

## MEASURING POVERTY AND DEPRIVATION IN SOUTH AFRICA

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This paper compares a standard expenditure-based poverty measure with a specifically created composite measure of deprivation using household survey data from South Africa. While there is a strong overall correlation between expenditures and levels of deprivation, the correlation is much weaker among the worst-off South Africans. In addition, the two measures differ considerably in the impact of race, headship, location (urban, rural), and household size on expenditure poverty versus deprivation. In general, the deprivation measure finds more Africans, rural dwellers, members of *de facto* female-headed households, and members of smaller households deprived than expenditure poor. Only the differences in the effect of household size on poverty are sensitive to assumptions about equivalence scales. As a result, the two measures diverge greatly in identifying the poorest and most deprived sections of the population, which may have considerable consequences for targeting.

### 1. INTRODUCTION

Poverty reduction is seen by many policy-makers as the most important goal of development policy. Consequently, much energy has gone into generating data and developing definitions of poverty that will allow the measurement of changes in poverty over time, comparisons across space, and the identification of poor households or individuals for targeted poverty-alleviation programs.

Two schools have emerged on this important measurement issue. One has defined poverty primarily in financial terms (insufficient incomes or consumption) (e.g. Ravallion and Chen, 1997; World Bank, 1990, 1997), while others have sought a more broad-based definition of poverty not solely based on financial resources (e.g. UNDP, 1997; Drèze and Sen, 1989). The latter have relied on work by Rawls, Sen, and others to emphasize that poverty should be seen in relation to the lack of important “basic goods” (Rawls) or “basic capabilities” (Sen), some of which cannot be purchased with money as they are under-provided in a market system. Financial resources, they contend, are just one of several *means* to achieve well-being and therefore efforts should be directed at measuring well-being *outcomes* directly, rather than focus on one of its imperfect proxies.

Several attempts have been made to measure poverty and deprivation in this broader sense, such as the Human Development Index, the Human Poverty Index by UNDP (UNDP 1991, 1998), or the Physical Quality of Life Index (Morris, 1979). While the HDI and the PQLI have helped further the debate on non-income measures of well-being at the aggregate level, they are very crude measures

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that have been criticized for their choice of components, weights, estimation procedures, and aggregation rules (Kelley, 1991; Srinivasan, 1994; Ravallion, 1997). Much of the short-coming of such efforts relate to the limited availability of reliable data on many non-income achievements, particularly for cross-country comparisons.

At the same time, a series of living standards measurement surveys has recently generated new, fairly reliable and comprehensive micro data for many developing countries.<sup>1</sup> While these surveys have been used for many economic analyses and poverty studies, including an effort to compare levels of absolute expenditure poverty across countries (Ravallion and Chen, 1997; World Bank, 1997), few attempts have been made to use the data to generate broader measures of well-being and deprivation.<sup>2</sup>

This paper uses a household survey from South Africa to compare standard expenditure-based poverty indicators with broader multi-component measures of deprivation. While finding considerable correlation between expenditure poverty and the broader index of deprivation, the paper finds that about 30 percent of the most deprived people (as identified by the deprivation measure) would not be identified by the expenditure poverty measure. Moreover, the deprivation index finds poverty to be distributed differently by race, residence, and household structure. In particular, the most deprived are more rural, more African, and more from one province, more from *de facto* female-headed households and more from smaller households than suggested by the expenditure poverty measures.

## 2. MEASURING POVERTY

It may be useful to briefly review the theoretical issues involved with constructing measures of poverty and deprivation. Income poverty measures can be derived from utilitarian welfare functions, with their emphasis on individual utilities as the critical welfare metric. Within this framework and an additional set of stringent assumptions (including the specification of cardinal utility functions, complete markets, no externalities or public goods, and no increasing returns to scale), it can be shown that individual incomes are a measure for individual welfare as all welfare-relevant goods could be purchased in a competitive market. Income shortfall could then be defined as welfare shortfall or poverty. As most analysts are not primarily interested in short-term or life-cycle fluctuations in incomes, they rely on expenditures as a more stable indicator of long-term or life-time resources and thus of welfare (Deaton, 1997; Slesnick, 1993).

While technically elegant in its grounding of poverty measurement in axiomatic welfare economics, this approach generates considerable difficulties. As this is very familiar terrain, I will just name the issues but not discuss them in detail.

<sup>1</sup>See Deaton (1997) for a detailed discussion of the living standards measurement surveys, their analytical potential as well as their limitations.

<sup>2</sup>Pradhan and Ravallion (1998) use these surveys to elicit views of the respondents about a subjective poverty line and apply those to study poverty levels. This approach provides qualitative information that can be used to derive an income poverty line grounded in local perceptions of income poverty. Instead of focusing on better ways to derive an income poverty line, this paper examines valuable well-being outcomes directly and defines deprivation in relation to insufficiency in such well-being outcomes.

The first difficulty relates to the appropriateness and interpretation of utility as the measure for welfare (see Sen, 1992). The second relates to the question of interpersonal variation among individuals in translating incomes into utilities (Friedman, 1947; Sen, 1992). A third raises the difficulty of inter-personal comparisons of utility, for which there is neither a satisfactory theory nor satisfactory empirical procedures without resorting to very restrictive assumptions about cardinal utility functions (Jorgensen 1990; Sen 1999). Finally, the assumptions of complete markets, no increasing returns, and no externalities are extremely stringent and highly unrealistic, particular in the context of developing countries. There are many instances of incomplete markets for welfare-related goods; externalities and public goods are a pervasive phenomenon in all societies; and increasing returns to scale and the consequent distortions of product markets are common to many societies, particularly in developing countries.

An additional practical difficulty of the expenditure poverty measure is illustrated by the inability of surveys to observe *individual* expenditures directly. As most individuals reside in households of various sizes and age structures, household expenditures must be set in relation to the number of “adult equivalents” and presumed economies of scale within the household. Different ways to adjust for household structure and size can have a considerable impact on the poverty of various household types as will be shown below (see also Srinivasan and Drèze, 1996; Deaton and Paxson, 1997; 1996; Deaton 1997; Short *et al.* 1998; Ferreira *et al.*, 1998).

This suggests that the leap from household expenditures to individual welfare is indeed a large and hazardous one, so that the use of expenditure data to identify poverty is beset with conceptual and practical difficulties.

Sen (1992, 1996) has suggested an alternative approach to the measurement of welfare and poverty. Given the rather loose relation between money incomes (or expenditures) and welfare in many contexts, he proposes to measure welfare *directly* by observing capabilities of individuals and households, i.e. what these individuals are able to be or do. He then defines poverty as the inability of individuals to achieve a minimal level of capabilities to function (such as the inability to be healthy, well-fed, clothed, sheltered, etc.). The main advantage of this approach is that it focuses directly on achievements. It thereby bypasses many of the difficulties encountered with financial resource-based approaches to welfare measurement, including the inherent heterogeneity of people (in their ability to translate consumption into welfare), the impact of public goods on welfare (e.g. public health, education, environmental protection, etc.) which is inadequately captured by expenditures, as well as the difficulties inherent in the utilitarian metric.

A focus on capabilities also bypasses many of the problems associated with aggregation and equivalence scales. By observing capabilities directly (some at the individual level such as education and health; others at the household level such as shelter and access to services), it does not need to make assumptions about adult equivalence and household-specific economies of scale.

While this approach is very attractive in its immediate focus on welfare outcomes, it engenders some other questions. In particular, the choice of capabilities to be included in an evaluation, the cardinal interpretation of the value of each

component (as it is done by assigning a score to an achievement or calculating an achievement index for each component), and the relative weights given to each may be controversial (Sen 1992).<sup>3</sup> Each of these steps cannot be axiomatically derived and have to be based, ultimately, on judgment and discussion about the nature, the relative merits and importance of various capabilities.<sup>4</sup> In many cases, the choice of the most basic capabilities may be uncontroversial and at least a range of weights may be agreed upon. Alternatively, the weights of various components of well-being could also be derived empirically through statistical techniques such as principal component analysis, or be based on subjective views of the population (see below). There will always remain considerable room for debate about the most appropriate way to identify, weigh, and measure capabilities. The index of deprivation proposed below is one such measure that may contribute to such debates.

