central Asia	11	17	39	63	92	48
South and Southeast Asia	3	9	16	31	66	26
Latin America and Caribbean	12	38	65	85	95	64
Total	8	17	30	53	84	41

The totals indicate that rural areas are mostly inhabited by poorer households and that the richest households live mostly in urban areas. However, in the Near East and North Africa region, almost one-fourth of the poorest households are urban, and in the South and Southeast Asia region, about one-third of the richest households are in rural areas.

4.2   Household Head

The characteristics of the head of the household are important to the living conditions of all household members. Tables 4.2 through 4.5 examine the sex, age, education, and marital status of the head.

Table 4.2 Percentage of female household heads in each wealth quintile, by region						
	Quintile (percent)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	22	22	23	26	24	24
Near East and North Africa	8	8	9	11	9	9
Europe and Central Asia	14	14	16	20	29	19
South and Southeast Asia	8	10	10	11	14	11
Latin America and Caribbean	17	22	25	27	26	24
Total	17	18	20	22	22	20

A common premise is that many poor households are headed by women, usually single mothers, widows, or women who have been abandoned. Table 4.2 shows that, overall, only one in six households in the lowest quintile are headed by women and that women-headed households tend to be somewhat wealthier. Indeed, even in sub-Saharan Africa, where more than a fifth of poor households are headed by women, the percentage of female-headed households is higher in the richer households.

The marital status of the household head is determined by whether a spouse is a member of the household. Table 4.3 shows that there are small differences in marital status by wealth. In four of the five regions, the richest households have fewer married heads than do the poorest households. Thus, there is no evidence to support the notion that women with no spouse in the household disproportionately head poor households in less developed countries as they do in the more developed countries.

Table 4.3 Percentage of currently married household heads in each wealth quintile, by region						
	Quintile (percent)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	76	76	74	70	72	73
Near East and North Africa	89	90	89	88	89	89
Europe and Central Asia	81	83	80	81	74	80
South and Southeast Asia	88	87	87	86	85	87
Latin America and Caribbean	82	78	75	72	72	75
Total	81	80	78	76	76	78

Overall, there is little difference by wealth quintile in the age of the head of the household (Table 4.4). By region, the heads of the poorest households are 3.4 years younger than those of the richest in South and Southeast Asia, and they are 2.4 years older in Europe and Central Asia.

Table 4.4 Mean age of household heads in each wealth quintile, by region						
	Quintile (mean age in years)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	43.7	44.3	44.4	43.6	43.3	43.8
Near East and North Africa	45.3	45.2	44.8	45.3	46.1	45.3
Europe and Central Asia	45.3	46.1	45.9	44.8	42.9	44.8
South and Southeast Asia	42.1	42.8	43.7	44.8	45.6	43.8
Latin America and Caribbean	43.3	43.1	43.1	43.5	46.1	43.9
Total	43.6	44.0	44.2	44.0	44.5	44.0

The number of years of education of the head of the household varies substantially according to the household's economic status (Table 4.5). Overall, there is a difference of 5.5 years between the lowest and highest quintiles. The Latin America and Caribbean and Near East and North Africa regions show the greatest difference in the education of the household head (7.1 and 6.9 years, respectively). The Europe and Central Asia region, where education is in general much higher, shows the least difference by wealth (3.2 years).

Table 4.5 Mean number of years of education for household heads in each wealth quintile, by region						
	Quintile (mean number of years of education)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	1.9	2.2	2.9	3.9	7.0	3.7
Near East and North Africa	2.8	3.9	4.8	6.3	9.7	5.7
Europe and Central Asia	7.6	8.2	8.7	9.2	10.8	9.1
South and Southeast Asia	2.8	3.7	4.4	5.7	8.5	5.1
Latin America and Caribbean	2.4	3.6	4.9	6.4	9.5	5.7
Total	2.8	3.5	4.3	5.4	8.3	5.0

4.3   Household Size

One of the reasons for equivalization is the idea that larger households may have more income recipients and therefore may be able to afford more assets used in common. Are wealthy households, as determined by the wealth index, larger than poorer households? Table 4.6 shows that, overall, this is not the case, and in the regions where it is (sub-Saharan Africa and South and Southeast Asia), the differences by household wealth are minor.

Table 4.6 Mean number of household members in each wealth quintile, by region						
	Quintile (mean number of persons)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	5.4	5.2	5.1	5.1	5.5	5.2
Near East and North Africa	5.9	6.2	6.0	5.6	5.3	5.8
Europe and Central Asia	5.2	5.1	4.9	4.4	3.5	4.5
South and Southeast Asia	5.3	5.0	5.2	5.5	5.6	5.3
Latin America and Caribbean	5.3	4.7	4.7	4.6	4.6	4.8
Total	5.4	5.1	5.1	5.0	5.1	5.1

4.4   Percentage of Children in Poverty

Of the age groups making up the poor population, children are thought to be the most numerous. This observation is usually based on experience from the developed countries. Tables 4.7 and 4.8 evaluate this notion for less developed countries by examining the mean number of children under five years of age in households, by wealth quintile, and the distribution of children under age 15 years, by wealth quintile, respectively.

Table 4.7 indicates that, overall, the poorest households have 1.5 times the number of young children in rich households. The difference between the poorest and richest households is least in South and Southeast Asia and greatest in Latin America and the Caribbean.

Table 4.7 Mean number of children under age five in each wealth quintile, by region						
	Quintile (mean number of children under five)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	1.6	1.5	1.5	1.4	1.3	1.5
Near East and North Africa	1.5	1.5	1.2	1.0	0.8	1.2
Europe and Central Asia	1.0	0.9	0.8	0.7	0.4	0.7
South and Southeast Asia	1.1	1.1	1.0	1.0	0.9	1.0
Latin America and Caribbean	1.4	1.1	1.0	0.8	0.6	0.9
Total	1.4	1.3	1.2	1.1	0.9	1.2

Table 4.8 shows that all children under 15 years of age are fairly well distributed across the quintiles. Sub-Saharan Africa and South and Southeast Asia have distributions that are mostly level across the quintiles. The attenuation of the differences between quintiles shown for children under five years of age may be due to increased child mortality experienced by the poorer households.

Table 4.8 Percent distribution of children under age 15 by wealth quintile, according to region

Region	Quintile (percent)					Total
	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa	20	19	19	21	21	100
Near East and North Africa	22	23	21	18	16	100
Europe and Central Asia	23	21	21	19	16	100
South and Southeast Asia	21	20	20	20	18	100
Latin America and Caribbean	22	21	21	19	17	100
Total	21	20	20	20	19	100

4.5   Characteristics of Household Members

The background characteristics of all household members according to wealth quintile are given in Tables 4.9 through 4.11; sex, age, and education are presented, respectively. Because most country surveys did not ask about the marital status of household members and relationship to head cannot be used to indicate marital status, there is no table showing marital status by wealth for all members.

Table 4.9 shows the percentage of members who are female, by wealth.

Table 4.9 Percentage of female household members in each wealth quintile, by region

Region	Quintile (percent)					Total
	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa	53	54	54	54	54	54
Near East and North Africa	51	50	50	50	51	50
Europe and Central Asia	50	51	52	53	54	52
South and Southeast Asia	50	50	51	51	52	51
Latin America and Caribbean	52	52	54	56	58	54
Total	52	52	53	54	54	53

Overall, women make up more of the household population than do men, probably for two reasons: greater mortality among men and greater likelihood of men to live in institutional and common housing (e.g., the armed forces, mining and other camps, prisons). There is little difference overall and in most of the regions by wealth quintile. The two regions where quintile makes minor differences are Latin America and the Caribbean and Europe and Central Asia, where richer households tend to have more female members.

The average age of household members is about half of that of the household head (Table 4.10). With increasing wealth, there is a small increase in the age of members. The largest increases are in Latin America and Caribbean countries, with 6.1 years between the poorest and richest households.

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Table 4.10 Mean age of household members in each wealth quintile, by region						
	Quintile (mean age in years)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	19.4	20.1	20.2	20.3	20.7	20.2
Near East and North Africa	20.6	20.9	21.7	22.9	24.2	22.0
Europe and Central Asia	22.4	23.8	24.5	25.0	26.3	24.4
South and Southeast Asia	21.6	22.5	23.2	23.8	25.1	23.3
Latin America and Caribbean	20.1	21.3	22.2	23.7	26.2	22.9
Total	20.3	21.2	21.7	22.2	23.4	21.8

As with the household head, there is a strong relationship between wealth and education of all members, as shown by the mean number of years of education (Table 4.11). The association between education of all household members and economic status is weaker than that between education of the household head and economic status.

Table 4.11 Mean number of years of education for household members in ech wealth quintile, by region						
	Quintile (mean number of years of education)					
Region	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa	1.8	2.2	2.7	3.7	6.4	3.6
Near East and North Africa	3.0	4.1	5.1	6.7	9.4	5.7
Europe and Central Asia	7.7	8.2	8.5	9.1	10.5	8.9
South and Southeast Asia	2.5	3.4	4.2	5.5	7.9	4.9
Latin America and Caribbean	2.6	3.9	5.4	7.0	9.6	6.3
Total	2.7	3.5	4.3	5.4	8.0	5.1

5 Importance of Wealth

To demonstrate the value of using economic status measures in general and the wealth index in particular to explain equity differences in health outcomes and services, this section discusses how reproductive and maternal health, child mortality and health, environmental health conditions, and education vary by economic status.[2]

5.1 Reproductive and Maternal Health

Fertility levels and contraceptive use vary substantially by wealth, as does use of health services and knowledge of the sexual transmission of HIV/AIDS (Table 5.1). Figures 5.1 and 5.2 show the relationship between wealth and the total fertility rate and the contraceptive prevalence rate, respectively, in India.

Table 5.1 Reproductive and maternal health indicators by wealth quintile, DHS surveys 1992-1998							
	Quintile					Population	Low/high
Survey	Lowest	Second	Middle	Fourth	Highest	average	ratio
Total fertility rate							
Egypt 1995	4.4	3.8	3.4	3.1	2.7	3.6	1.6
India 1992-93	4.1	3.6	3.2	2.8	2.1	3.4	2.0
Kenya 1998	6.5	5.6	4.7	4.2	3.0	4.7	2.2
Peru 1996	6.6	4.6	3.4	2.6	1.7	3.5	3.9
Uzbekistan 1996	4.4	3.7	3.2	3.2	2.2	3.3	2.0
Contraceptive prevalence rate							
Egypt 1995	28.2	39.0	47.1	52.0	57.4	45.5	0.5
India 1992-93	24.9	27.5	36.1	42.0	50.6	36.5	0.5
Kenya 1998	12.6	24.1	30.7	39.7	50.1	31.5	0.3
Peru 1996	24.0	37.5	45.2	48.9	50.3	41.3	0.5
Uzbekistan 1996	46.0	55.1	55.5	47.7	52.2	51.3	0.9
Medical prenatal care, 3+ visits							
Egypt 1995	11.1	15.6	31.7	45.6	75.3	34.9	0.1
India 1992-93	21.6	30.4	42.8	56.9	81.4	44.1	0.3
Kenya 1998	77.4	78.5	82.4	84.3	86.5	81.4	0.9
Peru 1996	28.7	54.9	71.5	81.8	93.7	62.3	0.3
Uzbekistan 1996	82.4	82.8	79.3	84.5	84.4	82.5	1.0
Knowledge of sexual transmission of HIV/AIDS							
Egypt 1995	u	u	u	u	u	u	u
India 1992-93	u	u	u	u	u	u	u
Kenya 1998	94.5	96.3	97.0	97.9	98.6	97.0	1.0
Peru 1996	67.1	83.7	93.1	96.0	97.8	89.2	0.7
Uzbekistan 1996	u	u	u	u	u	u	u
u = Unknown (not available)							

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[2] In the next revision of this document, relationships between economic status and women's status and domestic violence will be included, which have to be left out of the present document due to contractual obligations.

Figure 5.1
Total Fertility Rate by Wealth Quintile, India 1992-93

Births per woman

Wealth quintile	Births per woman
Lowest	4.1
Second	3.6
Middle	3.2
Fourth	2.8
Highest	2.1
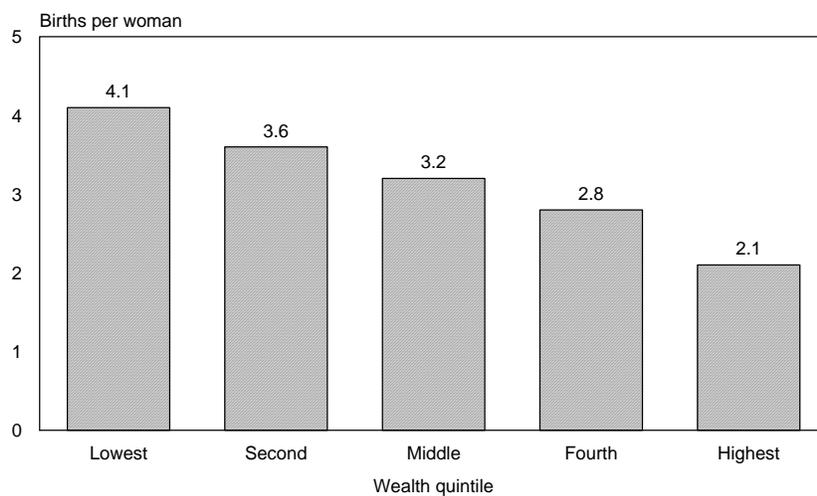
Wealth quintile

Figure 5.2
Contraceptive Prevalence by Wealth Quintile, India 1992-93

Percent of married women

Wealth quintile	Percent of married women
Lowest	25
Second	28
Middle	36
Fourth	42
Highest	51
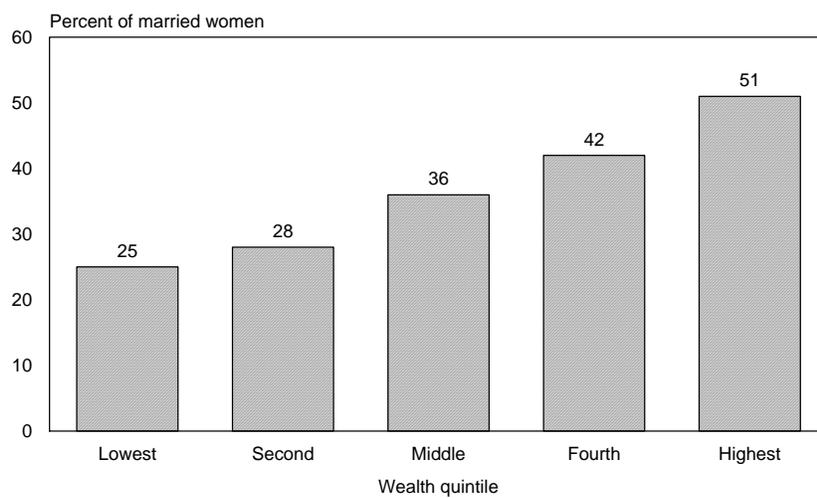
Wealth quintile

Figures 5.3 and 5.4 show TFR values and contraceptive prevalence for the poorest quintiles of various countries.