Apart from the important theoretical distinctions between the two ways of measuring poverty, it is important to examine how much the results differ between the two methods. If the expenditure poverty measure is closely related to alternative measures of welfare, then its theoretical short-comings may be less significant. This empirical question will be examined in more detail below.

### 3. DATA AND METHODOLOGY

The data analyzed are drawn from the so-called SALDRU household survey, conducted by the Southern African Labour and Demographic Research Unit at the University of Cape Town with support from the World Bank. It sampled 9,000 households in late 1993 and included a broad range of information on family composition, income, expenditures, employment, health status, education, transport, housing, agriculture, as well as questions on perceptions and aspirations of the population (RDP, 1995); it is very similar to World Bank-sponsored Living Standards Measurement Surveys undertaken in many developing countries in the past decade.

Before considering the deprivation measure (described below), let me briefly describe the expenditure poverty measure used. For ease of discussion, the expenditure based poverty measure will simply be referred to as the poverty measure, while the multi-component deprivation index will be referred to as the deprivation measure.<sup>5</sup> The poverty measure used in this paper is adult equivalent (monthly) expenditures. Expenditures are preferred to incomes as they are likely to give a better impression of long-term or life-time resources and are more reliably reported than household income, especially among poor people (Deaton, 1997; RDP, 1995). Table 1 shows the procedure for generating adult equivalents and

<sup>3</sup>It should be borne in mind that an income-based measure also has an implicit weighting scheme, weighing each unit of income the same regardless of the identity and position of the recipient. For alternative weighting schemes and their impact on assessments of well-being, see Klasen (1994).

<sup>4</sup>The views of the poor should be an important voice in these discussions. See May (1996) for views of South African poor about the nature of poverty and deprivation.

<sup>5</sup>This distinction is purely practical and should not be seen as judgements about appropriate terminology. In fact, it is one contention of the paper that poverty should not be narrowly conceived based on financial resources, but seen as a multi-dimensional shortfall which is better described by the deprivation index.

economies of scales which are both based on nutritional requirements of various demographic groups and the potential to economize on food expenditures in larger households.<sup>6</sup> These “nutrition-based” scales give a fairly large weight to children and assume only moderate economies of scale similar to those estimated by Ferreira *et al.* (1998). In a sensitivity analysis, I use the OECD equivalence scales and also develop “economy” scales that give a small weight to children (0.5 for children under 18) and assume sizeable economies of scale thus assuming that large households with lots of children can “economize” on available resources (see Table 1).<sup>7</sup>

TABLE 1  
EQUIVALENCE SCALE AND ECONOMIES OF SCALE ASSUMPTIONS

	Nutrition-based		OECD scales	“Economy”
	Male	Female		
0–2		0.40	0.5	0.5
3–4		0.48	0.5	0.5
5–6		0.56	0.5	0.5
7–8		0.64	0.5	0.5
9–10		0.76	0.5	0.5
11–12	0.80	0.88	0.5	0.5
13–14	1.00	1.00	0.5	0.5
15–18	1.20	1.00	0.7 (older than 16)	0.5 (younger than 18)
19–59	1.00	0.88	0.7	1.0
60 +	0.88	0.72	0.7	1.0
Economies of Scale Assumption	Adult equivalents multiplied by factors according to number of adults (1 adult: 1.0, two adults 0.946, three adults 0.897, four adults 0.851, etc)		First adult gets additional weight of 0.3	Number of adult equivalents to the power of 0.6

Sources: World Bank (1995); Collier *et al.*, (1986); Deaton and Muellbauer (1980); Lanjouw and Ravallion (1995).

The households were then ranked according to their adult equivalent expenditure and divided into five quintiles, ranging from the poorest to the richest 20 percent of households. For the comparative purposes of this paper, I set the poverty line at the 40th percentile of households (the “poor”), and the severe poverty line at the 20th percentile (the “poorest”).<sup>8</sup> It turns out that the 40 percent criterion is very similar to one of the locally used poverty lines in South Africa

<sup>6</sup>These nutrition-based scales are commonly used by the World Bank (1995) and are a composite of adult equivalents based on Collier (1986) and Engel curve estimates of economies of scales based on Deaton and Muellbauer (1980). Both these methods are controversial (e.g. Deaton, 1997). Unfortunately, there is no consensus on a satisfactory empirical or theoretical procedure to arrive at “objective” measures of child costs and economies of scales. While several methods have been proposed which, in various ways, seek to identify equivalence scales through the impact of demographic characteristics on expenditure patterns of households, all of these methods are controversial or lead to unconvincing results. See Deaton (1997), Lanjouw and Ravallion (1995), Srinivasan and Drèze (1996), and Ferreira *et al.* (1998).

<sup>7</sup>The economies of scale adjustment in the “nutrition” scales is similar to an exponent on household size of 0.9, thus assuming much fewer economies of scale than the “economy” scales which are based on Lanjouw and Ravallion (1995). In addition, adjustments were made to account for differences in prices in different locations.

<sup>8</sup>For comparisons of poverty across time or across countries, it would be necessary to use an absolute poverty line; but since the purpose is to compare two ways of measuring poverty in the same country at the same time, this way of arriving at a poverty line is adequate and makes the comparison particularly transparent.

and also similar to a poverty line based on caloric requirements (2500 kcal per adult equivalent per day), while the severe poverty line is close to the \$1 a day poverty line used by the World Bank for international comparisons (Ravallion and Chen, 1997; RDP, 1995; Klasen, 1997).

This paper uses two different concepts to examine the distribution of poverty. One is simply the incidence of poverty among a particular group, or the well-known poverty rate. The other measure is the poverty gap and refers to the amount of monetary transfer that would be necessary to lift the expenditure of the poor exactly to the poverty line. Since it specifically incorporates the depth of poverty in the assessment, it gives a more accurate picture of the magnitude of the problem.

Two ways of presenting this expenditure poverty gap are used. The first is the percentage gap to the poverty line of the average poor individual of a certain characteristic (e.g. by what percentage must the average expenditure of a poor African increase to reach the poverty line), thereby directly measuring the depth of poverty among individuals of that group.<sup>9</sup> The other is the share of the total national poverty gap that is made up of people with certain characteristics (e.g. what share of the total poverty gap is accounted for by the poverty gap among Africans). This indicator includes the population share of a group in the assessment and thereby gives an indication of the characteristics of the poor population.<sup>10</sup>

The broad measure of deprivation is a composite index of 14 components relating directly to specific capabilities mentioned above.<sup>11</sup> An attempt was made

<sup>9</sup>This formulation of the poverty gap is slightly different from standard usage which simply measures the absolute distance of a poor household to the poverty line. This was done for presentational purposes. The percentage increase required for a poor person to reach the poverty line is simply the absolute distance of a poor household to the poverty line divided by the expenditure of that household.

<sup>10</sup>The three concepts are closely related. In fact, the share of the total poverty gap accounted for by the poverty gap of group  $i$  is:

$$\frac{PG_i}{PG} = \frac{P_i}{P} * \frac{PIP_i * \bar{E}_i}{\overline{IPG}}$$

where the share of the poor accounted for by group  $i$  equals:

$$\frac{P_i}{P} = \frac{PR_i}{PR} * \frac{N_i}{N}$$

$PG$ , total poverty gap;  $P$ , number of poor;  $N$ , population;  $\overline{PIP}$ , average individual poverty gap (percentage increase of expenditure needed to reach poverty line);  $PR$ , poverty rate;  $\bar{E}$ , average expenditure of group  $i$ .

<sup>11</sup>All of these indicators are measured at the household level, rather than as achievements for individuals. This is done mainly to reflect the notion that many of the achievements (e.g. housing, access to services, durable goods, etc.) are, in principle, accessible to all members of the household. It is also done in recognition of the difficulty of inferring differences in access to household resources from household survey data. The inability to observe intra-household allocation of access and use of resources is a failing the deprivation index shares with all the expenditure poverty measures which also cannot take into account intra-household resource allocation. Where different people in a household have different achievements in a few indicators (e.g. education, employment), the achievement was averaged for the household. This was done to reflect the notion that individual achievements may provide externalities within the household, i.e. all household members may benefit from the education or employment of one of its members. Moreover, some achievements of an individual often depend on joint decisions within the household. For example, a person who has withdrawn from the labor force to care for children because other members of the household are working should not be seen as suffering from a low achievement in employment. Averaging education and employment levels within households reduces these biases. Unfortunately, no community-level indicators (e.g. existence and proximity to health, education, welfare, community facilities, etc.) could be incorporated as there was insufficient reliable data.

to include a comprehensive list of basic capabilities as well as stated priorities of the population which were also elicited in the same questionnaire.<sup>12</sup> Table 2 lists the capability in question, the indicator chosen to measure it, and the scores attached to each achievement. Each indicator is scored on a scale of 1 to 5. Scoring was aimed to roughly ensure that a score of five represents the best possible standard or condition, a score of three should allow a basic level of welfare to lead a simple, but reasonably safe and healthy existence, while a score of one is an indication of severe deprivation, severe health hazards, and few physical and human resources. By assigning scores, the differences in levels of achievements are interpreted cardinally (i.e. an achievement that gets a score of 2 is interpreted as being twice as good as an achievement that only gets a score of 1). Thus this procedure shares the same problem of the utilitarian approach to measuring poverty which also necessitates a cardinal interpretation of observed ordinal preference relations. In most cases, however, the scoring is quite intuitive and unlikely to stir much debate. Similarly, the cardinal interpretation of the scores is, in most cases, a fair approximation of the differences in the achievements. In some cases, however, the characteristic of the indicator may not yield sufficient information about the capability in question so that the scoring and its cardinal interpretation may be more controversial. These items will be highlighted below.

Two procedures were used to derive a weighting of the various components of the index. One derived the weights from the data itself based on principal component analysis.<sup>13</sup> The other is to calculate the total deprivation index as simply the average score of all individual components. It turns out that the two procedures yield virtually identical results. The correlation coefficient between the deprivation measure arrived at by the two procedures is 0.992.

The first two capabilities included are education and health, which are clearly among the most important aspects of well-being. The education measure simply records the average years of education achieved by the adult (16 years and older) members of the household. The second basic capability examined is health. Instead of relying on reported morbidity which are often prone to bias, the indicator measures access to health care by focusing on the type of health providers

<sup>12</sup>The survey asked for priorities for a new government to improve people's lives. All the capabilities mentioned below were named by a large share of respondents. The basic capabilities considered were based on Sen (1992, 1999).

<sup>13</sup>The first principal component of the fourteen individual components (i.e. the background variable contained in all the components that accounts for the largest share of variation in all the components) was interpreted as the measure of deprivation. The advantage of such an approach is that it uncovers empirically the commonalities between the individual components and bases the weights of these on the strength of the empirical relation between the deprivation measure and the individual capabilities. Using this procedure, the following weights for the individual components were derived: expenditure quintile (0.36), fuel (0.35), sanitation (0.34), durable goods (0.34), water (0.33), and education (0.28). The smallest weights are assigned to safety (0.01), stunting (0.15), satisfaction (0.16), and transport (0.2). With the exception of the safety variable, the analysis suggests that all individual components should properly be included in the measure of deprivation and all contribute quite evenly to it. The disadvantage of such an approach is that it implicitly assumes that only components with strong correlations with each other are relevant for the deprivation measure which may be debatable in some cases. For example, the fact that perceptions of safety are not closely correlated with the deprivation index and its other components should not necessarily suggest that safety is not an important indicator of deprivation, as would implicitly be assumed by a principal component analysis.

TABLE 2  
COMPONENTS OF A COMPOSITE MEASURE OF DEPRIVATION

Component	Description of indicator used	Score (1 signifying most deprived, 5 least)				
		1	2	3	4	5
Education	Average years of schooling of all adult (16+) household members	< 2	3-5	6-9	10-11	12+
Income	Expenditure quintiles (as used throughout paper)	Poorest quintile	Quintile 2	Quintile 3	Quintile 4	Richest quintile
Wealth	Number of household durables (list includes vehicles, phone, radio, TV, geyser, stoves, kettle, bicycles)	0-1	2-4	5-7	8-10	11+
Housing	Housing characteristic	Shack	Traditional dwelling hostel, outbuilding	Combination of buildings	Flat, maisonette	House
Water	Type of water access	River/Stream, Dam, Standing Water	Rainwater, protected spring, well, borehole	Public standpipe, water tanker/ carrier	Piped water on premise	Piped water inside house
Sanitation	Type of sanitation facilities	No toilet	Bucket	Latrine	Imp. latrine, chem. toilet, flush toilet outside	Flush toilet inside
Energy	Main source of energy for cooking	Wood	Dung	Paraffin, coal	Gas from bottle, dry battery	Electricity from grid, town gas
Employment	Share of adult members of households employed	0-19%	20-39%	40-59%	60-79%	80-100%
Transport	Type of transport used to get to work	Walk	Bicycle	Bus, train, taxis		Car
Financial	Ratio of monthly debt service to total debt stock*	0-5%	5-10%	10-20%	20-30%	30%+
Services						
Nutrition	Share of children stunted in household*	80-100%	61-80%	40-59%	20-39%	0-19%
Health Care	Use of health facilities during last illness*	None	Family, friend, trad. healer	Clinic, public hospital, shop	Pharmacy, visit by PHC nurse	Private doctor
Safety	Perception of safety inside (i) and outside (o) of house, compared to 5 years ago	Less safe (i)- less safe (o),	Less safe (i)-same (o), less safe (o)-same (i)	Same (i)-same (o), less safe (i)-safer (o), safer (i)-less safe (o)	Safer (i)-same (o), same (i)-safer (o)	Safer (i)-safer (o)
Perceived Well-Being	Level of satisfaction of household	Very Dissatisfied	Dissatisfied	Neither/Nor	Satisfied	Very Satisfied

\*Households with missing values in these indicators were assigned a value based on their race, location (rural/urban/metro), and expenditure quintile.



used by households during their last bout of illness.<sup>14</sup> While the scoring for some types of health providers, especially traditional healers, may be controversial, the scoring generally reflects the quality of health care available.<sup>15</sup>

Nutrition was measured using an anthropometric examination performed on children in the households. The score is based on the share of stunted children in the household.<sup>16</sup>

Five components measure households' access to the physical infrastructure. The first is the quality of housing which is important indicator of well-being for a number of instrumental and intrinsic reasons. Among the instrumental reasons, the quality of housing has important health and safety elements. Intrinsically, the quality of housing should affect the well-being of its occupants directly. The scoring is done on the type of housing, which in most cases is uncontroversial.<sup>17</sup>

Water access is also an indicator of considerable intrinsic and instrumental significance. Access to clean water is likely to be valued in its own right. In addition, it frees time [mostly women's time since women spend an average of 3 hours a day fetching water in areas where there is no water access, RDP (1995)] for other activities and has important health implications. Similarly, sanitation is likely to be valued for its intrinsic and instrumental significance, with its impact on health figuring prominently (World Bank, 1993).

Fourth, the type of cooking fuel is included, once again for intrinsic and instrumental significance. As indoor air pollution caused by the use of wood for cooking is one of the most serious environmental conditions afflicting poor households in developing countries (World Bank, 1993), is correlated with high accident rates, and necessitates household members (mostly women) to fetch it from far distances [spending an average of an hour a day fetching it in areas where they rely on wood, RDP, (1995)], the significance of this indicator is self-evident.

Finally, household equipment, in the form of appliances, bicycles, cars, and other consumer durables are included as another component as they have considerable instrumental significance for easing the work burden in and around the household, improving health, and helping the household in maintaining contact

<sup>14</sup>Household surveys are poor instruments to collect objective indicators of morbidity. The questions on morbidity, which focus on subjective assessment of morbidity, usually suffer from systematic biases. In the SALDRU survey, the richest quintile reported the highest levels of morbidity, which is in contrast to their much lower mortality levels, suggesting that *reported* morbidity is a very unreliable guide to *actual* morbidity (Klasen, 1997; see also Sen, 1992).