Figure 5.3
Total Fertility Rates for the Poorest Wealth Quintile,
by Region, DHS Surveys 1990-1998
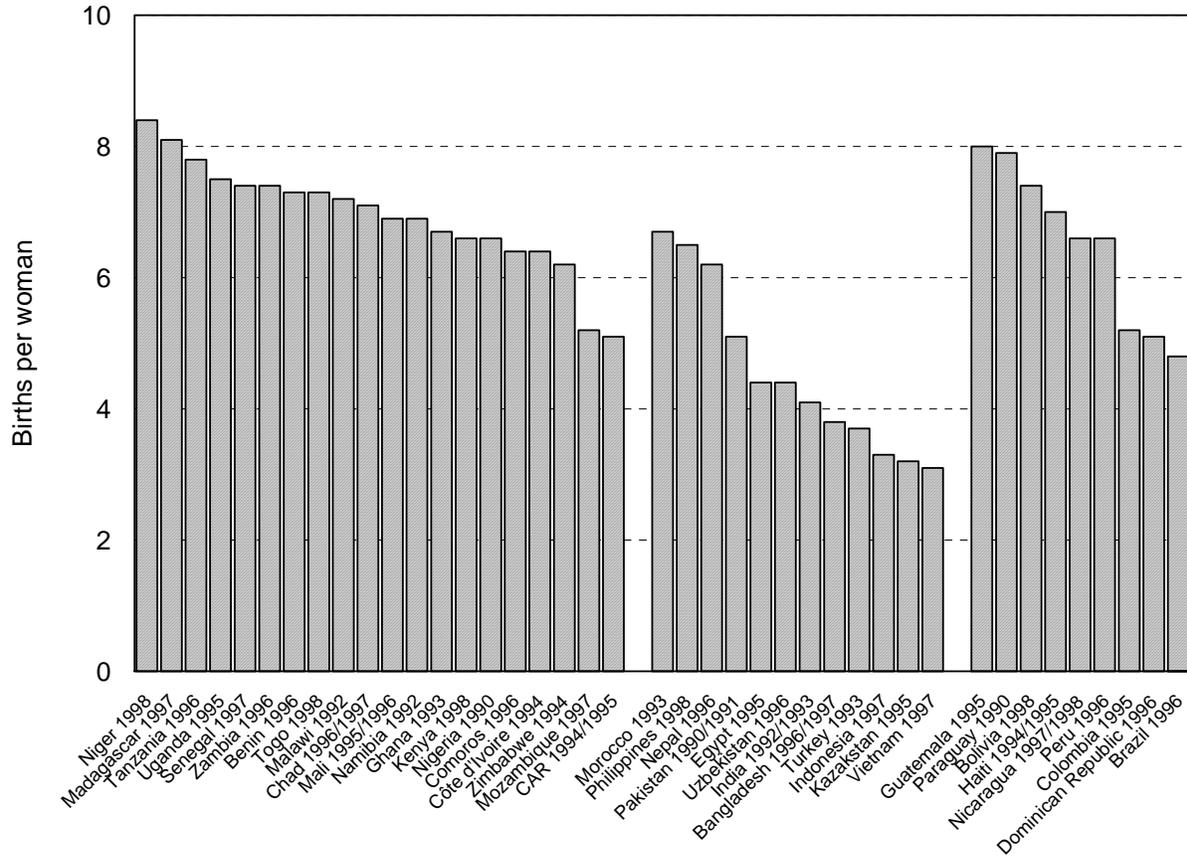
Figure 5.4
Contraceptive Prevalence Rates for the Lowest Wealth Quintile,
by Region, DHS Surveys 1990-1998
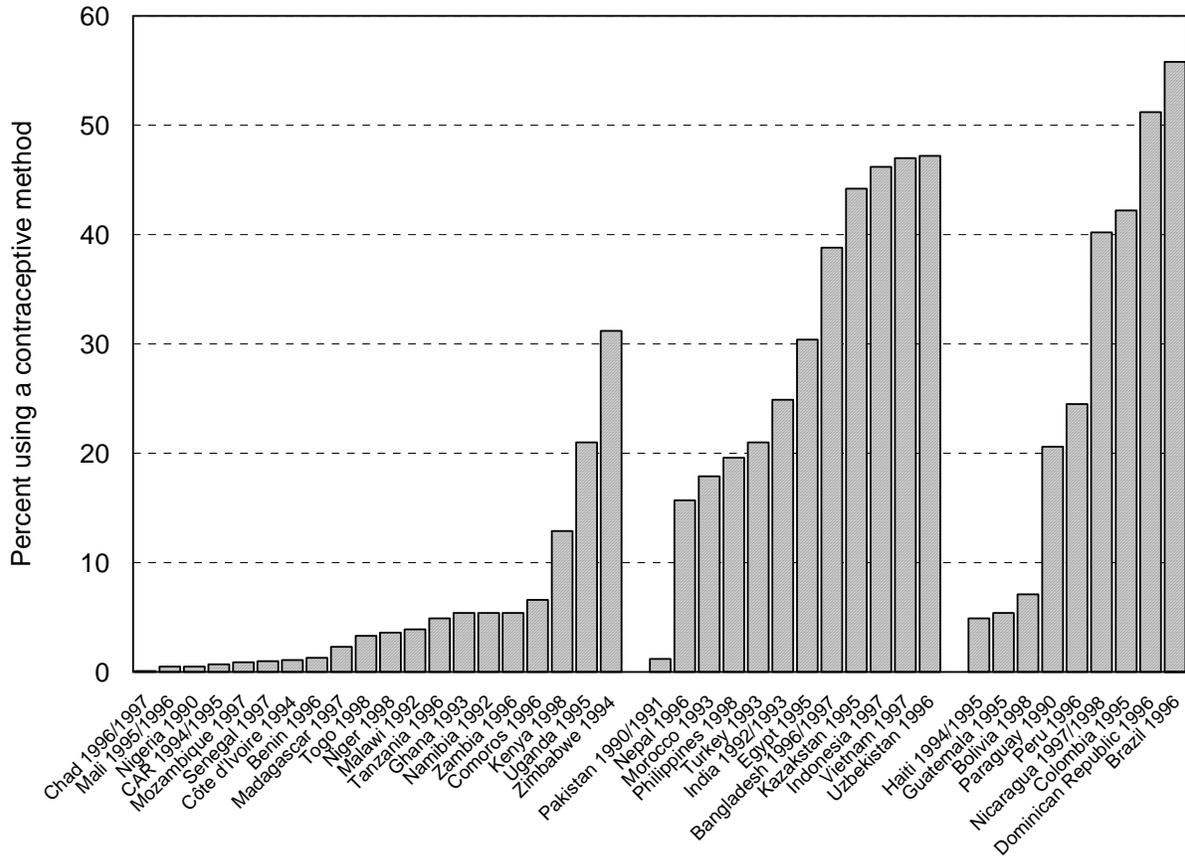
5.2   Child Mortality and Health

Figure 5.5 shows the level of under-five mortality by wealth quintile in India. There is almost a three to one ratio between the lowest and highest quintiles. As seen in Table 5.2, two other countries have greater differentials in the under-five mortality rate. The differences in child mortality by economic status are larger than the differences for most other variables, including mother's education.

Figure 5.5
Under-Five Mortality Rates by Wealth Quintile, India 1992-93

Deaths per 1,000 births

Table 5.2 Child mortality and other health indicators by wealth quintile, DHS surveys 1992-1998							
	Quintiles					Population	Low/high
Indicator	Lowest	Second	Middle	Fourth	Highest	average	ratio
Under-five mortality rate							
Egypt 1995	147.2	118.7	85.4	62.0	39.1	95.9	3.8
India 1992-93	154.7	152.9	119.5	86.9	54.3	118.8	2.8
Kenya 1998	136.2	130.4	92.3	84.9	60.7	105.2	2.2
Peru 1996	110.0	76.2	48.0	44.1	22.1	68.4	5.0
Uzbekistan 1996	70.3	43.8	55.4	51.7	50.4	55.2	1.4
Full basic vaccination rate							
Egypt 1995	65.1	72.8	81.0	86.6	92.5	79.1	0.7
India 1992-93	17.1	21.7	34.7	48.2	65.0	35.4	0.3
Kenya 1998	48.1	57.6	71.0	64.6	59.9	59.5	0.8
Peru 1996	55.3	63.8	63.5	71.7	66.0	63.0	0.8
Uzbekistan 1996	80.9	76.8	79.4	77.2	77.5	78.7	1.0
Percent stunted **(< 2 SD below mean)**							
Egypt 1995	38.4	33.7	28.6	25.1	20.2	29.8	1.9
India 1992-93	60.2	58.8	54.4	47.8	34.3	51.9	1.8
Kenya 1998	44.1	37.5	30.2	30.5	17.1	33.0	2.6
Peru 1996	45.6	30.8	18.8	10.0	5.2	25.8	8.8
Uzbekistan 1996	39.6	29.5	29.5	24.5	30.5	31.3	1.3
Private medical **treatment of ARI**							
Egypt 1995	28.0	35.3	44.1	53.4	62.7	43.5	0.4
India 1992-93	44.3	41.3	45.2	56.8	68.8	48.6	0.6
Kenya 1998	16.0	22.4	17.7	17.7	35.2	20.6	0.5
Peru 1996	0.9	3.7	6.7	11.6	21.7	5.9	0.0
Uzbekistan 1996	*	*	*	*	*	(3.2)	na
Note: An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. Figures in parentheses are based on 25-49 unweighted cases. SD = Standard deviation na = Not applicable							

Under-five mortality for the lowest wealth quintile in each country is shown in Figure 5.6. In general, sub-Saharan Africa has the highest levels, reaching almost 300 deaths per 1,000 births in Mali. In no country except Kazakhstan does under-five mortality in the lowest wealth quintile fall below 50 per 1,000 deaths.

Figure 5.6
Under-Five Mortality for the Lowest Wealth Quintile,
by Region, DHS Surveys 1990-1998
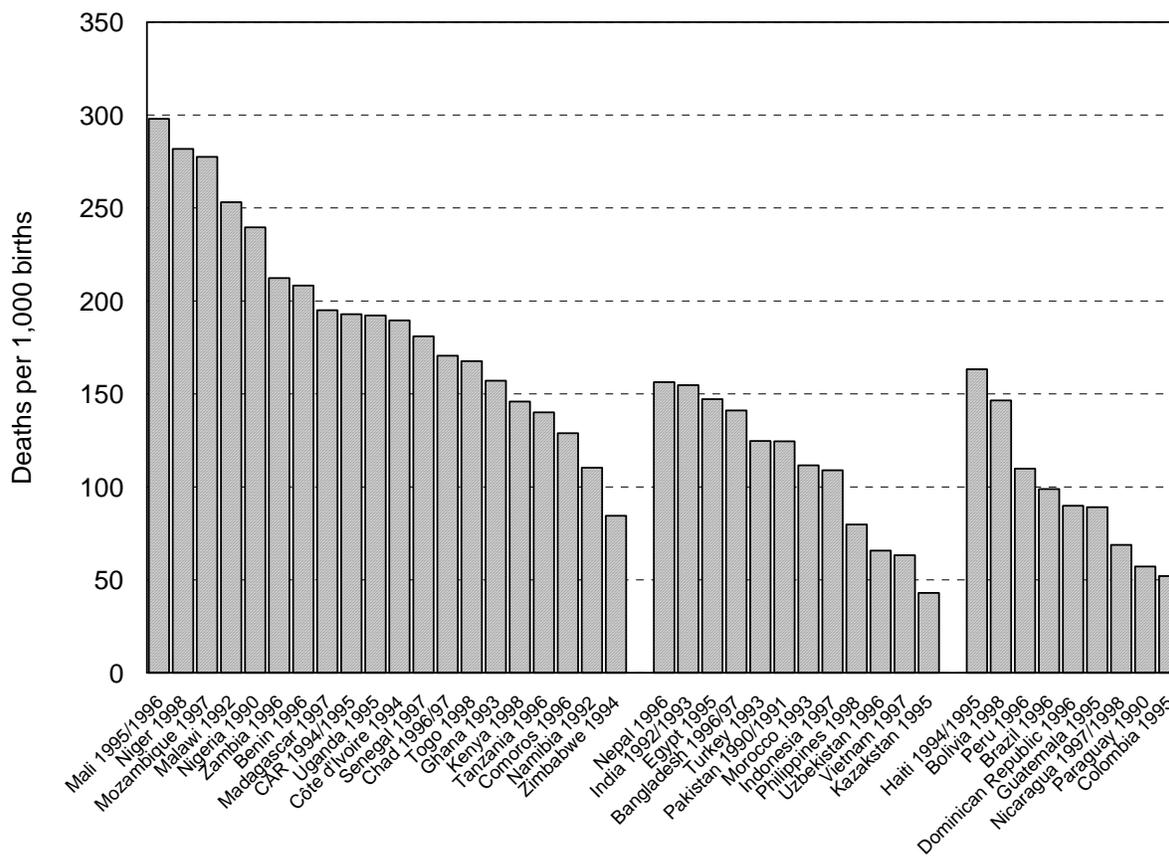
As seen in Table 5.2, chronic child malnutrition as measured by the percent stunted among children under five years is also highly variable by wealth, with the level of stunting for the lowest quintile being almost nine times the level for the highest quintile in Peru.

Use of health services is also unequally distributed, as indicated by full basic vaccination rates and the percentage of children ill with acute respiratory infection (ARI) who have been treated in private medical facilities (Table 5.2).

The relationship between economic status and child health is not because wealthier households tend to be more educated, as noted above; rather, both have a strong, independent effect. Table 5.3 shows both unadjusted and adjusted odds ratios for child mortality and stunting by mother's education, residence, and wealth quintile for selected countries. (There was no stunting information in the Egypt or Indonesia data used for this analysis.) The table, based on logistic regression, indicates that both mother's education and economic status as measured by the wealth index are important both before and after adjustment for each other and a number of other important variables. Table 5.3 also shows that after the adjustment for the various factors, residence is not significant in and of itself.

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Table 5.3   Unadjusted odds ratios and adjusted (adj.) odds ratios for under-five mortality (U5MR) and stunting by education, residence, and wealth quintile, DHS surveys in Peru, Egypt, Côte d'Ivoire, India, and Indonesia

| | Peru | | | | Egypt | | Côte d'Ivoire | | | | India | | | | Indonesia | |
| | U5MR | | Stunting | | U5MR | | U5MR | | Stunting | | U5MR | | Stunting | | U5MR | |
	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio	Odds ratio	Adj. odds ratio
Education																
No education	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Primary	0.7849	0.9027	0.8567	0.8098	0.7557	0.9330	0.7558	0.7626	1.0379	0.8188	0.6279	0.7787	0.7566	0.7678	0.6867	0.7527
Secondary	0.3697	0.6508	0.4693	0.5801	0.3661	0.6095	0.5316	0.5788	0.5459	0.5360	0.4070	0.6622	0.8007	0.6103	0.3445	0.5377
Higher	0.2417	0.4529	0.1597	0.3452	0.1732	0.3232	*	ns	*	ns	0.1678	0.3106	0.3934	0.3154	0.2259	0.5807
Residence																
Urban	0.4998	ns	0.3953	ns	0.5626	ns	0.7175	ns	0.5540	0.6114	0.5532	ns	0.8054	ns	0.5572	ns
Rural	1.0000	ns	1.0000	ns	1.0000	ns	1.0000	ns	1.0000	1.0000	1.0000	ns	1.0000	ns	1.0000	ns
Wealth quintile																
Lowest	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Second	0.9548	0.9127	0.8724	0.8736	0.8058	0.8899	0.9456	0.9666	1.0000	1.0221	1.0144	1.0584	1.0000	1.0950	0.8869	1.0395
Middle	0.6462	0.8321	0.6062	0.7159	0.6701	0.7594	0.8328	0.8852	0.9381	0.9386	0.7821	0.8993	0.8938	0.9210	0.8079	0.9588
Fourth	0.4622	0.7193	0.3611	0.5790	0.4515	0.6109	0.7599	0.7701	0.5522	0.5796	0.5420	0.7305	0.8514	0.8280	0.5900	0.8032
Highest	0.3271	0.5795	0.1427	0.3757	0.2798	0.4653	0.5167	0.5501	0.4753	0.5890	0.3422	0.6721	0.5872	0.7233	0.3464	0.7328

Note: Odds ratios for under-five mortality are adjusted through logistic regression for birth spacing, birth order, mother's age at birth, and death of preceding child (if any). Births occurring 60 to 179 months prior to the survey are used. Odds ratios for stunting are adjusted for the preceding variables as well as prenatal care, delivery attendance, tetanus toxoid vaccinations during the pregnancy, and the wantedness of the birth. Living children under five years of age are included. The surveys in Egypt and Indonesia did not measure children for nutritional status.
* Not shown due to small number of births (53)
ns = Not statistically significant

5.3   Environmental Health Conditions

For the selected countries, Table 5.4 shows two environmental health conditions: safe water supply and safe sanitation procedures. Safe water supply is defined as drinking water supplied through a piped system, either into the household or available at a public tap, or from a covered well. Among the poorest people in Egypt and Uzbekistan, almost half have access to a safe supply. However, in India and Kenya, even one out of four people in the highest quintile do not have access to safe drinking water.

Regarding safe sanitation, defined as access to private or shared flush toilets (including bucket flush) or a ventilated improved pit (VIP) latrine, only in Egypt do any of the people in the lowest quintile have access (46 percent). Among people in the highest quintile, only in Kenya and Uzbekistan do less than 80 percent have access to safe sanitation.

Table 5.4 Environmental health indicators by wealth quintile, DHS surveys 1992-1998

Indicator	Quintile (percent)					Population average	Low/high ratio
	Lowest	Second	Middle	Fourth	Highest		
Safe water supply (piped and covered well)							
Egypt 1995	47	73	87	97	99	81	0.5
India 1992-93	6	15	27	44	74	33	0.1
Kenya 1998	1	9	16	43	76	29	0.0
Peru 1996	14	60	87	97	100	72	0.1
Uzbekistan 1996	47	59	78	96	99	75	0.5
Safe sanitation disposal (flush toilet and VIP latrine)							
Egypt 1995	46	78	94	97	100	83	0.5
India 1992-93	0	0	4	22	80	22	0.0
Kenya 1998	0	1	3	12	64	16	0.0
Peru 1996	0	7	44	87	100	48	0.0
Uzbekistan 1996	0	1	2	5	70	16	0.0

VIP = Ventilated improved pit (latrine)

5.4   Education

Section 4 describes the characteristics of household heads and household members by wealth quintile and level of education. Figure 5.7 shows the level of literacy among poor women by country, and Figure 5.8 shows the proportion of poor children age 6 to 14 years who have never attended school or who have dropped out.

Figure 5.7
Percentage of Poor Women Who Are Literate,
by Region, DHS Surveys 1990-1999

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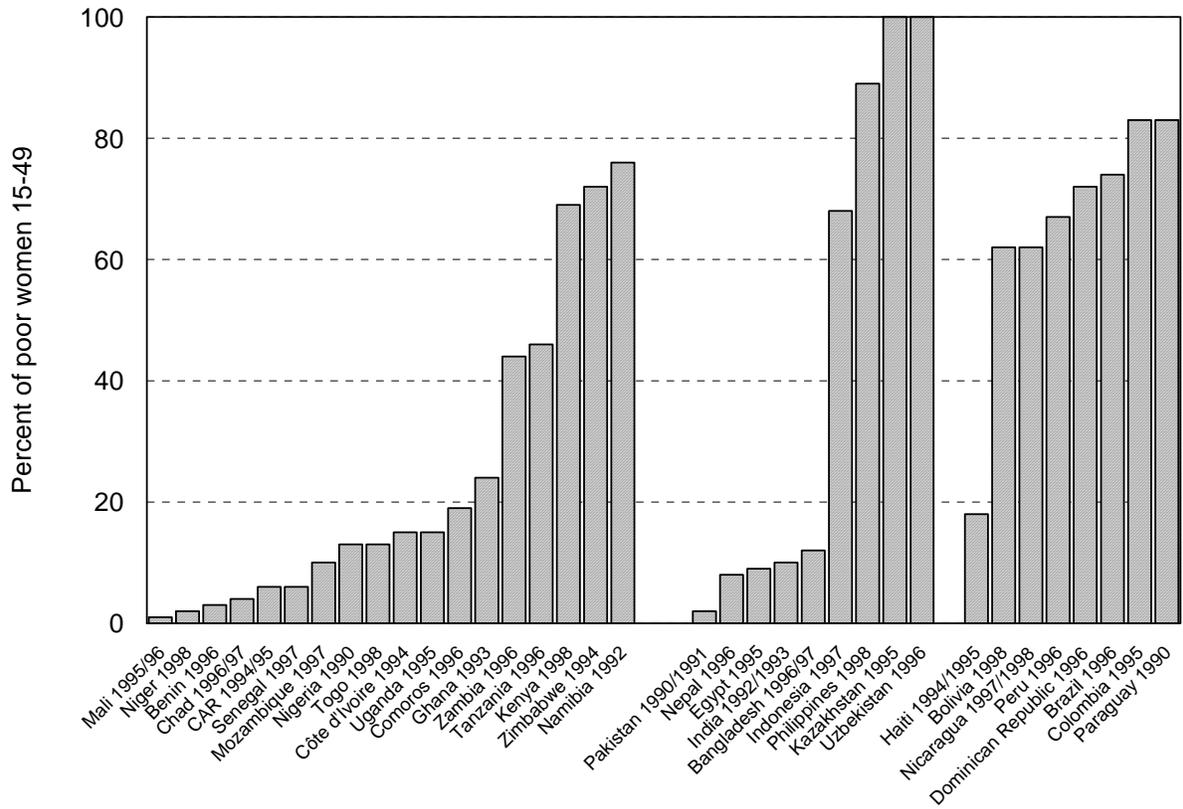
Figure 5.8
Among Poor Children Age 6-14 Who Are Not Attending School,
Percentage Who Never Attended School and Percentage Who Attended
But Dropped Out, by Region, DHS Surveys 1990-1999
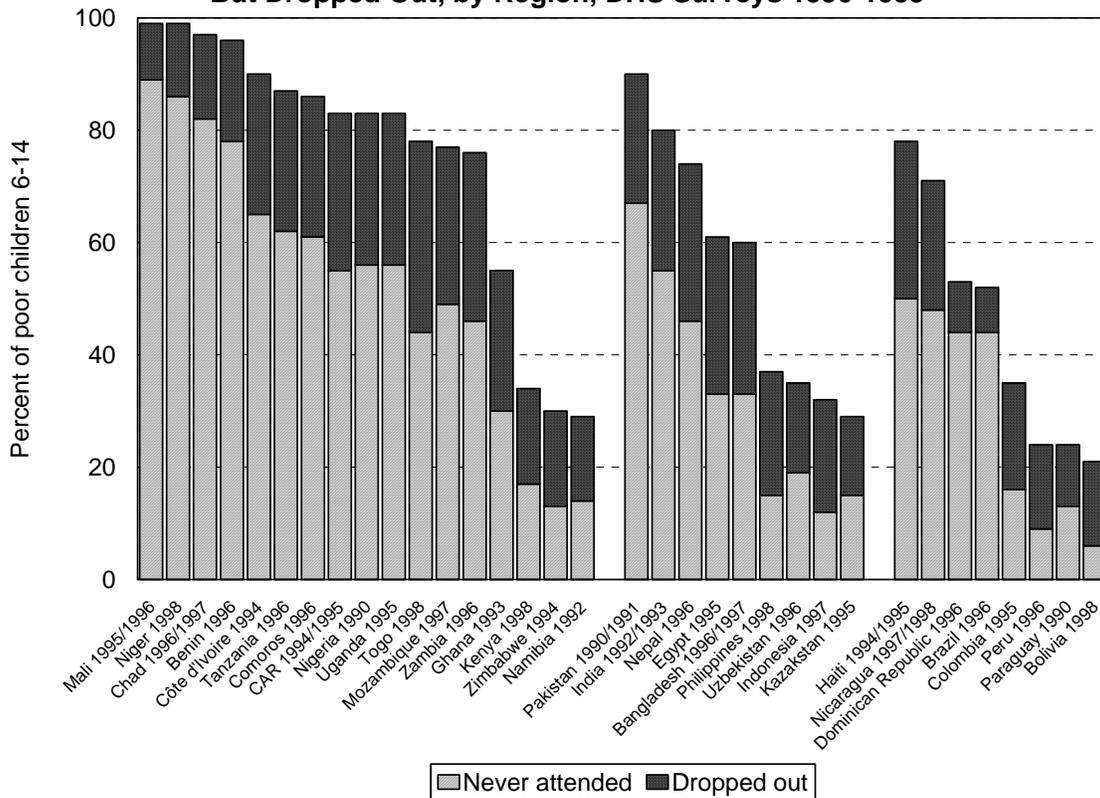
Both figures indicate that there is substantial variation in literacy and education among the poor across countries, much more so than across world regions. Another use of this information is shown in Figure 5.9, which compares drop-out rates with the percentage of children with no education among children age 6-14 years in the lowest quintiles. Except for Brazil and the Dominican Republic, there is a strong linear relationship between the two. Thus, poor children in these countries are doubly burdened: even those who are fortunate enough to start school are likely to drop out before completing their education.

Figure 5.9
Relationship Between No Education and the Drop-Out Rate,
among Poor Children Age 6-14, DHS Surveys 1990-1999
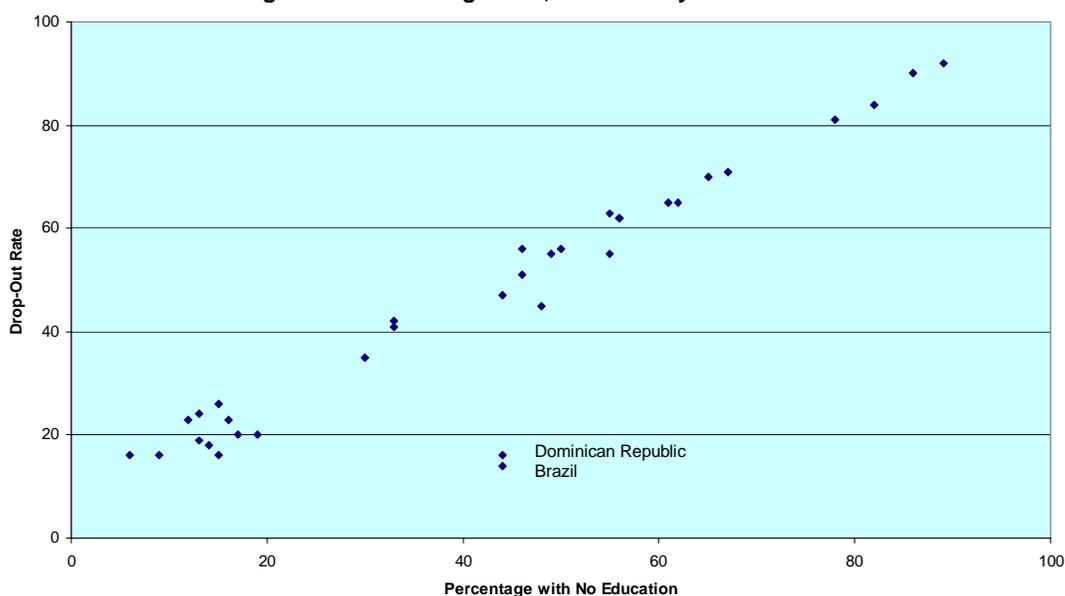
5.5   Use of Public Services

Another way in which the wealth index can be used is in evaluating the reach of public health services. Figure 5.10 shows the percentage of children under five with acute respiratory infection (ARI) treated for the illness in a public facility, by wealth quintile. The figure compares Bolivia and Turkey. In both countries, the greatest use of public facilities for treating ARI is in the fourth wealth quintile. The poorest make the least use of services. Figure 5.11 shows the use of public facilities for childbirth in the two countries. Again, the lowest quintile has the least use, and the fourth and highest quintiles have the most use. Figure 5.12 shows that the relationship is reflected by more countries than just Bolivia and Turkey. The use of publicly provided childbirth delivery, ARI, and diarrhea services increases with increasing wealth quintile in 11 countries. These results, which need further investigation, may be related to public facilities being located in or near more affluent urban areas.

**Figure 5.10
Use of Public Health Services for Acute Respiratory
Infection (ARI), by Wealth Quintile, DHS Surveys
in Bolivia and Turkey**

Percentage of children with ARI

| Lowest | Second | Middle | Fourth | Highest |
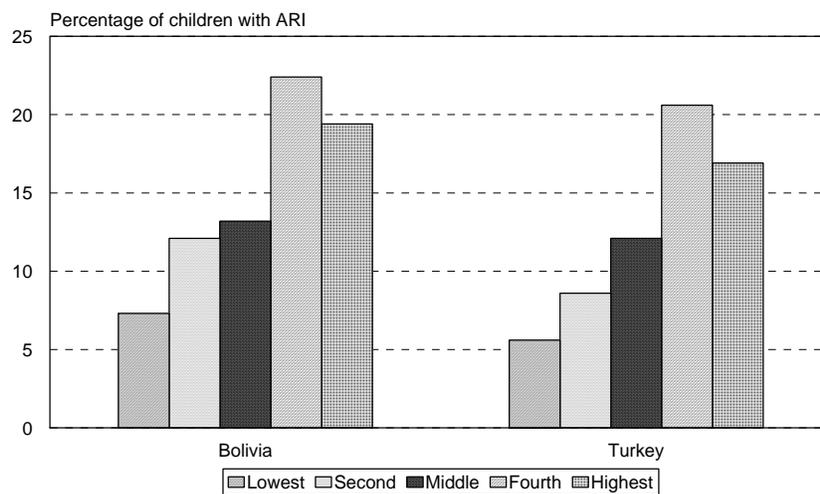
Note: Children under five with ARI in the two weeks preceding the survey

**Figure 5.11
Use of Public Health Services for Assistance at Childbirth,
by Wealth Quintile, DHS Surveys in Bolivia and Turkey**