<sup>15</sup>The care received by traditional healers may be of varying quality. Similarly, some public health facilities provide high quality health care, possibly better than some private doctors. Nevertheless, on average, this scoring is likely to reflect the quality of care received. Please note also that information on the use of health providers was only available for about 50 percent of households as it was dependent on having experienced an episode of illness in the previous two weeks. The remaining households were then assigned a score based on their race, expenditure quintile, and location (rural-urban-metropolitan) as these three variables were found to predict health provider utilization with high accuracy.

<sup>16</sup>Also here, households with missing observations (as not all children were measured) were assigned a score based on their race, location, and expenditure quintile. This procedure of imputing missing values for nutrition and health care has little influence on the overall results; dropping the missing observations (and calculating the index on a smaller number of components in those cases) would lead to very similar results.

<sup>17</sup>At the same time, there may be traditional dwellings of varying quality and the description of housing in a minority of cases says little about their quality (e.g. "combination of buildings"). This housing measure is also closely correlated with indicators of crowding which are not separately considered.

with the surrounding world. The indicator chosen is simply the number of consumer durables (from a list including radio, TV, refrigerator, geyser, electric kettle, telephone, primus cooker, electric stove, gas stove, bicycle, and car) owned by the household.

Employment is included as a component. In a country where the official unemployment rate stands at about 30 percent, the ability to be employed counts as an important indicator of well-being with obvious instrumental, but also considerable intrinsic significance (in particular as a basis of self-respect and fulfillment, see Sen, 1999). Since there may be a division of labor taking place between the adult members of the household, the share of adult members of the household who are employed is the indicator chosen.

Transport to and from work is included as well. Particularly in the South African context, where *apartheid* spatial policies led to considerable distances between the place of residence and work for most of the black population, transport means are of important instrumental significance, as they affect travel time and costs, and thereby the ability to participate in the labor market and in society.

Consumption, measured as adult equivalent monthly household expenditures (using the quintiles from the expenditure poverty measure as scores) is also included as a separate component to capture the instrumental significance of consumption expenditures above and beyond the ways it has already been captured in some of the indicators above.<sup>18</sup>

Access to financial services is included in the measure for two reasons. High rates of household debt service may indicate severe financial stress on the household, with obvious impact on present and future well-being; in addition, poor access to financial services may limit the ability of many poor households to manage their highly variable income streams and deal with the risks and uncertainties they face. The particular indicator chosen is the amount of monthly debt repayment divided by the stock of total debt owed. High debt service ratios indicate both severe financial stress as well as access only to informal sources of credit (shopkeepers, moneylenders, relatives, etc.) where the interest rates are often high and the maturities short, necessitating rapid repayment streams (Klasen, 1997).

The last two indicators deal with perceived levels of well-being. The first component measures perceptions of safety, an important consideration in a country known for its high crime levels. Unfortunately, no absolute assessment of safety was asked, only an assessment relative to five years ago. This question was asked for physical safety in the home as well as outside the home and the index is a composite of responses to the two questions.

The last component is simply the response of the household to the question "Taking everything into account, how satisfied is this household with the way it lives these days?" In addition to all the previously measured "objective" indicators of well-being, subjective assessments of well-being are clearly an important element of well-being. In particular, these assessments may also measure well-being relevant factors that were not included in any of the previous indicators,

<sup>18</sup>Note that the inclusion of this component is simply as a "catch-all" for all capabilities that are correlated with household expenditure levels but are not separately listed. This is similar to the role played by the income component of the Human Development Index (Anand and Sen, 1996).

and may include an assessment of the relative nature of poverty and deprivation.<sup>19</sup>

Clearly, one may question the choice of indicators, the scoring, and the implicit weighting. I have not attempted to propose the definitive measure of well-being, but simply to contribute to a debate about possible ways to capture well-being more directly than relying on expenditures as an imperfect proxy. The SALDRU survey as well as the increasing number of comparable household surveys available in many developing countries would allow testing a variety of ways to conceptualize well-being and apply them nationally and internationally.

In order to test the sensitivity of the findings of this paper to the construction of this index, I also used the same information to construct a core deprivation index which contains only seven components (education, health, housing, nutrition, water, employment, and safety). This core deprivation index concentrates on the most basic capabilities and I will report whenever the results are different using this measure. In addition, I tested the sensitivity of the index to the scores for individual achievements in the various components and found that the results were not very sensitive to changes in individual scores.<sup>20</sup>

To compare the deprivation measure to the expenditure poverty measure, the cut-off for the “deprivation line” and a “severe deprivation line” was also chosen to be the 40 percent and 20 percent worst-off households, respectively, measured in terms of the deprivation index. Similarly, a deprivation gap measure is calculated which is simply the absolute gap of a deprived (or most deprived) household to the deprivation (or severe deprivation) line.<sup>21</sup> Moreover, and similar to the expenditure poverty measure, the total deprivation gap is calculated and the share attributed to individuals with certain characteristics (i.e. what percentage of the total deprivation gap is accounted for by deprivation among Africans?). The same formulas presented above for the expenditure poverty measure apply here as well.

#### 4. POVERTY AND DEPRIVATION COMPARED

A first useful comparison is to examine the correlation between expenditure poverty, the deprivation index, and its various components. Table 3 lists the correlation coefficients for the deprivation index and the scores (from 1–5) for its 14 components. Since one of the components is the expenditure quintile, the basis for the poverty measure, Table 3 also shows the correlation with the expenditure poverty measure.

Table 3 shows that all components are positively (significantly) correlated with the deprivation score and most components are closely and positively

<sup>19</sup>For a discussion of the use of subjective indicators of welfare in South Africa, see Møller (1997); for a general discussion, see Easterlin (1995). As in many other countries, poorer people report much lower levels of satisfaction than wealthier groups which may be related to reference group comparisons.

<sup>20</sup>Only drastic changes in the scoring of several components would make a significant difference. Moreover, the index is very insensitive to rescalings of individual scoring, which is another potential problem of cardinal interpretations of ordinal relations.

<sup>21</sup>In contrast to the expenditure poverty gap measure where the percentage increase in expenditures needed for the household to reach the poverty line is considered, here the absolute gap to the deprivation line (2.9) is considered as it is intuitively a clearer concept.

TABLE 3  
CORRELATION COEFFICIENTS BETWEEN DEPRIVATION INDEX AND ITS COMPONENTS

	Index	Expand Quintile	Education	Health	Nutrition	Housing	Water	Sanitation	Energy	Employ- ment	Transport	Durables	Financial Services	Satis- faction	Safety
Exp. Quintile	0.847**	1.000													
Education	0.651**	0.565**	1.000												
Health	0.633**	0.633**	0.374**	1.000											
Nutrition	0.405**	0.299**	0.216**	0.197**	1.000										
Housing	0.565**	0.350**	0.327**	0.232**	0.167**	1.000									
Water	0.784**	0.593**	0.438**	0.418**	0.249**	0.445**	1.000								
Sanitation	0.804**	0.631**	0.502**	0.441**	0.247**	0.450**	0.754**	1.000							
Energy	0.825**	0.655**	0.502**	0.454**	0.259**	0.428**	0.753**	0.719**	1.000						
Employment	0.553**	0.477**	0.259**	0.322**	0.183**	0.163**	0.427**	0.381**	0.440**	1.000					
Transport	0.486**	0.425**	0.359**	0.274**	0.148**	0.203**	0.272**	0.332**	0.306**	0.089**	1.000				
Durables	0.807**	0.706**	0.572**	0.474**	0.275**	0.441**	0.558**	0.618**	0.632**	0.360**	0.454**	1.000			
Fin. Services	0.655**	0.594**	0.391**	0.427**	0.215**	0.277**	0.454**	0.453**	0.488**	0.296**	0.283**	0.480**	1.000		
Satisfaction	0.432**	0.333**	0.246**	0.232**	0.117**	0.177**	-0.224**	0.260**	0.242**	0.224**	0.181**	0.367**	0.225**	1.000	
Safety	0.102**	0.003	0.010	0.020**	-0.014**	0.013**	-0.004	0.024**	0.040**	-0.024**	0.022**	0.023**	0.001	-0.088**	1.000

Note: \*\*refers to 99% significance, \*to 95% significance.

correlated with each other. This suggests that all bad (and good) things tend to go together and most deprived people suffer from poor achievements in most or all components.<sup>22</sup> At the same time, the strength of the correlation differs considerably. The safety component is only weakly related to the deprivation index, suggesting that safety is a problem for all population groups, not just the deprived. It is also the only component that is not significantly correlated with most of the other components, and significantly *negatively* correlated with some components. Nutrition, satisfaction, and transport also have weaker correlations with the other components.