Percentage of births

| Lowest | Second | Middle | Fourth | Highest |
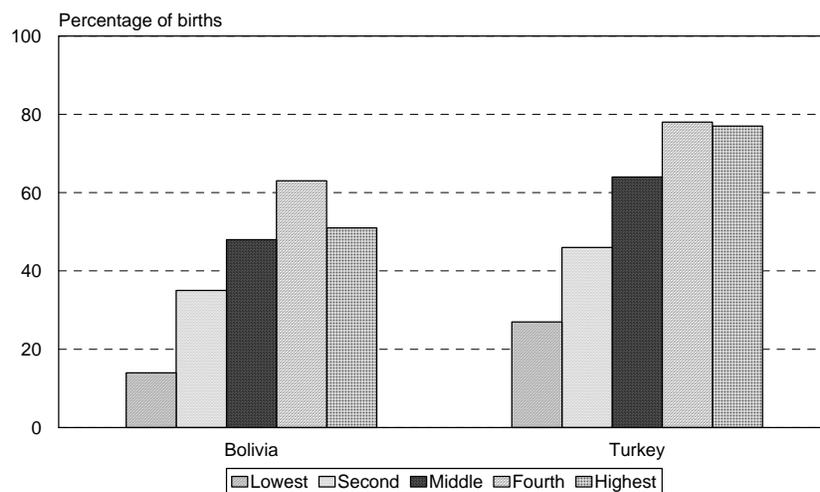
Figure 5.12
Use of Public Health Services for Delivery, ARI Treatment,
and Diarrhea Treatment, by Wealth Quintile (11 countries)
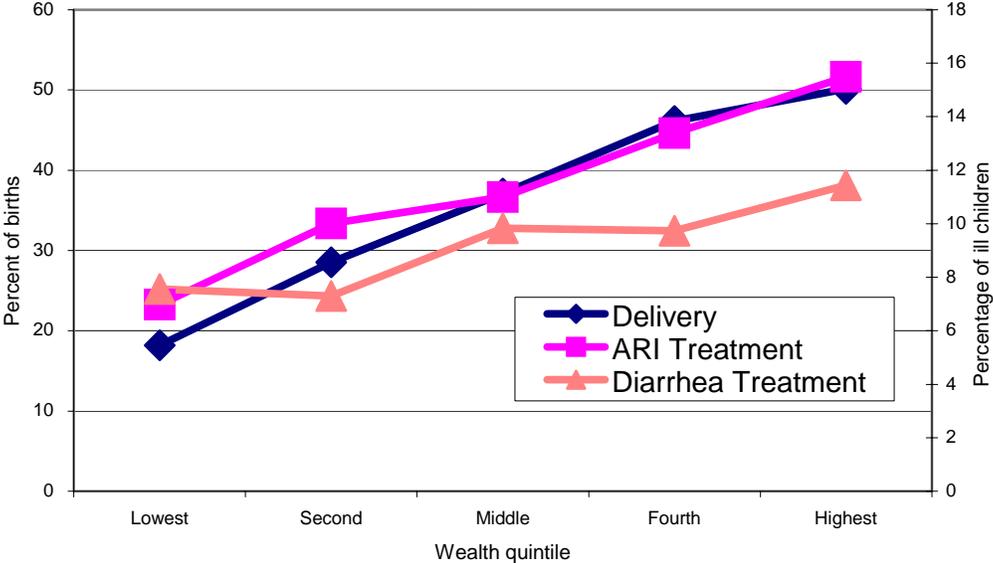
6　Targeting Programs and Services by Wealth and Mapping Poverty

An important use of the wealth index can be for targeting services, programs, and projects that alleviate poverty. Many programs use geographical criteria for targeting their activities, and so mapping poverty or wealth is an important component. Several illustrations are presented below as to how the DHS wealth index can be used for geographic poverty targeting with both tables and maps.

6.1　Where Do the Poor Live?

Figure 6.1 presents the distribution of the household population in the lowest quintile by state from the India 1992-93 NFHS survey. This figure shows that three states, Uttar Pradesh, Bihar, and West Bengal, account for more than half of the poorest people in India. Figure 6.2 shows a map of India illustrating the geographic distribution of people in the lowest wealth quintile. Table 6.1 shows the distribution of the population by state according to wealth quintile.

**Figure 6.1 Distribution of the Population in the
Lowest Wealth Quintile by State, India 1992-93**
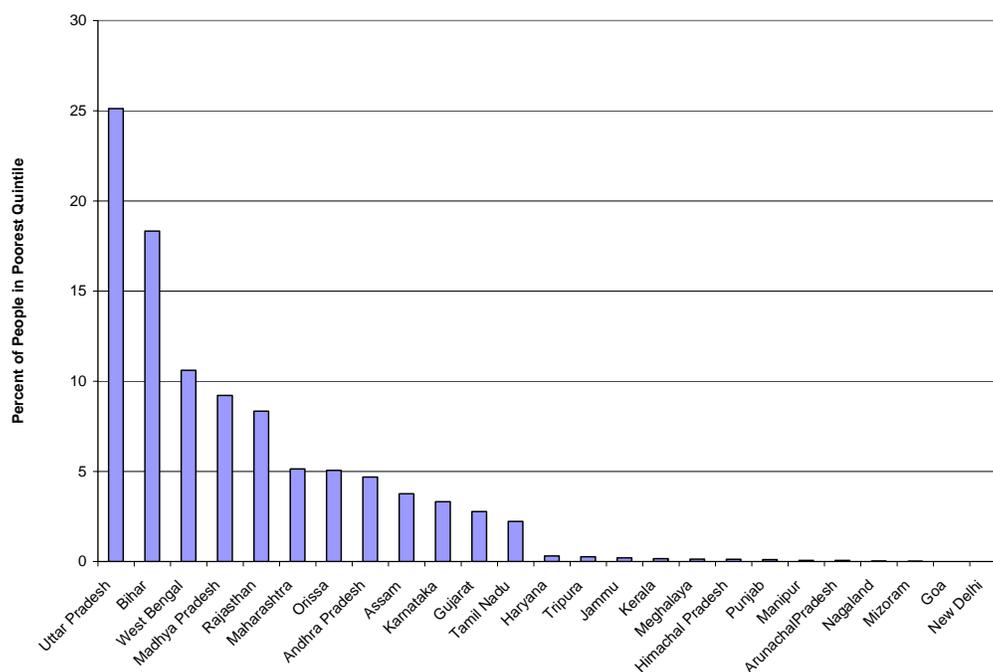
Figure 6.2
Map of India Showing Distribution of the Population in the
Lowest Quintile by State, India 1992-93
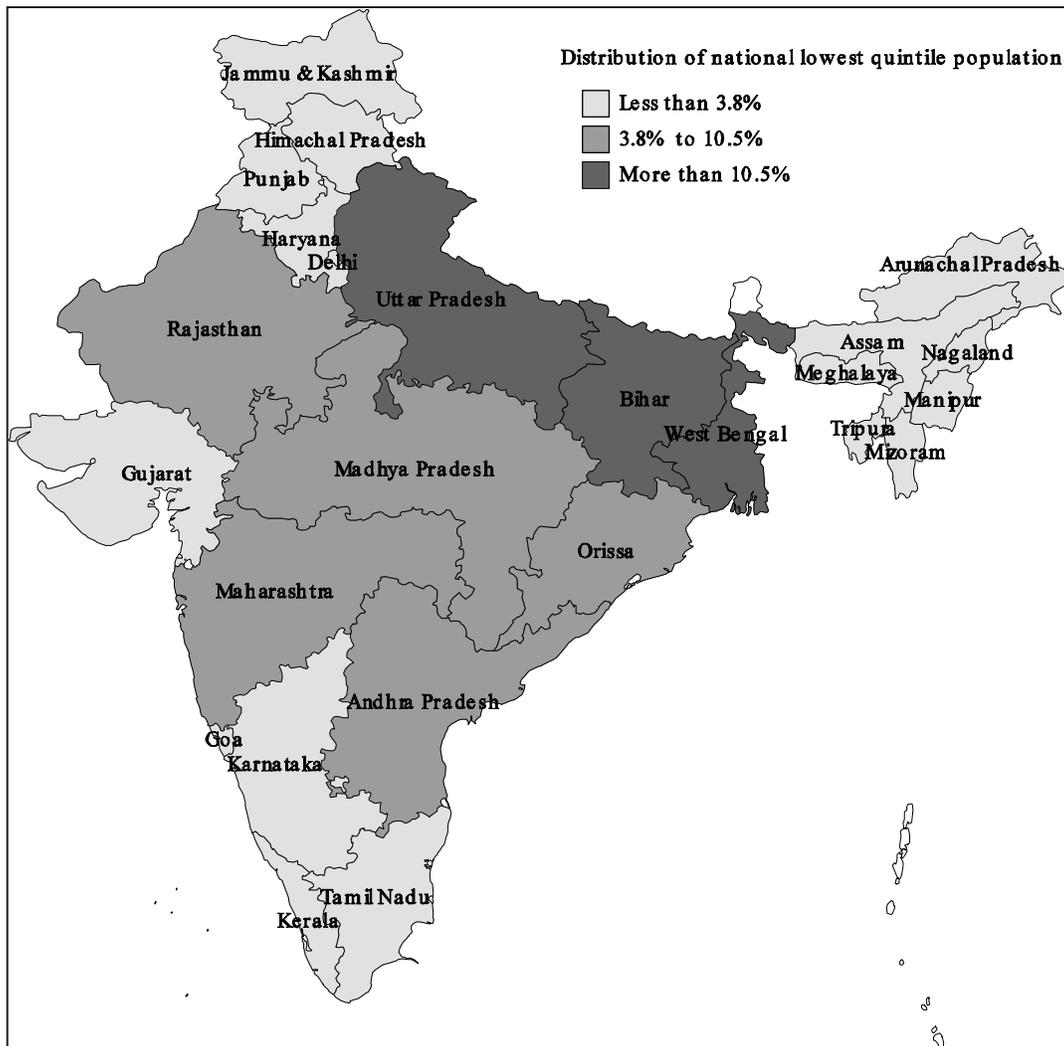
Table 6.1 Percent distribution of the household population by state, according to wealth quintile, India 1992-93

| State | Quintile | | | | | Total |
	Lowest	Second	Middle	Fourth	Highest	
Uttar Pradesh	25.1	23.8	16.3	13.2	13.6	18.4
Bihar	18.3	18.0	9.4	5.1	5.9	11.3
West Bengal	10.6	9.9	5.3	5.8	7.2	7.8
Madhya Pradesh	9.2	7.4	10.8	6.6	6.8	8.2
Rajasthan	8.3	4.5	5.7	5.6	4.2	5.7
Maharashtra	5.1	5.4	9.6	11.2	14.2	9.1
Orissa	5.1	5.4	2.9	2.7	1.5	3.5
Andhra Pradesh	4.7	6.8	8.6	7.8	7.4	7.0
Assam	3.8	4.3	2.6	1.4	1.4	2.7
Karnataka	3.3	4.1	7.7	6.4	5.4	5.4
Gujarat	2.8	2.4	4.8	6.0	7.3	4.7
Tamil Nadu	2.2	4.4	6.5	7.3	6.2	5.3
Haryana	0.3	0.7	1.9	4.9	2.9	2.1
Tripura	0.3	0.4	0.4	0.4	0.2	0.3
Jammu	0.2	0.2	0.4	0.8	0.6	0.4
Kerala	0.2	1.3	3.7	5.5	4.7	3.1
Meghalaya	0.1	0.3	0.3	0.3	0.2	0.2
Himachal Pradesh	0.1	0.2	1.0	1.2	0.4	0.6
Punjab	0.1	0.3	1.2	5.5	4.9	2.4
Manipur	0.1	0.1	0.3	0.4	0.2	0.2
Arunachal Pradesh	0.1	0.1	0.2	0.1	0.1	0.1
Nagaland	0.0	0.1	0.2	0.3	0.1	0.1
Mizoram	0.0	0.0	0.1	0.2	0.1	0.1
Goa	0.0	0.0	0.1	0.2	0.3	0.1
New Delhi	0.0	0.0	0.1	0.9	4.2	1.0
India	100.0	100.0	100.0	100.0	100.0	100.0

Note: Quintiles are based on distribution of national population.

Another way to look at the same data, i.e., percentage of people in the lowest quintile by state, is shown in Figure 6.3. In this figure, six states, Bihar, Rajasthan, Orissa, Assam, Uttar Pradesh, and West Bengal, have more than one in four people in the lowest wealth quintile. Under either criterion, Uttar Pradesh, Bihar, and West Bengal are the states with the highest levels of poverty. The full distribution of poverty by state is shown in Table 6.2.

Figure 6.3 Percentage of the Population in the Lowest Wealth Quintile, by State, India 1992-93
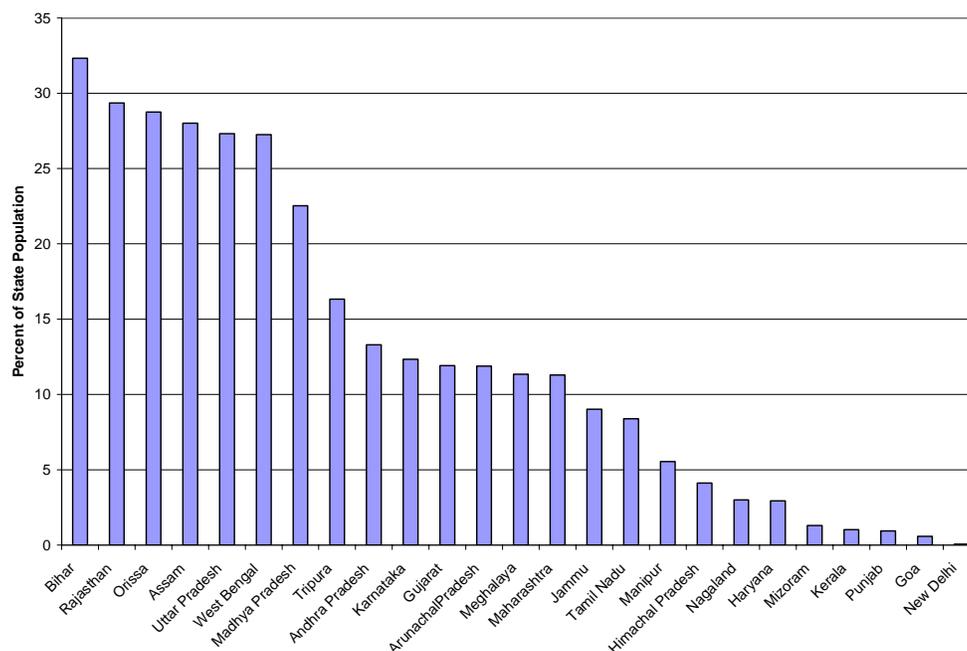
Table 6.2 Percentage of household population in each wealth quintile, according to state, India 1992-93

State	Lowest	Second	Middle	Fourth	Highest	Total
			Quintile			
Bihar	32.3	31.7	16.6	9.0	10.4	100.0
Rajasthan	29.4	15.9	20.1	19.8	14.9	100.0
Orissa	28.8	30.8	16.2	15.5	8.7	100.0
Assam	28.0	31.8	19.2	10.5	10.5	100.0
Uttar Pradesh	27.3	25.8	17.8	14.3	14.8	100.0
West Bengal	27.2	25.5	13.7	15.0	18.5	100.0
Madhya Pradesh	22.5	18.1	26.4	16.2	16.6	100.0
Tripura	16.3	23.7	24.6	25.6	9.8	100.0
Andhra Pradesh	13.3	19.3	24.4	22.1	20.9	100.0
Karnataka	12.3	15.3	28.8	23.7	20.0	100.0
Gujarat	11.9	10.2	20.7	25.8	31.4	100.0
Arunachal Pradesh	11.9	17.3	31.2	27.9	11.6	100.0
Meghalaya	11.3	23.5	22.5	26.1	16.6	100.0
Maharashtra	11.3	11.9	21.0	24.7	31.2	100.0
Jammu	9.0	7.9	19.9	36.4	26.7	100.0
Tamil Nadu	8.4	16.4	24.5	27.4	23.4	100.0
Manipur	5.5	12.7	24.8	36.1	20.9	100.0
Himachal Pradesh	4.1	5.4	36.0	41.5	13.0	100.0
Nagaland	3.0	7.1	28.4	45.3	16.1	100.0
Haryana	2.9	6.7	17.3	45.9	27.2	100.0
Mizoram	1.3	7.8	18.0	50.3	22.7	100.0
Kerala	1.0	8.6	23.8	35.8	30.8	100.0
Punjab	0.9	2.5	9.7	46.1	40.7	100.0
Goa	0.6	3.3	11.8	33.5	50.9	100.0
New Delhi	0.1	0.4	2.3	17.5	79.7	100.0
India	20.0	20.0	20.0	20.0	20.0	100.0

Note: Quintiles are based on distribution of national population.