Table 3 also shows that the expenditure quintile measure has the closest correlation with the deprivation index, with a correlation coefficient of 0.847. At the same time, other components (that can be estimated much more easily) have about the same close (and statistically indistinguishable) correlation, including the score for sanitation, fuel, durable goods, and water.

Regardless of its theoretical limitations, in the case of South Africa in 1993, the expenditure poverty measure is among the best available proxies for a broad index of deprivation. Four cautionary notes are, however, in order. First, it appears that the expenditure quintiles are more closely correlated with the deprivation index among the least deprived groups of the population. If the data are restricted to the most deprived groups (deprivation index less

TABLE 4  
CORRELATION BETWEEN DEPRIVATION INDEX AND COMPONENTS  
AMONG MORE AND LESS DEPRIVED

	More deprived (Index < = 3)	Less deprived (Index > 3)
Expenditure quintile	0.503**	0.762**
Education	0.347**	0.556**
Water	0.475**	0.528**
Sanitation	0.519**	0.603**
Fuel	0.532**	0.483**
Financial services	0.493**	0.475**
Durables	0.361**	0.780**
Satisfaction	0.156**	0.479**
Safety	0.107**	-0.036**

Note: This represents only a partial list. \*\* refers to 99% significance.

than 3), Table 4 shows that the correlation between expenditure quintiles and the index of deprivation is no longer the largest.<sup>23</sup> Now fuel and sanitation have closer correlations with the deprivation index, and access to financial services has a very similar correlation. On the other hand, for the least deprived groups (index > 3), the expenditure quintile is (together with the durable goods score) by far the best predictor of the deprivation index, much better than any of the service indicators. Thus expenditure is apparently better able to

<sup>22</sup>Note that this high correlation does not constitute some form of double-counting. Each achievement is intrinsically and separately valuable regardless of whether it is related to another achievement.

<sup>23</sup>Splitting the data at higher or lower levels of the deprivation index does not alter this result significantly.

differentiate among the better-off than to identify the deprived (see also below).<sup>24</sup>

Second, this particularly strong correlation between expenditures and deprivation may be uniquely strong in South Africa due to its *apartheid* legacy. Many of the policies that propelled the consumption levels of the favored white population group were accompanied by measures that ensured their better access to, and higher quality of public goods. Thus the correlation between private incomes and provision of public goods is unusually high, which may not be as strong in other countries (van de Walle and Nead, 1995). As the new government is extending public goods and services to the broader population, this correlation should become considerably weaker (as it is in other countries that have adopted policies of universal provision of public goods such as basic health and education, see Drèze and Sen, 1989).<sup>25</sup>

Third, high average correlation does not preclude the existence of outliers and misidentified population groups. For targeting purposes (regionally or by household or individual), these misallocations may have serious consequences as will be illustrated below.

Finally, as mentioned in Section 2, if the object is to measure deprivation rather than expenditure poverty, it should be emphasized that it is no more difficult to construct such an index of deprivation as it is to determine expenditure quintiles. All data come from the same data source and can easily be assessed. Thus it would still be preferable to measure deprivation directly rather than rely on a proxy, however good that proxy may be.

Let me now turn to the measurement and identification of poor and deprived populations. Table 5 compares the average rates, cut-offs and gaps for the poverty and the deprivation measure. The expenditure poverty measure (based on the 40th percentile of households) generates a poverty line of 301 R/month adult equivalent expenditure, while the severe poverty line generates a cut-off of 177.6 R/month. Using the same 40 percent cut-off of households yields a deprivation line of 2.9 and a severe deprivation line of 2.4. As the scoring was done to ensure that a score of 3 ensured the satisfaction of the most basic capabilities, the 40 percent cut-off appears to distinguish between those who meet this basic standard and those who do not; a household scoring less than 2.4 on average is clearly suffering from multiple deprivations and is appropriately grouped among the most deprived.

The expenditure poverty gap per household stands at 68 percent for the poor and 48 percent to the poorest. Poor households need an income boost of 68 percent to reach the poverty line; the poorest still need a 48 percent boost to reach the much lower severe poverty line (to reach the poverty line, they would need an increase of 155 percent!). The total poverty gap stood at R20.022b in 1993, equivalent to about 4 percent of GDP.

The equivalent deprivation gap (i.e. the average gap in the deprivation index between a deprived household and the deprivation line) is 0.52. Since the improvement of one score in one component would boost the index by 1/14 or

<sup>24</sup>As shown in Table 4, all correlation coefficients in the split analysis are smaller than when they were calculated for the entire population. This is to be expected as the covariances in the split analysis are lower than the variances of the components, leading to smaller correlation coefficients.

<sup>25</sup>Nor does the close correlation have any direct causal message. While it may be the case that reducing expenditure poverty will reduce deprivation levels, this is far from automatic and other measures may be equally or better equipped to reduce deprivation levels.

TABLE 5  
EXPENDITURE POVERTY AND DEPRIVATION INDEX

	Expenditure Poverty (Nutrition scales)		Deprivation Index		Adjusted Deprivation Index		Adj. Exp. Poverty (Economy scales)	
	Poor	Poorest	Deprived	Most deprived	Deprived	Most deprived	Poor	Poorest
Cut-off	301 R/mth.	177.6 R/mth.	2.9	2.4	3.0	2.5	482 R/mth.	293.5 R/mth.
Cut-off households	40%	20%	40%	20%	43.4%	22.1%	44.2%	23.2%
Population affected	52.9%	28.4%	49.7%	25.4%	52.7%	29.0%	52.8%	29.1%
Average poverty gap per household	68.4%	48.2%	0.52	0.30	0.58	0.36	69.0%	48.2%
Total poverty gap	R20.02b.	R7.81b.	10.33m.	3.04m.	12.31m.	4.11m.	R47.4b.	R15.5b.

*Notes:* The cut-off for poverty refers to monthly adult equivalent expenditure in 1993 Rands; for the deprivation measure, it refers to the average individual score of deprivation index. The expenditure poverty measure is based on nutrition-based equivalence scales, while the adjusted expenditure measure is based on scales that reduce the need of children and increase the implied economies of scale ("economy" scales). For the expenditure poverty measure, the average poverty gap per household refers to the percent increase in household expenditures needed for the household to reach the poverty line. For the deprivation index, it refers to the absolute gap between the deprivation index for the household and the deprivation line. For the expenditure poverty measure, the total poverty gap refers to the amount of transfer needed (on an annual basis) to lift each poor household to the poverty line; for the deprivation index, they refer to the total gap of all poor individuals to the deprivation line. The adjusted deprivation line and the adjusted expenditure poverty line are set to ensure that it generates roughly the same number of poor and deprived individuals as there are poor individuals using the "nutrition" scales.

0.0714, this gap suggests that the average deprived household must move up by one score in 8 components to make it above the deprivation line (or by one score in 5 components to make it above the much lower severe deprivation line). Using Table 2, one can see what sort of changes it would entail for a household to move up by this much.

While both poverty and deprivation lines use the poorest 40 percent of *households* for their cut-off, this translates into a higher share of the *population* being affected, suggesting that larger households are more likely to suffer from poverty or deprivation. There is, however, a difference in the number of poor versus deprived people. While the expenditure poverty measure finds nearly 53 percent of the population to be poor and 29 percent of the population to be among the poorest, the deprivation measure finds “only” just below 50 percent of the population to be deprived and “only” 25 percent of the population to be severely deprived, suggesting that some of the expenditure poor large families are not counted among the deprived (and conversely, that some small households are found to be deprived, but not poor).