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6.2   Which States Are the Poorest?

Using Peru as an example, Table 6.3 compares two measures of overall economic status of the household population according to state (called "departments" in Peru). Both the average quintile value for the state and the average wealth index score are presented. There is little difference in the rankings of the departments by either indicator, and where there is a reversal, it is very small (noted by italics). In Peru, the poorest departments tend to cluster geographically, as seen in Figure 6.4.

Table 6.3 Mean wealth quintile and mean wealth index score by department, Peru 1996		
Region	Quintile mean	Mean index score
Huancavelica	1.538	-0.892
Cajamarca	1.838	-0.681
Amazonas	*1.918*	*-0.610*
Apurimac	*1.939*	*-0.626*
Ayacucho	2.117	-0.475
Huanuco	2.215	-0.429
Pasco	2.324	-0.307
Puno	2.325	-0.304
Ucayali	2.357	-0.275
San Martin	2.385	-0.264
Cusco	2.406	-0.235
Loreto	2.519	-0.185
Junin	2.754	0.029
Madre de Dios	2.787	0.033
La Libertad	2.810	0.049
Piura	*2.881*	*0.085*
Ancash	*2.889*	*0.083*
Lambayeque	3.169	0.299
Tumbes	3.327	0.416
Moquegua	3.353	0.435
Ica	3.474	0.540
Arequipa	3.549	0.597
Tacna	3.852	0.819
Lima	3.861	0.837
Peru	3.003	0.191

Note: Quintile and index scores are based on household population. Italics indicates a reversal in ranking.

Figure 6.4
Map of Peru Showing Mean Wealth Index Scores, by Department, Peru 1996
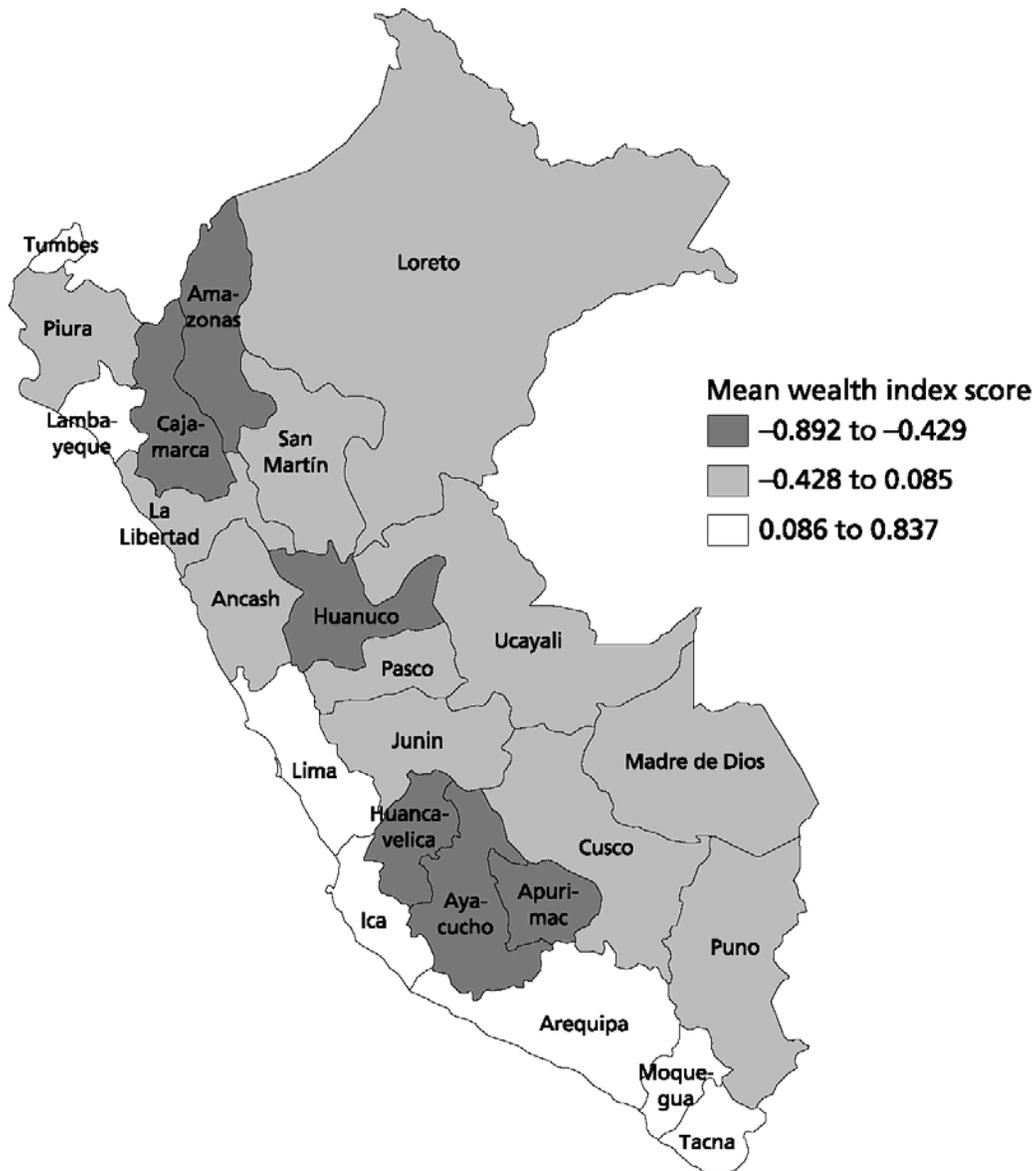
6.3   Nongeographic Targeting

Many times, geographic targeting is too broad to achieve program and project goals. Not all poor people live in poor areas, and not all who live in poor areas are poor themselves. The wealth index score coefficients can be useful for targeting families if they are used judiciously. If reliable information can be gathered on assets and services for families attending health facilities, then the resultant score could be used for, say, assessment of user fees. The basic problem is obtaining information—perhaps through a visit to the household—that is not underestimated by the patient in order to lower the user fees he or she is charged. It appears that the wealth index could have significant advantages over asking about expenditures or income for targeting, since much information can be gathered by observation. However, once patients know that user fees are tied to the responses they give, simple questions in facilities with no confirming observations could influence them to hide or misstate their assets and services.

7   Joining with Other Poverty Measures

As mentioned previously, there may be official poverty lines based on non-DHS data and criteria other than quintiles. Usually, a consumption survey is combined with a minimum wage criterion to specify the percentage of the population (or households) below the poverty line. Drawbacks in using consumption expenditure data and politically determined criteria were mentioned above. However, for administrative needs, it is often necessary to use official figures. The percentage of the population below the official poverty line for selected countries is shown in Table 7.1. Uzbekistan does not have official figures, so those of Kazakhstan are used instead.

Table 7.1 Percentage of population below official poverty line in selected countries		
Country	Percentage of population	Corresponding cutoff value of the wealth index
Egypt	23	-0.855812
India	25	-0.923202
Kenya	50	-0.028722
Kazakhstan	26	-1.060894
Peru	50	0.245489

Selected health and asset indicators are shown according to the official poverty line in Table 7.2. In Egypt 1995 and Peru 1996, under-five mortality rates for those below the poverty line (124 and 74, respectively) are at least twice as high as under-five rates for those above the line (63 and 34, respectively). There is little difference in Kazakhstan (48 and 45), however. From a broader perspective, the under-five mortality rates for children below the poverty line in Kazakhstan and Peru (48 and 74) are below those for children above the line in India (96). Part of the difference may be the setting of the line. In Peru, 50 percent of the population is below the line, while in India, only 25 percent is below. If, in Peru, only the poorest 25 percent were classified as below the line, the above result would probably not hold since the lowest quintile has a rate of 110 deaths per 1,000 births.

Other notable differences between the poor and the nonpoor in Table 7.2 are seen in India 1992-93 and Kazakhstan 1995. A high proportion of the nonpoor in India probably would be classified as poor in most other countries since several of the indicator values are low: only 28 percent of births are delivered with the assistance of a physician, only 42 percent of children age 12-23 months have had all basic vaccinations, almost half of the children are stunted, and 61 percent of the population have no toilet or latrine facilities. At the other extreme is Kazakhstan, which shows little difference between the poor and nonpoor populations. Mortality rates, contraceptive use, and vaccination rates are almost the same in the two groups, and even among the poor, 79 percent of the population live in households with a television. While the simple division into poor and nonpoor can be useful for getting a quick idea of health and other differences, it can hide large differentials within the groups and is hard to compare across countries because of political considerations in establishing official poverty lines.

Table 7.2 Health and asset indicators for household populations above and below the official poverty line in selected countries

Indicator	Egypt 1995		India 1992-93		Kazakhstan 1996		Kenya 1998		Peru 1996	
	Poor	Not poor	Poor	Not poor	Poor	Not poor	Poor	Not poor	Poor	Not poor
Under-five mortality rate	124.0	63.0	142.4	96.2	47.9	44.5	127.3	74.8	74.2	34.2
Use of modern contraception	29.9	49.9	25.1	40.1	44.1	46.6	23.5	45.4	33.8	48.7
Delivery assistance by a physician	15.3	48.3	5.5	27.8	70.7	81.2	8.2	21.6	18.2	55.2
Full basic vaccination	65.2	83.6	17.3	42.3	20.3	24.7	58.2	62.2	60.8	66.3
Percent of children stunted	37.8	26.8	60.3	48.7	26.1	12.2	37.4	23.1	35.6	10.2
Knowledge of sexual transmission of HIV/AIDS	u	u	u	u	u	u	51.3	66.0	46.8	78.8
Piped water into residence	41.2	73.1	0.7	23.7	0.3	78.4	3.9	48.1	27.6	92.1
Has no latrine or toilet	22.5	5.5	98.7	60.6	1.4	0.3	23.2	2.7	45.2	0.8
Has television	58.6	85.1	0.0	29.4	78.6	94.0	0.8	37.5	44.0	95.8

Indicators:
Under-five mortality rate: for the five-year period preceding the survey
Use of modern contraception: by currently married women age 15-49
Delivery assistance by a physician: births in the last five years
Full basic vaccination: children age 12-23 months getting BCG, three doses of DPT and polio, and measles vaccine
Percent of children stunted: children under age five years who are below -2 SD on the WHO/CDC/NCHS height-for-age standard
Knowledge of sexual transmission of HIV/AIDS: women age 15-49
Assets: Percentage of household population with asset
u = Unknown (not available)

8   Further Work

There are several ways in which the DHS wealth index can be improved. One is by extending the list of assets and services beyond those in the current core set. In several countries, more assets have been asked about, such as possession of a computer, cell phone, and sofa set. Table 8.1 gives potential areas for extension of the asset and service list. Individual new items are shown in Appendix Tables C.1 to C.11. The idea is have questions that are easy to answer (i.e., people will be willing to respond) or items that can be observed. An example would be whether there is glass in the windows of the dwelling, which is easily observable. It is also easier to ask whether someone in the household has a bank account of any kind (e.g., checking, savings, loan) rather than how much is in the account. Possession of jewelry and clothing (including shoes) presumably should not be asked but can be observed by the interviewer. While some items will be country specific, others should be considered for any new DHS core questionnaires. It is important to include items that distinguish households throughout the economic status scale and not just at one end or the other. However, individual items can be effective at only the low end, at only the high end, or in the middle, and an appropriate mix of such items should be asked. At the low end, items such as dining tables and chairs can be asked about or observed. At the higher end, computers and DVD players can be asked about. Household possession of business and farm equipment, machinery, livestock, and inventory can be asked about.

Table 8.1 New wealth index areas (presence of item)
_____

Farm equipment
Livestock
Business equipment
Financial assets, loans
Land holdings and real estate
  - Agricultural
  - Nonagricultural
Furnishings
Clothing and jewelry
Communications

Currently, the DHS survey covers the household population. Not all people in a country are covered, especially some of the poor who may not be living in households or in dwellings. Special samples have been suggested to include the homeless, those living in group quarters, and people living in refugee camps. Since the homeless and people living in noninstitutional group quarters are part of the general population, ways of including them should be examined, such as special samples with interviews occurring during a given night in the locations where they sleep. Ascertaining their economic status is problematic, especially for the homeless, but they can probably be included in the lowest quintile. On the other hand, institutional populations, such as people in the army, hospitals, asylums, prisons, and orphanages, generally do not have access to health services available for the general population, but they may have access to specialized health services. These people should not be included in analyses that cover the general population of the country but rather should be the subject of special studies.

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Appendix A

The Development and History of the U.S. Poverty Thresholds —
A Brief Overview
by
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[*GSS/SSS Newsletter* [Newsletter of the Government Statistics Section and the Social Statistics Section of the American Statistical Association], Winter 1997, pp. 6-7]

In view of the recent major proposal to revise the way in which the United States measures poverty, it may be useful to review the development and subsequent history of the current official poverty thresholds.

The poverty thresholds were originally developed in 1963-1964 by Mollie Orshansky of the Social Security Administration. She published an analysis of the poverty population using these thresholds in a January 1965 *Social Security Bulletin* article. Orshansky based her poverty thresholds on the economy food plan — the cheapest of four food plans developed by the Department of Agriculture. The actual combinations of foods in the food plans, devised by Agriculture Department dietitians using complex procedures, constituted nutritionally adequate diets; the Agriculture Department described the economy food plan as being "designed for temporary or emergency use when funds are low." (Orshansky also developed a second set of poverty thresholds based on the Agriculture Department's somewhat less stringent low-cost food plan, but relatively little use was ever made of these higher thresholds.)

Orshansky knew from the Department of Agriculture's 1955 Household Food Consumption Survey (the latest available such survey at the time) that families of three or more persons spent about one third of their after-tax money income on food in 1955. Accordingly, she calculated poverty thresholds for families of three or more persons by taking the dollar costs of the economy food plan for families of those sizes and multiplying the costs by a factor of three — the "multiplier." In effect, she took a hypothetical average family spending one third of its income on food, and assumed that it had to cut back on its expenditures sharply. She assumed that expenditures for food and non-food would be cut back at the same rate. When the food expenditures of the hypothetical family reached the cost of the economy food plan, she assumed that the amount the family would then be spending on non-food items would also be minimal but adequate. (Her procedure did not assume specific dollar amounts for any budget category besides food.) She derived poverty thresholds for two-person families by multiplying the dollar cost of the food plan for that family size by a somewhat higher multiplier (3.7) also derived from the 1955 survey. She derived poverty thresholds for one-person units directly from the thresholds for two-person units, without using a multiplier. The base year for the original thresholds was calendar year 1963.

Orshansky differentiated her thresholds not only by family size but also by farm/nonfarm status, by the sex of the family head, by the number of family members who were children, and (for one- and two-person units only) by aged/non-aged status. The result was a detailed matrix of 124 poverty thresholds, although the figures generally cited were weighted average thresholds for each family size.

In her January 1965 article, Orshansky presented the poverty thresholds as a measure of income inadequacy, not of income adequacy — "if it is not possible to state unequivocally 'how much is enough,' it should be possible to assert with confidence how much, on an average, is too little."