TABLE 6  
HOUSEHOLD SIZE, POVERTY, AND DEPRIVATION

	Expenditure Poverty (Nutrition scales)		Adjusted Deprivation Index		Adjusted Expenditure Poverty (Economy scales)	
	Poor	Poorest	Deprived	Most Deprived	Poor	Poorest
Average household size	5.92	6.45	5.44	5.89	5.37	5.57
Share of households with:						
1–3 members	23.3%	15.3%	30.2%	22.5%	31.0%	26.9%
4–6 members	39.6%	40.2%	37.8%	40.4%	37.3%	38.5%
7–10 members	25.5%	35.0%	25.5%	29.7%	25.4%	28.6%
11+ members	7.8%	9.5%	6.5%	7.4%	6.3%	6.0%

*Note:* The adjusted deprivation index and the adjusted expenditure poverty measure (“economy” scales) are set to ensure that the share of the population poor is the same as in the expenditure poverty measure (“nutrition scales”).

Table 6 investigates this issue further by examining the average household size and its distribution. The average household size of expenditure poor households is 5.92, compared to an average size of 5.48 for deprived households. Among the poorest, the average household size is 6.46, compared to 5.95 among the most deprived. The table also shows that there are a great deal more small households among the deprived population group (30 percent of all deprived household contain fewer than 4 people) than among the poor (23 percent). Choosing the lower line for both measures accentuates the difference. 22 percent of all most deprived households contain fewer than 4 people, compared to 15 percent of poorest households.<sup>26</sup>

<sup>26</sup>Since the remainder of the analysis is based on people, rather than households, the deprivation and severe deprivation lines were raised to ensure that about they generate about the same numbers of people as the poverty and severe poverty line, respectively (see Table 5). Using this adjusted deprivation line, more than 43 percent of households are considered deprived, and 22 percent of households most deprived, generating approximately the same number of people in each category as the income poverty and severe income poverty lines. The same is done for the expenditure measures using different equivalence scales.



TABLE 7  
CORRELATION COEFFICIENTS BETWEEN EXPENDITURES AND DEPRIVATION SCORES

	Expenditure (Nutrition scales)	Expenditure (OECD scales)	Expenditure (Economy scales)	Deprivation Index	Core Deprivation Index
Exp. (Nut.)	1.000				
Exp. (OECD)	0.988**	1.000			
Exp. (Econ.)	0.967**	0.983**	1.000		
Deprivation	0.658**	0.660**	0.682**	1.000	
Core Deprivation	0.559**	0.562**	0.579**	0.929**	1.000

*Note:* The correlations considered here are based on the continuous expenditure measures, not the discrete score based on expenditure quintiles used in the correlations in Tables 3 and 4. \*\*refers to 99% significance.

The poverty of various household types and sizes is dependent on the assumptions about equivalence scales. Tables 5 and 6 also report expenditure poverty rates based on the “economy” scales which assume small adult equivalents for children and large economies of scale. Using these scales suggests that, not surprisingly, the average household size among the poor is much smaller and more similar to (in fact, slightly smaller than) the deprivation index. Using these scales should therefore enable us to determine whether the differences between the poverty and deprivation measures are largely driven by the choice of equivalence scales.<sup>27</sup>

A preliminary look at the sensitivity of the differences between the poverty and deprivation measures to the equivalence scales is provided in Table 7 where I correlate monthly adult equivalent expenditures using three different equivalence scales with the two deprivation indices. Despite the drastic differences in the scales, the differences among the three expenditure measures are minor compared to the differences between them and the two deprivation measures. Thus it appears that the differences between the poverty and deprivation measures are not mainly due to the assumptions about equivalence scales.

It is noticeable, however, that the correlation between the “economy” scale-adjusted poverty measure and the deprivation index is slightly larger than between the “nutrition” scale-adjusted poverty measure and the deprivation index (0.682 versus 0.658). If expenditure measures are used as proxies for broader notions of deprivation, it appears that one should assign a comparatively small value to children and assume large economies of scale.<sup>28</sup>

Apart from the differences in relation to household size, the poor and the deprived differ considerably in other characteristics. Table 8 compares poverty

<sup>27</sup>Poverty rates using the OECD scales were very similar to the rates based on the scales used here. If anything, the average household size among the poor is even larger using the OECD scales (6.02 and 6.64 for poor and poorest, respectively), thereby widening the discrepancy between the expenditure poverty and the deprivation measure. Using the core deprivation index suggests that the average household size among the deprived is now slightly smaller than using the deprivation index, and virtually identical to the expenditure poverty measure based on the “economy” scales.

<sup>28</sup>A caveat is in order. The deprivation index assumes that all individuals in a household have equal and “sufficient” access to all the household-specific public goods (e.g. housing, water or sanitation access, electricity, durable goods, etc). If in large households such access is restricted due to crowding, then this would increase the deprivation of large households.

TABLE 8  
POVERTY AND DEPRIVATION BY LOCATION, RACE, EDUCATION, AND HEADSHIP

	Expenditure Poverty Measure			Deprivation Measure		
	Poverty rate	Poverty gap	Share of poverty gap	Deprivation rate	Deprivation gap	Share of deprivation gap
Location						
Rural	73.7	73.8	77.1	80.1	0.64	88.6
Urban	40.5	63.6	15.3	31.2	0.39	7.9
Metropolitan	19.7	42.9	7.5	13.7	0.32	3.4
Old Administrative Boundaries						
Former Provinces	32.8	71.1	29.3	25.8	0.48	20.2
Former "Self-Gov. Territories"	67.6	60.5	32.8	75.8	0.62	45.1
Former "TBVC States"	80.2	96.9	37.9	79.3	0.73	34.7
Race						
African	64.9	70.1	96.0	67.1	0.59	98.9
Coloured	32.6	45.2	3.8	12.2	0.33	1.0
Indian	2.5	37.3	0.1	0.0	0.00	0.0
White	0.7	33.9	0.1	0.6	0.45	0.1
Education of Household Head						
No education	78.0	81.2	44.9	81.5	0.67	48.9
Less than primary	65.2	68.3	31.4	69.5	0.58	31.0
Less than secondary	36.2	52.5	22.4	36.8	0.45	18.9
Secondary and beyond	7.8	30.9	1.3	7.0	0.35	1.1
Household Headship						
De jure						
female-headed	66.5	72.6	35.1	61.7	0.61	33.0
De facto female-headed	69.9	68.6	11.5	83.5	0.65	15.4
Resident male head	43.6	66.1	52.1	44.3	0.54	50.2
No head/abs. fem. head	67.7	58.7	1.3	66.1	0.57	1.4

*Notes:* For the expenditure poverty measure, the average poverty gap per household refers to the percent increase in household expenditures needed for the household to reach the poverty line (all based on the "nutrition" scales). For the deprivation index, it refers to the absolute gap between the deprivation index for the household and the deprivation line. The share of poverty (deprivation) gap refers to the share of the total poverty (deprivation) gap that is made up of poverty (deprivation) among the population group in question (e.g. urban or Africans).

rates, poverty gaps, and the share of the poverty gap attributable to different population groups (all based on the "nutrition" scales) with the same indicators using the deprivation measure.

As to be expected, both measures qualitatively agree on most correlates of poverty and deprivation. Both measures find poverty and deprivation to be particularly high and deep in rural areas,<sup>29</sup> in the former "self-governing territories"

<sup>29</sup>The classification into rural, urban (small towns and cities) and metropolitan (four metropolitan centers of Cape Town, Port Elizabeth, Durban, and Johannesburg-Pretoria-Vereeniging) are based on classifications by the Central Statistical Services.

and the former nominally “independent states,”<sup>30</sup> among Africans,<sup>31</sup> and among the poorly educated. They also agree that female-headed households, both *de jure* (where the female is officially household head) and *de facto* (where the male head is absent for most of the year), have a higher incidence of poverty and deprivation, although the depth of poverty and deprivation does not vary as much by headship.

However, there are important difference in the extent to which particular groups appear to be affected by poverty and deprivation. In particular, the deprivation measure suggests that the worst-off groups are even worse off than was suggested by the expenditure poverty measure. For example, while 77 percent of the poverty gap was due to poverty in rural areas, 89 percent of the deprivation gap is due to deprivation among rural dwellers. 80 percent of the deprivation gap arises in the former homelands, compared to “only” 70 percent of the poverty gap. Particularly the “self-governing territories” show much higher and deeper deprivation than suggested by the expenditure poverty measure. Important aspects of this greater deprivation in rural areas and the homelands are the much lower access to services, poorer education, and inferior access to health care.