While the poverty thresholds had been calculated on the basis of after-tax money income, they were applied to income data — the Census Bureau's Current Population Survey — that used a before-tax definition of money income; this was done because when the thresholds were being developed, the Current Population Survey was the only good source of nationally representative income data. Orshansky was aware of the inconsistency involved, but there was no other alternative; she reasoned that the result would yield "a conservative underestimate" of poverty.

In April-May 1965, it was decided to set farm poverty thresholds at 70 percent of the corresponding nonfarm thresholds, and to update the thresholds for annual price changes by the yearly change in the per capita cost of the economy food plan. In May 1965 — just over a year after the Johnson Administration had initiated the War on Poverty — the Office of Economic Opportunity adopted Orshansky's poverty thresholds as a working or quasi-official definition of poverty.

As early as November 1965, Social Security Administration policymakers and analysts began to express concern about how to adjust the poverty thresholds for increases in the general standard of living. (There is extensive historical evidence from the U.S. and other countries that successive poverty lines developed as absolute poverty lines show a pattern of getting higher in real terms as the real income of the general population rises; this evidence is discussed in the author's "Relative or Absolute — New Light on the Behavior of Poverty Lines Over Time," in the Summer 1996 issue of this newsletter.) In 1968, the Social Security Administration tried to take a very modest step towards raising the poverty thresholds to reflect increases in the general standard of living. The Bureau of the Budget (the predecessor of the Office of Management and Budget) prohibited the modest increase in the poverty thresholds, but initiated an interagency Poverty Level Review Committee to re-evaluate the poverty thresholds. This Committee decided to adjust the thresholds only for price changes, and not for changes in the general standard of living. In 1969, the Committee decided that the thresholds would be indexed by the Consumer Price Index instead of by the per capita cost of the economy food plan, and that farm poverty thresholds would be set at 85 percent rather than 70 percent of corresponding nonfarm thresholds. In August 1969, the Bureau of the Budget designated the poverty thresholds with these revisions as the federal government's official statistical definition of poverty.

In 1973, three interagency subcommittees were formed to conduct a thorough review of federal income and poverty statistics. The Subcommittee on Updating the Poverty Threshold recommended that the poverty thresholds be updated every ten years using a revised food plan and a multiplier derived from the latest available food consumption survey; this would generally have resulted in higher poverty thresholds at each decennial revision. The Subcommittee also recommended that the definition of income used to measure overall income should also be the income definition used to calculate the multiplier for revised poverty thresholds. No changes were made in the poverty definition as a result of the 1973 review of poverty and income statistics.

In 1974, in response to a Congressional requirement, an interagency Poverty Studies Task Force was established to undertake an intensive review of the current poverty measure and alternative measurement schemes. A final report, *The Measure of Poverty,* was submitted to Congress in 1976 along with seventeen Technical Papers. This report thoroughly explored the issues involved in developing and revising poverty measures, but did not recommend specific changes in the current poverty measure.

In 1981, several minor changes were made in the poverty thresholds in accordance with recommendations of an interagency committee. The farm/nonfarm differential was eliminated by applying nonfarm poverty thresholds to all families. The distinction between thresholds for "female-headed" and "male-headed" families was eliminated by averaging. The poverty threshold matrix was extended to make the largest family size category "nine persons or more" rather than "seven or more persons." These changes reduced the number of thresholds in the detailed matrix of poverty thresholds from 124 to 48.

During the 1980s, there were extensive debates about poverty measurement — particularly about proposals to count government noncash benefits as income for measuring poverty without making corresponding changes in the poverty thresholds. (For comments on these proposals, see pp. 9, 65-66, 205, and 227-231 of the report cited in the next paragraph.) However, no changes were made in the official poverty definition during the 1980s.

In 1990, a Congressional committee requested a study of the official U.S. poverty measure by the National Academy of Sciences/National Research Council to provide a basis for a possible revision of the poverty measure. In 1992, the NRC's Committee on National Statistics appointed a Panel on Poverty and Family Assistance to conduct this study. In May 1995, the Panel published its report of the study (Constance F. Citro and Robert T. Michael (editors), *Measuring Poverty: A New Approach,* Washington, D.C., National Academy Press, 1995). In the report, the Panel proposed a new approach for developing an official poverty measure for the U.S. — although it did not propose a specific set of dollar figures. The Panel's proposal has been summarized and discussed in a number of sources, including earlier issues of this newsletter.

(This article is a summary of Gordon M. Fisher, "The Development and History of the Poverty Thresholds," Social Security Bulletin, Vol. 55, No. 4, Winter 1992, pp. 3-14; the article was condensed from a 75-page unpublished paper. [This unpublished paper — subsequently revised to 88 pages — is available on the Census Bureau's Poverty Measurement Web site at http://www.census.gov/hhes/poverty/ povmeas/papers/orshansky.html.] For additional information, you may contact Gordon Fisher by telephone (202-690-6143) or e-mail gordon.fisher@hhs.gov. The views expressed here are those of the author, and do not represent the position of the Department of Health and Human Services.)

Appendix B

Table B.1 Distribution statistics and quintile cutoff values for the wealth index

Country and survey	Mean	Median	Mode	Skewness	Kurtosis	Quintile cutoff values			
						1st-2nd	2nd-3rd	3rd-4th	4th-5th
Sub-Saharan Africa									
Benin 1996	0.084	-0.190	-1.065	0.971	0.165	-0.8631	-0.4743	-0.0134	0.9419
CAR 1994-95	0.016	-0.329	-0.587	3.205	13.784	-0.5727	-0.3463	-0.0572	0.7773
Chad 1996-97	-0.226	-0.489	-0.639	4.264	24.511	-0.6390	-0.5212	-0.4114	-0.0295
Comoros 1996	0.065	-0.344	-0.395	1.965	4.563	-0.7726	-0.5178	-0.2232	0.5259
Côte d'Ivoire 1994	-0.042	-0.257	-1.067	0.891	0.230	-0.9234	-0.5166	0.0270	0.9414
Ghana 1998	0.086	-0.236	-0.622	1.251	1.089	-0.7886	-0.5417	-0.0990	0.8452
Kenya 1998	0.065	-0.344	-0.395	1.965	4.563	-0.7726	-0.5178	-0.2232	0.5259
Madagascar 1997	-0.124	-0.432	-0.836	1.899	4.234	-0.8109	-0.6007	-0.2656	0.3706
Malawi 1992	-0.194	-0.534	-0.589	2.390	5.773	-0.6210	-0.5509	-0.3857	0.1798
Mali 1995-96	-0.018	-0.293	-0.819	3.065	12.457	-0.5592	-0.3276	-0.1019	0.4635
Mozambique 1997	-0.123	-0.401	-0.438	3.993	18.626	-0.5501	-0.4177	-0.2766	0.2252
Namibia 1992	0.093	-0.463	-0.719	0.818	-0.884	-0.7776	-0.6952	-0.4022	0.8945
Niger 1998	-0.080	0.028	0.284	-0.579	1.505	-0.9018	-0.1680	0.2878	0.8157
Nigeria 1990	-0.204	-0.423	-1.122	1.001	0.156	-0.9615	-0.5931	-0.3144	0.5026
Senegal 1997	0.000	-0.461	-0.699	1.575	1.996	-0.7105	-0.5839	-0.1851	0.8381
Tanzania 1996	-0.050	-0.398	-0.559	2.846	10.268	-0.5854	-0.5043	-0.3329	0.3761
Togo 1998	0.070	-0.089	-1.142	0.861	0.540	-0.9054	-0.4137	0.0564	0.8034
Uganda 1995	-0.220	-0.434	-0.635	3.992	21.706	-0.5968	-0.4944	-0.3713	-0.1366
Zambia 1996	0.145	-0.443	2.224	1.317	0.583	-0.6823	-0.5233	0.1042	1.3364
Zimbabwe 1994	0.061	-0.252	-0.904	0.851	-0.365	-0.9035	-0.6553	-0.2161	0.9787
Near East and North Africa									
Egypt 1995	-0.020	0.153	0.815	-1.135	1.911	-0.9829	-0.3133	0.1757	0.6939
Morocco 1992	0.000	-0.068	1.239	0.041	-1.545	-1.1056	-0.5611	0.3662	1.1747
Europe and Central Asia									
Kazakhstan 1995	-0.133	-0.385	1.446	0.402	-1.083	-1.1238	-0.7824	-0.3434	0.5266
Turkey 1993	0.020	0.004	0.586	0.169	-0.796	-1.0347	-0.4791	0.1940	0.8551
Uzbekistan 1996	-0.231	-0.280	-0.015	0.241	-0.350	-1.1141	-0.6670	-0.1712	0.2792
South and Southeast Asia									
Bangladesh 1996-97	-0.035	-0.399	-0.694	2.376	4.967	-0.5609	-0.4719	-0.2428	0.2297
India 1992-93	-0.178	-0.496	-0.957	0.972	0.004	-0.9879	-0.7092	-0.2127	0.6529
Indonesia 1997	0.136	0.075	1.285	0.305	-0.494	-0.7247	-0.1616	0.3874	1.0176
Nepal 1996	-0.046	-0.389	-0.749	2.277	5.397	-0.6315	-0.4727	-0.2318	0.2720
Pakistan 1990-91	-0.273	-0.685	-1.132	1.110	0.103	-1.0109	-0.7899	-0.3146	0.7124
Philippines 1998	0.183	0.193	1.123	0.045	-1.009	-0.8669	-0.0992	0.5531	1.1699
Viet Nam 1997	-0.053	-0.175	0.275	0.633	-0.079	-0.9389	-0.4388	0.0634	0.7040
Latin America and Caribbean									
Bolivia 1998	0.145	0.299	1.492	-0.251	-0.977	-0.9396	0.0169	0.5226	1.0711
Brazil 1996	-0.123	-0.401	-0.438	3.993	18.626	-0.5501	-0.4177	-0.2766	0.2252
Colombia 1995	0.020	0.372	0.893	-0.951	-0.139	-0.9344	-0.0061	0.5317	0.8931
Dominican Rep. 1996	0.221	0.024	2.164	0.299	-0.764	-0.6806	-0.2350	0.4063	1.2968
Guatemala 1995	0.297	0.017	2.411	0.527	-0.933	-0.8408	-0.4327	0.3192	1.3283
Haiti 1994-95	0.188	0.223	1.120	0.017	-1.154	-0.9274	-0.1510	0.5978	1.1919
Nicaragua 1997-98	0.168	0.122	2.210	0.205	-0.996	-0.9832	-0.3154	0.3346	1.1027
Paraguay 1990	0.128	-0.120	-0.446	0.357	-1.240	-0.9417	-0.4462	0.1653	1.1870
Peru 1996	0.188	0.223	1.120	0.017	-1.154	-0.9274	-0.1510	0.5978	1.1919

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Appendix C

Table C.1 Percent urban by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	14	15	22	49	87	40
Cameroon 1991	3	10	28	43	94	35
CAR 1994-95	9	13	39	69	86	43
Chad 1996-97	2	2	6	28	83	23
Comoros 1996	12	18	18	29	62	30
Côte d'Ivoire 1994	2	6	32	69	88	42
Eritrea 1995	1	3	5	31	98	33
Ghana 1993	4	7	11	56	91	38
Kenya 1998	1	4	10	21	67	23
Madagascar 1997	11	11	9	21	77	28
Malawi 1992	1	2	4	10	45	12
Mali 1995-96	5	9	14	36	84	32
Mozambique 1997	0	7	9	31	72	24
Namibia 1997	5	3	10	49	94	38
Niger 1998	0	1	3	12	83	20
Togo 1998	2	5	14	51	88	38
Uganda 1995	2	3	4	7	54	15
Zambia 1996	2	7	23	78	97	45
Zimbabwe 1994	0	1	2	37	95	32
Near East and North Africa						
Egypt 1995	6	20	38	66	90	46
Jordan 1997	61	82	87	91	94	84
Morocco 1992	1	7	36	84	97	49
Europe and Central Asia						
Kazakhstan 1995	13	19	42	80	97	57
Kyrgyzstan 1997	6	8	20	36	83	34
Turkey 1993	16	34	67	87	97	64
Uzbekistan 1996	8	8	28	49	91	38
South and Southeast Asia						
Bangladesh 1996-97	1	3	4	9	43	12
India 1992-93	2	7	12	30	78	26
Indonesia 1997	2	9	22	39	70	28
Nepal 1996	1	2	3	4	34	8
Pakistan 1990-91	2	4	12	49	86	31
Philippines 1998	14	35	57	70	85	57
Vietnam 1997	2	3	5	15	66	19
Latin American and Caribbean						
Bolivia 1998	6	42	82	96	99	71
Brazil 1996	40	76	89	95	99	82
Colombia 1995	14	48	88	98	98	75
Dominican Republic 1996	21	47	65	86	95	67
Guatemala 1995	7	14	33	61	81	43
Haiti 1994-95	1	8	20	64	95	44
Nicaragua 1997-98	10	37	69	88	95	65
Paraguay 1990	6	14	52	82	96	56
Peru 1996	8	51	86	97	99	73
Average	8	17	30	53	84	41

Table C.2 Mean number of children under age five by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	2.2	2.1	2.3	1.8	1.3	1.9
Cameroon 1991	1.7	1.8	1.6	1.5	1.2	1.6
CAR 1994-95	1.2	1.3	1.4	1.7	2.1	1.5
Chad 1996-97	1.8	1.5	1.6	1.9	1.8	1.7
Comoros 1996	1.5	1.2	1.1	1.1	0.9	1.1
Côte d'Ivoire 1994	2.1	2.4	2.4	2.1	1.7	2.1
Eritrea 1995	1.5	1.3	1.0	1.0	0.7	1.1
Ghana 1993	1.5	1.3	1.2	1.1	0.8	1.2
Kenya 1998	1.3	1.1	1.0	1.0	0.8	1.0
Madagascar 1997	1.7	1.3	1.3	1.2	0.8	1.3
Malawi 1992	1.2	1.1	1.1	1.0	1.2	1.1
Mali 1995-96	1.4	1.6	1.8	2.0	1.6	1.7
Mozambique 1997	1.1	1.0	1.4	1.4	1.4	1.3
Namibia 1997	1.9	2.4	2.1	1.6	1.2	1.8
Niger 1998	2.1	1.7	1.9	2.1	1.8	1.9
Togo 1998	2.0	2.0	1.7	1.2	1.0	1.5
Uganda 1995	1.6	1.6	1.6	1.5	1.4	1.5
Zambia 1996	1.5	1.4	1.4	1.3	1.5	1.4
Zimbabwe 1994	1.5	1.2	1.2	0.9	0.9	1.1
Near East and North Africa						
Egypt 1995	1.4	1.5	1.1	0.9	0.7	1.1
Jordan 1997	1.7	1.6	1.4	1.2	1.0	1.4
Morocco 1992	1.5	1.4	1.2	0.8	0.7	1.1
Europe and Central Asia						
Kazakhstan 1995	0.8	0.7	0.7	0.5	0.3	0.6
Kyrgyzstan 1997	1.1	0.9	0.9	0.8	0.5	0.8
Turkey 1993	1.1	0.9	0.7	0.6	0.4	0.7
Uzbekistan 1996	1.2	1.0	0.9	0.9	0.6	0.9
South and Southeast Asia						
Bangladesh 1996-97	0.9	0.9	0.9	0.9	0.9	0.9
India 1992-93	1.2	1.1	1.1	1.1	0.9	1.1
Indonesia 1997	0.8	0.7	0.7	0.7	0.7	0.7
Nepal 1996	1.4	1.3	1.3	1.4	1.0	1.3
Pakistan 1990-91	1.4	1.4	1.5	1.7	1.6	1.5
Philippines 1998	1.3	1.0	0.8	0.8	0.6	0.9
Vietnam 1997	1.0	0.9	0.7	0.6	0.6	0.8
Latin America and Caribbean						
Bolivia 1998	1.3	1.1	0.9	0.7	0.5	0.9
Brazil 1996	0.9	0.7	0.6	0.5	0.4	0.6
Colombia 1995	1.3	0.9	0.8	0.7	0.4	0.8
Dominican Republic 1996	1.1	0.9	0.9	0.7	0.6	0.8
Guatemala 1995	1.7	1.4	1.2	1.0	0.7	1.2
Haiti 1994-95	1.5	1.3	1.2	1.0	0.7	1.1
Nicaragua 1997-98	1.8	1.4	1.2	0.9	0.7	1.1
Paraguay 1990	1.6	1.3	1.2	1.0	0.7	1.1
Peru 1996	1.3	1.1	0.9	0.8	0.5	0.9
Average	1.4	1.3	1.2	1.1	0.9	1.2

Table C.3 Mean number of household members by wealth quintile						
	Quintile					Total
Country	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa						
Benin 1996	6.6	5.7	6.3	5.7	5.8	6.0
Cameroon 1991	6.0	6.5	5.9	5.7	7.3	6.2
CAR 1994-95	5.5	5.6	5.8	5.5	5.0	5.5
Chad 1996-97	4.3	4.0	4.3	5.8	7.7	4.9
Comoros 1996	6.2	5.5	4.3	5.5	5.6	5.3
Côte d'Ivoire 1994	6.5	5.8	6.2	6.5	6.6	6.3
Eritrea 1995	5.7	5.3	3.5	3.9	4.5	4.4
Ghana 1993	3.7	4.0	4.1	3.6	3.6	3.8
Kenya 1998	4.9	4.8	4.3	4.1	3.6	4.3
Madagascar 1997	5.9	4.8	4.5	4.7	4.8	4.9
Malawi 1992	4.2	4.2	4.4	4.6	5.1	4.5
Mali 1995-96	4.5	5.2	5.9	6.3	6.7	5.6
Mozambique 1997	4.6	3.5	4.4	4.9	6.3	4.6
Namibia 1997	6.0	8.0	6.7	5.5	4.8	6.0
Niger 1998	6.6	6.0	5.5	5.6	6.3	5.9
Togo 1998	6.0	6.0	5.6	4.5	5.2	5.4
Uganda 1995	4.7	4.7	4.9	4.7	4.8	4.8
Zambia 1996	5.6	4.7	5.0	5.4	6.4	5.4
Zimbabwe 1994	6.1	4.9	5.0	3.9	4.0	4.7
Near East and North Africa						
Egypt 1995	5.9	6.1	5.6	5.1	4.3	5.3
Jordan 1997	5.8	5.9	6.1	6.1	5.9	6.0
Morocco 1992	6.0	6.5	6.3	5.7	5.7	6.0
Europe and Central Asia						
Kazakhstan 1995	4.5	4.3	4.2	3.2	3.0	3.7
Kyrgyzstan 1997	5.7	5.3	5.3	4.7	3.3	4.7
Turkey 1993	5.1	4.9	4.6	4.2	4.0	4.5
Uzbekistan 1996	5.7	5.9	5.6	5.5	3.9	5.2
South and Southeast Asia						
Bangladesh 1996-97	4.7	5.0	5.3	5.7	5.9	5.3
India 1992-93	5.8	5.3	5.7	5.7	5.6	5.6
Indonesia 1997	4.3	4.1	4.1	4.3	4.7	4.3
Nepal 1996	5.9	5.1	5.2	5.8	5.6	5.5
Pakistan 1990-91	6.2	6.4	6.7	7.1	7.6	6.8
Philippines 1998	5.2	4.8	4.9	5.1	5.4	5.1
Vietnam 1997	5.0	4.6	4.7	4.6	4.6	4.7
Latin America and Caribbean						
Bolivia 1998	4.3	4.3	4.4	4.2	4.4	4.3
Brazil 1996	4.5	4.3	4.0	3.9	3.8	4.1
Colombia 1995	4.9	4.5	4.4	4.3	4.2	4.4
Dominican Republic 1996	4.2	4.2	4.3	4.3	4.4	4.3
Guatemala 1995	6.2	5.2	5.4	5.0	4.6	5.2
Haiti 1994-95	6.0	4.7	4.9	4.5	5.3	5.0
Nicaragua 1997-98	6.7	5.5	5.4	5.3	5.1	5.5
Paraguay 1990	5.6	5.4	5.2	4.7	4.5	5.1
Peru 1996	5.0	4.6	4.7	4.9	5.0	4.8
Average	5.4	5.1	5.1	5.0	5.1	5.1

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Table C.4 Percent female of household heads by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	7	10	12	23	22	15
Cameroon 1991	12	12	23	28	31	23
CAR 1994-95	22	15	16	23	20	19
Chad 1996-97	22	19	14	16	18	18
Comoros 1996	32	30	30	33	34	32
Côte d'Ivoire 1994	11	14	19	21	16	16
Eritrea 1995	12	19	28	36	41	28
Ghana 1993	36	41	35	54	41	42
Kenya 1998	31	35	38	37	30	34
Madagascar 1997	17	24	21	19	21	21
Malawi 1992	33	28	26	20	14	24
Mali 1995-96	7	5	4	6	8	6
Mozambique 1997	29	29	18	23	20	24
Namibia 1997	36	27	32	32	33	32
Niger 1998	9	11	9	9	12	10
Togo 1998	10	15	24	37	26	23
Uganda 1995	23	24	21	23	27	24
Zambia 1996	25	25	24	22	19	23
Zimbabwe 1994	40	37	50	37	22	36
Near East and North Africa						
Egypt 1995	11	9	9	8	6	8
Jordan 1997	6	5	5	6	7	6
Morocco 1992	8	9	14	19	14	13
Europe and Central Asia						
Kazakhstan 1995	24	20	23	30	39	28
Kyrgyzstan 1997	14	20	19	26	35	24
Turkey 1993	6	6	7	6	5	6
Uzbekistan 1996	13	10	17	17	37	19
South and South East Asia						
Bangladesh 1996-97	9	8	7	9	9	8
India 1992-93	5	9	9	9	8	8
Indonesia 1997	9	8	7	8	6	8
Nepal 1996	10	13	10	9	12	11
Pakistan 1990-91	4	6	7	6	8	6
Philippines 1998	7	10	16	16	17	14
Vietnam 1997	15	16	15	20	36	21
Latin America and Caribbean						
Bolivia 1998	13	16	18	21	21	18
Brazil 1996	17	19	21	19	18	19
Colombia 1995	17	22	26	27	24	24
Dominican Republic 1996	19	24	28	34	32	28
Guatemala 1995	15	18	19	22	21	19
Haiti 1994-95	26	35	44	47	53	43
Nicaragua 1997-98	19	31	35	41	33	33
Paraguay 1990	11	11	17	16	15	14
Peru 1996	13	17	20	20	16	17
Average	17	18	20	22	22	20

Table C.5 Mean age of household head by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	44.8	46.1	46.3	45.0	45.6	45.5
Cameroon 1991	45.5	45.6	47.8	45.1	43.2	45.3
CAR 1994-95	39.5	39.5	40.7	43.8	45.0	41.6
Chad 1996-97	41.9	43.7	42.4	42.3	42.8	42.8
Comoros 1996	44.9	43.8	44.8	46.1	46.0	45.2
Côte d'Ivoire 1994	47.7	50.0	47.8	45.7	44.8	47.0
Eritrea 1995	46.2	46.0	43.8	45.5	48.1	46.1
Ghana 1993	42.2	41.5	42.0	39.9	40.4	41.1
Kenya 1998	42.6	43.7	44.7	42.9	39.3	42.4
Madagascar 1997	41.0	40.6	41.4	43.5	43.3	42.0
Malawi 1992	41.6	41.0	41.2	41.5	41.5	41.4
Mali 1995-96	43.4	44.8	45.8	46.3	47.4	45.6
Mozambique 1997	39.5	38.9	40.5	41.9	43.7	41.0
Namibia 1997	53.2	56.0	54.7	46.5	42.3	49.7
Niger 1998	43.4	44.1	44.9	46.4	45.8	44.9
Togo 1998	45.8	45.5	46.0	44.8	44.0	45.1
Uganda 1995	39.4	39.5	40.3	39.9	38.6	39.5
Zambia 1996	42.0	43.5	43.7	40.5	40.6	41.9
Zimbabwe 1994	45.2	47.2	45.0	41.0	40.6	43.4
Near East and North Africa						
Egypt 1995	45.6	45.8	44.8	43.8	43.4	44.6
Jordan 1997	40.6	39.1	40.1	43.7	45.4	41.8
Morocco 1992	49.9	50.7	49.6	48.3	49.4	49.5
Europe and Central Asia						
Kazakhstan 1995	44.6	46.4	45.5	42.8	42.1	44.0
Kyrgyzstan 1997	46.6	47.0	47.8	46.8	42.3	45.9
Turkey 1993	45.5	43.8	41.7	40.6	41.1	42.3
Uzbekistan 1996	44.6	47.2	48.6	48.8	46.2	47.1
South and Southeast Asia						
Bangladesh 1996-97	40.4	42.5	42.8	44.5	45.4	43.1
India 1992-93	44.8	44.0	45.3	45.9	46.7	45.3
Indonesia 1997	40.9	41.3	41.8	42.2	43.0	41.8
Nepal 1996	41.9	42.2	44.1	43.9	44.5	43.3
Pakistan 1990-91	45.8	46.6	46.3	47.7	47.2	46.7
Philippines 1998	40.6	41.9	43.8	45.3	46.7	44.1
Vietnam 1997	40.0	41.0	42.1	44.0	45.6	42.6
Latin America and Caribbean						
Bolivia 1998	42.0	41.3	40.1	41.6	47.0	42.6
Brazil 1996	42.6	43.2	43.1	43.6	44.4	43.4
Colombia 1995	44.5	43.8	42.9	43.9	47.1	44.5
Dominican Republic 1996	40.8	41.7	42.5	44.1	47.2	43.6
Guatemala 1995	42.4	42.3	42.3	42.2	44.0	42.7
Haiti 1994-95	47.0	46.4	45.4	41.3	43.3	44.4
Nicaragua 1997-98	43.9	43.6	43.3	45.3	46.5	44.7
Paraguay 1990	43.2	43.9	46.5	44.4	46.3	45.0
Peru 1996	43.0	41.4	41.8	45.6	49.7	44.7
Average	43.6	44.0	44.2	44.0	44.5	44.0

Table C.6 Mean number of years of education of household heads by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	0.5	0.9	1.0	2.5	6.4	2.4
Cameroon 1991	3.0	2.6	4.8	6.1	8.1	5.1
CAR 1994-95	1.7	2.6	3.3	4.0	6.0	3.4
Chad 1996-97	0.5	0.8	1.0	1.8	4.3	1.6
Comoros 1996	0.8	1.2	1.7	1.7	4.6	2.1
Côte d'Ivoire 1994	0.9	1.3	1.9	3.2	7.4	3.1
Eritrea 1995	0.2	0.3	0.5	1.5	4.4	1.6
Ghana 1993	3.5	3.5	4.7	6.4	9.7	5.8
Kenya 1998	4.5	5.1	5.7	7.0	10.0	6.7
Madagascar 1997	1.9	2.3	2.9	4.0	7.6	3.9
Malawi 1992	2.5	3.0	3.5	4.2	7.3	4.1
Mali 1995-96	0.3	0.4	0.5	1.1	4.4	1.5
Mozambique 1997	1.4	2.0	2.1	2.9	5.2	2.7
Namibia 1997	1.9	2.3	3.1	4.2	8.5	4.4
Niger 1998	0.2	0.2	0.4	0.6	3.4	1.0
Togo 1998	1.5	1.8	2.6	3.6	7.5	3.7
Uganda 1995	3.3	3.9	4.2	4.9	8.2	4.9
Zambia 1996	4.1	4.4	5.6	7.7	10.8	6.8
Zimbabwe 1994	3.9	3.9	5.1	6.9	8.9	6.0
Near East and North Africa						
Egypt 1995	1.8	2.9	4.6	7.1	11.9	5.9
Jordan 1997	6.3	8.3	8.6	9.7	12.1	9.0
Morocco 1992	0.2	0.6	1.1	2.2	5.2	2.1
Europe and Central Asia						
Kazakhstan 1995	8.6	9.4	9.9	10.6	11.6	10.2
Kyrgyzstan 1997	9.3	9.3	9.9	9.9	11.7	10.1
Turkey 1993	3.0	4.0	5.1	6.3	8.7	5.7
Uzbekistan 1996	9.6	10.1	10.1	10.1	11.3	10.3
South and Southeast Asia						
Bangladesh 1996-97	1.3	1.7	2.8	4.3	7.4	3.5
India 1992-93	1.9	2.5	3.5	5.1	9.2	4.5
Indonesia 1997	4.2	4.8	5.4	6.9	10.1	6.2
Nepal 1996	1.3	1.6	1.8	2.7	5.0	2.4
Pakistan 1990-91	1.0	1.7	2.2	3.8	7.0	3.1
Philippines 1998	5.0	6.7	7.9	9.4	11.5	8.5
Vietnam 1997	4.8	6.6	7.3	8.0	8.9	7.1
Latin America and Caribbean						
Bolivia 1998	3.8	5.2	6.9	8.4	12.0	7.8
Brazil 1996	2.0	3.7	4.9	6.6	8.6	5.4
Colombia 1995	2.5	4.0	5.8	7.4	9.8	6.3
Dominican Republic 1996	3.4	5.0	5.9	7.4	10.2	6.7
Guatemala 1995	1.0	1.3	2.4	4.4	9.0	4.0
Haiti 1994-95	0.6	1.0	1.7	3.2	6.8	3.0
Nicaragua 1997-98	1.6	2.6	3.9	5.6	8.7	4.9
Paraguay 1990	3.6	4.0	5.1	6.3	9.6	6.1
Peru 1996	3.7	5.5	7.3	8.3	10.5	7.4
Average	2.8	3.5	4.3	5.4	8.3	5.0