The measures also disagree on the impact of headship on poverty. In contrast to the poverty measure, *de facto* female-headed households suffer from much higher and somewhat deeper deprivation than other household types, and thus they make up a much larger share of the deprivation gap than of the poverty gap. This is due to the fact that these households, many of which reside in rural areas of the former homelands, suffer from the poorest access to water, sanitation, fuel, financial services, and have the lowest education levels.

Conversely, the deprivation measure finds some groups not as badly off, compared to the expenditure poverty indicator. Particularly noteworthy is that the poverty measure finds 33 percent of “Coloureds” to be poor, while the deprivation rate among this group is much lower at 12 percent. Similarly, residents of urban and metropolitan areas and the former provinces appear much less deprived than poor. Despite their expenditure poverty, these groups have much better access to services, education, and health which explains the big difference between the poverty and deprivation measure.<sup>32</sup>

It could be the case that some of these univariate determinants of poverty and deprivation are an artifact of their correlation with other determinants of

<sup>30</sup>The four provinces were reserved for whites; in designated areas, Coloureds, Indians and Africans with permits were allowed to reside there as well. All other Africans were required to live in the 10 homelands, six of which were “self-governing territories” and four of which (Transkei, Bophutatswana, Venda, and Ciskei, the so-called “TBVC states”) were granted full independence in the 1970s. The restrictions on movement of Africans were lifted in the 1980s, leading to a large migration of Africans to the four provinces. Provinces and homelands were consolidated into new provinces in 1994.

<sup>31</sup>I use the racial classifications that were generated during the *apartheid* years but are still being used to measure the dismantling of the *apartheid* legacy. Africans are black Africans, Coloureds descendants from mixed-race couples, Indians descendants of Indian immigrants, and White descendants of European immigrants.

<sup>32</sup>I also consider the relationship between poverty, deprivation, and age. Poverty and deprivation rates are much larger for children, about average for the elderly, and below average for non-elderly adults. The differences between the poverty and deprivation measures are slight and disappear entirely when different equivalence scales are used. This suggests that the correlation between poverty, deprivation, and age is largely driven by household size.

poverty (and thus due to omitted variable bias). In particular, one may suspect that some of the geographic, educational, and headship influences on poverty shown in Table 8 are really reflections of the powerful influence of race on poverty and deprivation. Thus we need to test whether these determinants, and the differences in the importance of these determinants in explaining poverty and deprivation, remain important in a multivariate setting. Table 9 runs simple OLS regressions to explain the level of adult equivalent expenditure (using “nutrition” and “economy” scales, columns 1, 2) and the index of deprivation and the core index of deprivation (columns 3, 4) using race, household size, education, headship structure, and location as independent variables to assess the importance of each of these factors in a multivariate setting.

Table 9 shows that all correlates of poverty and deprivation identified in the univariate analysis remain significant in the multivariate setting. At the same time, the importance of the various factors differ considerably. In particular, race is the overwhelming influence explaining expenditures with whites having R1,300 more per month to spend (compared to a poverty line of R300 !) than Africans. The Coloured population group appears to be much closer in expenditure levels to the poorer African population group than to the richer Indian group, which itself is about one-third of the way between Africans and whites. Household size has the expected negative, and education a positive and strongly non-linear influence on adult equivalent expenditures. It is noticeable, however, that neither are nearly as important as race in determining expenditure levels suggesting that (at least in late 1993) the legacy of *apartheid* played an overriding role in determining expenditure levels of the population (including its impact of past and present labor market discrimination and differences in educational quality).<sup>33</sup> Headship has a comparatively small influence on expenditures, but female-headed households remain worse off than others.

It is also noticeable that the rural population is now slightly (though not significantly) *better* off than their urban counterparts, and residents of “self-governing territories” are also better off than residents of the former provinces. At the same time, people in metropolitan areas are still much better off than their rural or urban counterparts.

In column 2, I repeat the expenditure regression using the “economy” scales. As expected, the household size coefficient is much smaller. Otherwise, the results are qualitatively the same to the first regressions; but all factors (except household size) now have a larger and more significant influence than before. Moreover, *de jure* female headed household now are associated with much lower expenditures than previously which is due to the fact that these households are somewhat smaller than other household types and thus do not benefit much from the greater discounting of children and the larger economies of scale.

Column 3 implements the same regression using the deprivation index. Two differences to the expenditure poverty measure, already apparent in the univariate analysis above, are confirmed. First, there appears to be a much larger gap in

<sup>33</sup>For example, if a person jumped from the average African education level (5 years) to the average white education level (10 years), their monthly expenditure would rise by R 490, less than a half of the amount of difference a change in racial group (from African to white) would make. The impact of household size is even smaller.

TABLE 9  
OLS REGRESSIONS ON EXPENDITURES AND DEPRIVATION

	Adult	Equivalent	Monthly	Deprivation	
	Expenditure			(3)	(4)
	(1)	(2)		Deprivation	Core
	Nutrition	Economy			Deprivation
	Scales	Scales			
Constant	2042.8** (39.8)	2400.9** (40.0)		3.97** (184.8)	3.77** (170.6)
Race					
African	-1299.3** (28.4)	-1533.1** (29.1)		-0.82** (46.2)	-0.44** (23.9)
Coloured	-1168.8** (23.6)	-1363.1** (23.5)		-0.42** (19.2)	-0.13** (6.1)
Indian	-837.0** (12.5)	-859.7** (9.5)		-0.15** (6.5)	-0.07** (2.8)
Location					
Rural	-227.7** (8.1)	-299.6** (9.5)		-0.45** (27.6)	-0.29** (16.9)
Urban	-234.7** (7.9)	-302.0** (9.5)		-0.11** (8.7)	-0.05** (3.3)
Self-governing territory	62.8** (4.0)	54.9** (2.9)		-0.02 (1.1)	-0.13** (7.0)
TBVC State	-23.5 (1.4)	-60.1** (2.9)		-0.13** (7.0)	-0.20** (10.2)
Household size	-48.0** (22.9)	-24.9** (11.0)		-0.02** (13.9)	-0.02** (12.0)
Education of Head					
Less than Primary	7.8 (0.8)	29.9** (2.4)		0.11** (7.4)	0.09** (5.8)
Less than Secondary	40.6** (3.3)	84.6** (5.4)		0.33** (24.1)	0.33** (22.0)
Secondary and beyond	536.7** (14.4)	707.7** (16.3)		0.66** (33.9)	0.66** (33.1)
Headship					
De jure female-headed	-37.8* (1.7)	-175.3** (8.8)		-0.12** (10.8)	-0.07** (5.8)
De facto female-headed	-44.4** (3.5)	-89.7** (5.8)		-0.21** (-11.8)	-0.24** (11.7)
No head/absent female head	-5.2 (0.1)	-60.0 (1.5)		-0.06 (-1.3)	-0.07 (1.4)
Adj. R-Squared	52.4%	53.3%		72.5%	58.0%

*Note:* Absolute value of heteroscedasticity corrected *t*-statistics (one-tailed test) are in parentheses. \*\*refers to 99% significance, \*to 95% significance. White, metropolitan, "former provinces", no education, and resident male head are the omitted categories for the dummy variables.

deprivation levels between Africans and Coloureds than was true in the expenditure measure. Coloureds are about half-way between Africans and whites, while in the expenditure measure they did not reach the 10th percentile of the difference between Africans and whites. Similarly, Indians are only slightly worse off than whites using the deprivation index, while they were much worse off using the expenditure measure. Secondly, the levels of deprivation in rural areas are now much worse than urban areas, whose impact on deprivation is now much closer

to the impact of metropolitan areas. The same is true, to a lesser extent, for the homeland residents who are now worse off than residents of the “former provinces.”

Education and household size also have the expected effects, but their magnitude differs from the expenditure regression. Education is much more important than household size, and the effect is more linear than in the expenditure regression. Consistent with the findings from Table 7, it also appears that the “economy” scales (column 2) better approximate the influence of household size and education on deprivation than the “nutrition” scales (column 1). Female headed households are much worse off than household with resident male heads, which is also different to the expenditure regressions.