Table C.7 Percent of household heads who are currently married by wealth quintile						
	Quintile					
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	79	75	73	62	57	68
Cameroon 1991	82	81	68	65	63	71
CAR 1994-95	75	81	79	70	74	76
Chad 1996-97	79	82	86	84	81	82
Comoros 1996	78	78	75	70	72	74
Côte d'Ivoire 1994	78	70	66	67	73	71
Eritrea 1995	87	80	70	63	57	70
Ghana 1993	63	58	65	46	57	57
Kenya 1998	69	64	60	62	67	64
Madagascar 1997	80	74	76	77	77	77
Malawi 1992	66	71	75	80	85	76
Mali 1995-96	92	95	95	93	90	93
Mozambique 1997	80	78	84	68	75	77
Namibia 1997	57	67	62	56	60	60
Niger 1998	90	88	90	90	87	89
Togo 1998	83	79	70	58	68	71
Uganda 1995	74	75	77	75	70	74
Zambia 1996	79	78	78	76	79	78
Zimbabwe 1994	60	62	49	61	73	62
Near East and North Africa						
Egypt 1995	86	88	89	91	92	89
Jordan 1997	93	94	94	94	92	93
Morocco 1992	87	88	83	78	84	84
Europe and Central Asia						
Kazakhstan 1995	71	78	73	75	67	72
Kyrgyzstan 1997	79	77	76	74	66	74
Turkey 1993	90	89	90	92	93	91
Uzbekistan 1996	84	87	83	81	70	81
South and Southeast Asia						
Bangladesh 1996-97	89	88	89	86	88	88
India 1992-93	88	85	86	85	87	86
Indonesia 1997	90	91	92	91	93	91
Nepal 1996	85	83	86	87	85	85
Pakistan 1990-91	90	88	87	88	84	87
Philippines 1998	90	87	83	83	80	84
Vietnam 1997	86	85	87	85	80	84
Latin America and Caribbean						
Bolivia 1998	84	81	79	76	74	78
Brazil 1996	82	79	78	81	81	80
Colombia 1995	81	76	72	72	75	75
Dominican Republic 1996	82	76	72	67	70	73
Guatemala 1995	84	81	82	77	77	80
Haiti 1994-95	75	66	59	52	41	57
Nicaragua 1997-98	82	72	71	63	69	71
Paraguay 1990	86	87	83	83	81	84
Peru 1996	84	81	77	76	79	79
Average	81	80	78	75	76	78

Table C.8 Percent female of household members by wealth quintile						
	Quintile					Total
Country	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa						
Benin 1996	51	53	53	55	55	54
Cameroon 1991	56	52	56	55	54	55
CAR 1994-95	54	54	55	54	52	54
Chad 1996-97	55	56	53	54	52	54
Comoros 1996	52	53	54	55	54	54
Côte d'Ivoire 1994	53	51	55	54	55	54
Eritrea 1995	52	53	54	54	57	54
Ghana 1993	55	55	55	58	58	56
Kenya 1998	53	55	55	55	56	55
Madagascar 1997	51	52	52	51	53	52
Malawi 1992	55	55	53	52	50	53
Mali 1995-96	54	53	53	53	53	53
Mozambique 1997	52	55	53	55	54	54
Namibia 1997	56	55	54	56	56	55
Niger 1998	52	53	52	54	53	53
Togo 1998	52	52	53	56	58	54
Uganda 1995	54	54	55	53	55	54
Zambia 1996	53	54	53	53	54	53
Zimbabwe 1994	53	54	56	54	56	55
Near East and North Africa						
Egypt 1995	49	48	49	49	50	49
Jordan 1997	50	49	49	49	50	49
Morocco 1992	54	52	53	53	55	53
Europe and Central Asia						
Kazakhstan 1995	52	52	54	54	57	54
Kyrgyzstan 1997	50	53	52	54	55	53
Turkey 1993	50	50	50	50	50	50
Uzbekistan 1996	50	51	53	52	54	52
South and Southeast Asia						
Bangladesh 1996-97	51	50	51	50	50	50
India 1992-93	48	50	49	49	49	49
Indonesia 1997	50	50	50	50	52	51
Nepal 1996	52	51	51	51	51	51
Pakistan 1990-91	50	48	49	49	50	49
Philippines 1998	50	51	52	54	58	54
Vietnam 1997	51	51	52	51	52	51
Latin America and Caribbean						
Bolivia 1998	52	52	54	55	57	54
Brazil 1996	52	53	56	54	55	54
Colombia 1995	50	52	56	58	59	55
Dominican Republic 1996	50	52	54	56	59	55
Guatemala 1995	53	52	53	54	57	54
Haiti 1994-95	54	53	54	58	60	56
Nicaragua 1997-98	51	52	53	56	57	54
Paraguay 1990	50	51	52	53	57	53
Peru 1996	51	52	53	54	56	54
Average	52	52	53	54	54	53

Table C.9 Mean age of household members by wealth quintile						
	Quintile					Total
Country	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa						
Benin 1996	19.7	19.8	19.4	19.5	20.0	19.7
Cameroon 1991	20.3	20.8	21.6	21.1	20.6	20.9
CAR 1994-95	20.1	19.9	19.6	19.5	19.0	19.5
Chad 1996-97	17.6	20.0	19.2	18.7	18.9	19.0
Comoros 1996	20.5	22.3	23.1	23.5	24.2	22.8
Côte d'Ivoire 1994	20.1	20.8	19.9	20.0	20.1	20.2
Eritrea 1995	19.8	20.7	21.7	22.5	23.7	21.8
Ghana 1993	19.0	19.3	20.0	19.3	20.8	19.7
Kenya 1998	18.6	19.4	20.4	20.3	21.2	20.0
Madagascar 1997	18.0	19.7	19.8	20.5	22.7	20.2
Malawi 1992	19.9	19.6	20.3	20.6	19.5	20.0
Mali 1995-96	20.0	19.7	19.7	19.4	21.0	20.0
Mozambique 1997	20.7	20.8	19.7	20.1	20.4	20.3
Namibia 1997	21.0	20.8	21.6	22.2	22.5	21.6
Niger 1998	18.1	20.3	20.1	20.0	19.6	19.7
Togo 1998	19.6	19.4	20.1	20.8	21.6	20.4
Uganda 1995	18.2	18.1	17.9	18.4	18.2	18.2
Zambia 1996	19.2	19.9	19.7	19.0	18.8	19.3
Zimbabwe 1994	18.9	21.1	20.1	20.6	21.0	20.3
Near East and North Africa						
Egypt 1995	21.2	21.6	22.3	23.0	24.2	22.3
Jordan 1997	18.5	18.3	19.4	21.3	22.4	20.0
Morocco 1992	22.1	22.8	23.3	24.6	26.0	23.8
Europe and Central Asia						
Kazakhstan 1995	23.1	25.2	25.9	26.7	28.0	25.8
Kyrgyzstan 1997	22.5	23.4	24.2	24.5	25.7	24.0
Turkey 1993	22.3	23.9	23.8	24.6	25.9	24.0
Uzbekistan 1996	21.6	22.9	24.2	24.2	25.5	23.7
South and Southeast Asia						
Bangladesh 1996-97	21.6	22.2	22.9	23.5	24.5	23.0
India 1992-93	22.9	23.3	23.7	24.2	25.7	24.0
Indonesia 1997	23.0	24.1	24.6	24.6	25.6	24.4
Nepal 1996	20.5	21.7	22.4	21.9	24.0	22.1
Pakistan 1990-91	21.7	21.7	21.5	21.4	22.1	21.7
Philippines 1998	19.9	21.8	23.7	25.2	26.7	23.9
Vietnam 1997	21.4	23.1	24.0	25.6	26.7	24.1
Latin America and Caribbean						
Bolivia 1998	20.0	20.4	20.9	23.0	26.2	22.5
Brazil 1996	21.4	23.5	24.9	26.3	27.5	24.8
Colombia 1995	21.3	22.9	23.7	25.4	28.4	24.6
Dominican Republic 1996	20.5	22.0	22.7	24.0	26.4	23.4
Guatemala 1995	18.6	20.0	20.8	21.9	25.4	21.5
Haiti 1994-95	21.0	21.8	21.6	21.5	22.8	21.8
Nicaragua 1997-98	18.8	20.0	20.9	22.8	25.5	21.8
Paraguay 1990	19.0	20.4	22.4	23.6	25.7	22.4
Peru 1996	20.3	21.2	22.4	24.6	28.3	23.8
Average	20.3	21.2	21.7	22.2	23.4	21.8

Table C.10 Mean number of years of education of household members by wealth quintile						
	Quintile					Total
Country	Lowest	Second	Middle	Fourth	Highest	
Sub-Saharan Africa						
Benin 1996	0.3	0.5	0.8	1.9	5.0	1.8
Cameroon 1991	2.8	2.9	4.8	5.9	7.7	5.0
CAR 1994-95	1.1	1.7	2.4	3.6	5.3	3.1
Chad 1996-97	0.3	0.5	0.6	1.3	3.7	1.4
Comoros 1996	1.0	1.6	2.2	2.6	5.2	2.8
Côte d'Ivoire 1994	0.9	1.4	1.7	2.5	5.6	2.7
Eritrea 1995	0.2	0.4	0.5	1.8	5.3	2.0
Ghana 1993	2.8	2.8	4.2	6.2	9.2	5.3
Kenya 1998	4.6	5.5	6.1	7.0	9.7	6.8
Madagascar 1997	1.9	2.2	2.8	3.9	7.5	4.0
Malawi 1992	1.8	2.5	2.9	3.5	6.2	3.5
Mali 1995-96	0.2	0.3	0.5	0.9	3.9	1.5
Mozambique 1997	1.1	1.5	1.7	2.5	4.7	2.5
Namibia 1997	3.1	3.6	4.3	5.1	8.0	5.0
Niger 1998	0.3	0.3	0.4	0.7	3.5	1.1
Togo 1998	1.1	1.2	2.0	3.1	5.9	3.0
Uganda 1995	2.8	3.1	3.7	4.2	7.4	4.3
Zambia 1996	3.9	4.3	5.3	7.0	9.6	6.4
Zimbabwe 1994	4.4	4.6	5.6	7.1	9.0	6.4
Near East and North Africa						
Egypt 1995	2.1	3.3	5.0	7.2	11.3	5.6
Jordan 1997	6.5	8.2	8.6	9.6	11.3	8.9
Morocco 1992	0.3	0.7	1.7	3.3	5.8	2.7
Europe and Central Asia						
Kazakhstan 1995	9.1	9.6	9.9	10.7	11.4	10.2
Kyrgyzstan 1997	9.4	9.7	9.8	10.1	11.5	10.1
Turkey 1993	2.6	3.6	4.3	5.5	7.9	4.9
Uzbekistan 1996	9.7	10.0	10.1	10.3	11.3	10.3
South and Southeast Asia						
Bangladesh 1996-97	1.0	1.5	2.5	3.9	6.7	3.4
India 1992-93	1.5	2.2	3.0	4.7	8.4	4.2
Indonesia 1997	4.0	4.6	5.3	6.7	9.8	6.2
Nepal 1996	0.9	1.2	1.5	2.2	4.4	2.1
Pakistan 1990-91	0.7	1.3	1.7	3.1	6.1	2.8
Philippines 1998	5.3	7.1	8.5	9.8	11.2	9.1
Vietnam 1997	4.1	6.0	6.8	7.7	9.0	6.8
Latin America and Caribbean						
Bolivia 1998	3.2	4.9	6.9	8.7	11.8	8.0
Brazil 1996	2.4	4.4	5.6	7.1	8.8	6.0
Colombia 1995	2.9	4.7	6.4	8.0	10.0	6.9
Dominican Republic 1996	3.5	5.4	6.6	8.1	10.6	7.5
Guatemala 1995	1.0	1.4	2.4	4.7	8.6	4.2
Haiti 1994-95	0.9	1.3	2.6	4.1	7.5	3.8
Nicaragua 1997-98	1.9	3.3	4.8	6.6	9.0	5.7
Paraguay 1990	3.9	4.3	5.7	6.7	9.7	6.5
Peru 1996	3.5	5.4	7.4	8.7	10.5	7.8
Average	2.6	3.9	5.4	7.0	9.6	6.3

Table C.11 Distribution of children under age fifteen by wealth quintile						
			Quintile			
Country	Lowest	Second	Middle	Fourth	Highest	Total
Sub-Saharan Africa						
Benin 1996	20	19	21	20	20	100
Cameroon 1991	23	13	11	43	10	100
CAR 1994-95	16	16	18	22	29	100
Chad 1996-97	18	25	16	21	21	100
Comoros 1996	22	20	19	20	19	100
Côte d'Ivoire 1994	17	19	21	22	22	100
Eritrea 1995	24	21	16	17	22	100
Ghana 1993	20	20	20	20	19	100
Kenya 1998	22	21	19	19	18	100
Madagascar 1997	26	19	17	20	18	100
Malawi 1992	19	18	21	20	22	100
Mali 1995-96	15	18	20	22	25	100
Mozambique 1997	24	10	20	20	27	100
Namibia 1997	18	24	21	19	18	100
Niger 1998	17	24	17	19	23	100
Togo 1998	20	21	20	18	21	100
Uganda 1995	20	20	20	18	22	100
Zambia 1996	22	15	18	20	25	100
Zimbabwe 1994	24	18	21	18	19	100
Near East and North Africa						
Egypt 1995	24	24	20	17	15	100
Jordan 1997	22	22	21	19	17	100
Morocco 1992	21	23	21	18	17	100
Europe and Central Asia						
Kazakhstan 1995	23	21	21	19	16	100
Kyrgyzstan 1997	23	20	21	20	15	100
Turkey 1993	25	21	21	18	15	100
Uzbekistan 1996	22	22	21	20	16	100
South and Southeast Asia						
Bangladesh 1996-97	19	21	19	21	19	100
India 1992-93	21	20	21	21	17	100
Indonesia 1997	23	21	20	19	18	100
Nepal 1996	23	18	21	21	17	100
Pakistan 1990-91	19	19	21	21	20	100
Philippines 1998	22	20	19	19	20	100
Vietnam 1997	23	21	20	18	17	100
Latin America and Caribbean						
Bolivia 1998	21	21	21	20	17	100
Brazil 1996	24	23	20	17	16	100
Colombia 1995	22	21	22	19	16	100
Dominican Republic 1996	20	20	20	21	19	100
Guatemala 1995	24	20	21	20	15	100
Haiti 1994-95	20	20	20	20	21	100
Nicaragua 1997-98	24	20	20	19	16	100
Paraguay 1990	23	20	19	19	18	100
Peru 1996	22	21	21	20	16	100
Average	21	20	20	20	19	100

Appendix D
Possible New Additions to Wealth Index Indicators

Services
  Trash collection
  Mail service (to dwelling or PO box)
  Email account

Transport
  Boat
  Horse, donkey, mule
  Cart

**Household construction (by observation
 of main component)**
  Wall construction
  Roof construction
  Glass windows

Appliances
  Type of cooking appliance
    • Clock
    • Blender
    • Grinder
    • Water heater
    • Fan
    • Air conditioner
    • Washing machine
    • Water pump for dwelling
    • Electronic generator for dwelling

Electronics and communications
  Sound equipment (cassette, CD, HI-FI, stereo)
  Video equipment (VCR, DVD, video camera)
  Photographic camera (film or digital)
  Telephone
    • Landline
    • Mobile
  TV cable, satellite dish
  Computer

Land holdings and real estate ownership
  Agricultural land by type (ask size)
    • Irrigated agricultural land
    • Non-irrigated wet crop land
    • Non-irrigated dry crop land
    • Grazing land
  Non-agricultural land and buildings
    • Main residence
    • Other residences
    • Rental residential property
    • Commercial and industrial property
    • Vacant land

Farm capital and livestock
  Motorized agricultural implements, machines
    • Tractor, combines, harvesters, threshers
  Non-motorized agricultural implements, machines
    • Plows
  Irrigation pumps
  Electric generators for agricultural machinery
  Livestock and herds

Business capital and inventory
  Business machinery
    • Water pump for business
    • Electric generator for business
  Business inventory

Financial assets
  Bank account
    • Checking account
    • Savings account
  Membership in self-help organizations
  Stocks and bonds
  Loan, mortgage from an institution
  Debts to others
  Non-institutional loans made to others
  Life insurance

Furnishings
  Furniture
    • Tables, chairs, benches, sofas, beds,
      armoires, shelves
  Curtains, tablecloth
  Coffee pot, tea pot

Clothing and jewelry
  Shoes
  Watch
  Gold rings, bracelets, necklaces