Column 4 shows the factors influencing core deprivation. While race is now a slightly less important factor overall, the differences with the expenditure regressions regarding Coloureds, Indians, and rural areas are as strong as before.

Clearly, there are major differences between the expenditure poverty and the deprivation measures. The deprivation measure finds well-being to be much worse in rural areas, particularly among Africans, even when education, and household size is controlled for. In contrast, people in urban areas, Coloureds and Indians, are reported to be much less deprived than one would surmise from the expenditure measures.

## 5. IDENTIFYING THE POOR AND DEPRIVED

As a last step in the comparison, I examine the differences in identifying the worst off between the poverty and deprivation measure. Misidentification of the worst off is of particular importance for targeting purposes. Such misidentification may be a major problem even if aggregate statistics are very similar for both measures. For example, even if the poverty and deprivation rates for Africans were the same, there could be large differences in identifying poor and deprived households as the two measures may find a similar number, but different individual African households to be deprived or poor.

Table 10 compares the households identified as poor and deprived using the two measures. While both the poverty and the deprivation measure converge on identifying 16.8 million people as income poor and deprived, 3.3 million people are either found expenditure poor, but not deprived, or vice versa. If the deprivation index was indeed the true measure of deprivation, about 17 percent of the 20 million truly deprived are not identified by the expenditure measure.

With the severe poverty measure, the level of misidentification is much larger. Now both indicators find 7.7 million people among the poorest and most deprived, but the measures do not agree on another 6.6 million, half of which are among the poorest and not most deprived, and vice versa. Two factors seems important for this large misidentification among the very poor. The first is that finer targeting will always lead to larger misidentifications (as a share of the targeted population). In addition, however, it appears that, at the most deprived end of the distribution, expenditure poverty is no longer a very good proxy for broader levels of deprivation. While about 69 percent of the most deprived come from the poorest expenditure quintile, now 24 percent of the severely deprived

TABLE 10  
OVERLAP AND DIFFERENCES BETWEEN POOR AND DEPRIVED POPULATIONS

	Both	Poor, not deprived	Deprived, not poor	Neither
Poor/Deprived, %	44.2	8.7	8.7	38.4
Poor/Deprived, Numbers (m.)	16.8	3.3	3.3	14.6
Poorest/Most Deprived, %	20.3	8.6	8.8	62.4
Poorest/Most Deprived, Numbers (m.)	7.7	3.2	3.3	23.7
Convergence and Divergence of Incidence of Poorest/Most Deprived by Population Groups (figures in parentheses sum to 100% in each column category such as race, the other figures sum to 100% in each row)				
Race				
African	26.1 (99.2)	10.2 (92.2)	11.3 (99.2)	52.4 (64.8)
Coloured	1.9 (0.8)	8.3 (7.8)	0.8 (0.8)	89.0 (11.5)
Indian	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	100.0 (4.2)
White	0.0 (0.0)	0.0 (0.0)	0.1 (0.0)	99.9 (19.5)
Location				
Rural	35.1 (92.8)	8.4 (52.7)	15.2 (92.0)	41.3 (35.5)
Urban	6.5 (6.6)	13.3 (31.9)	1.6 (3.7)	78.6 (25.8)
Metropolitan	0.8 (1.1)	5.0 (15.4)	1.4 (4.2)	92.7 (38.8)
Old Administrative Boundaries				
Old Provinces	8.0 (19.6)	8.8 (49.4)	2.2 (12.5)	81.0 (64.0)
Old Homelands	32.3 (80.6)	8.3 (50.6)	15.2 (87.5)	44.2 (36.0)
Kwa Zulu	16.0	4.6	24.6	54.9
Gazankulu	30.5	2.3	27.7	39.5
Venda	30.1	3.3	10.6	55.9

come from the second quintile, and another 6 percent even are in the third or fourth quintile. Similarly, the level of correlation between deprivation levels and expenditures is now considerably lower, as shown already in Table 4.

The bottom of Table 10 examines which population groups are particularly affected by this misidentification among the poorest and most deprived. 99 percent of the most deprived but not poorest are Africans, while in the reverse case, 8 percent are Coloureds (refer to figures in parentheses), suggesting that the poverty measures finds Coloureds a lot worse off than the deprivation measure. In fact, the two measures only concur in identifying 2 percent of Coloureds as poorest and most deprived, while another 8 percent are identified as poorest, but not most deprived. Clearly, in the deprivation index the low expenditures of some Coloureds are more than compensated for by better housing, services, and other capabilities. Similarly, 92 percent of the most deprived but not poorest are from rural areas, while nearly half of the poorest but not most deprived are from urban and metropolitan areas. Similar to the situation among Coloureds, there is also more disagreement than agreement in identifying the poorest versus the most deprived in urban and metropolitan areas.

Finally, there are big differences in the regional distribution of the poorest but not most deprived, and vice versa. In particular, nearly 50 percent of the poorest, but not most deprived come from the old provinces, while only 12 percent of the most deprived but not poorest are from there. In contrast, 88 percent of the most deprived but not poorest are from the former homelands. Among

them, three former homelands (KwaZulu, Gazankulu, and Venda) stand out as having particularly large numbers of most deprived, but not poorest, suggesting that higher expenditures go hand-in-hand with very poor other capabilities. In these areas, the shares of people who are identified as poorest and most deprived are often smaller than the shares where there are disagreements.<sup>34</sup>

Using the core deprivation index or alternative equivalence scales only has a minor impact on these results. In fact, using the OECD or the “economy” scales only increases the divergence between the expenditure measures and the deprivation index. Similarly, the core deprivation index only increases the divergence between deprivation and poverty measures so that the misidentification is not greatly influenced by the equivalence scales used or a particular choice of index.

Thus there appears to be considerable divergence in identifying the worst off individuals using the deprivation and the expenditure poverty measure. If the expenditure poverty measure was used for targeting purposes, it would lead to a very different geographic spread of policy interventions than if the deprivation measure was used. In many cases (e.g. in urban and metropolitan areas, among Coloured, in some homelands), there would be more disagreement than agreement about the beneficiaries of a policy measure aimed at the worst off. The magnitude of these differences surely serves to reinforce the need to develop a more appropriate measure of well-being and deprivation.

## 6. CONCLUSION

The emergence of new household surveys in developing countries allows a much more careful examination of well-being and deprivation than previously possible. Instead of relying on crude indicators such as GDP/capita, life expectancy and schooling information, these data allow a careful examination of the multi-faceted dimensions of poverty and deprivation. As such, they can be used for investigations of broader notions of poverty or deprivation.

This paper has investigated the linkages between expenditure poverty and one formulation of a broader deprivation index in South Africa. While there is a very strong overall correlation between expenditure levels and the deprivation index, the correlation is much weaker among the worst-off sections of the society. Among this group, there is considerable divergence in the rates, depth, and distribution of poverty as measured by the expenditure and the deprivation measure. While both measures agree on common trends, such as high poverty in rural areas, among Africans, and among female-headed households, the deprivation measures presents, on the whole, a much more accentuated picture of poverty among the least favored groups in society. Deprivation is found to affect more rural dwellers, more Africans, more members of *de facto* female-headed households, and more poorly educated families. Moreover, the analysis suggests that equivalence scales assuming large economies of scale and relatively low costs for

<sup>34</sup>In the case of KwaZulu where fully one-third of the deprived, but not expenditure poor are from, the people missed by the expenditure poverty measure are mostly Africans in rural areas of this province who, despite slightly higher levels of expenditures, suffer from multiple deprivations, particularly in terms of access to water, fuel, employment, education, and nutrition.



children are appropriate if one wants to ensure that an expenditure poverty measure and broader notions of deprivations agree on the influence of household size (or age) on poverty or deprivation; changing equivalence scales will not, however, eliminate the differences between the two measures in other dimensions (especially race and location).

In addition, there is considerable divergence in identifying poor versus deprived households in South Africa leading to difference in the regional spread of poverty and deprivation, with possibly important consequences for targeted anti-poverty programs.

While some of these results are specific to South Africa and its *apartheid* legacy (especially the very large racial differentials), some results are likely to generalize to elsewhere. For example, it is likely that not only in South Africa, but elsewhere in developing countries, rural dwellers suffer from multiple deprivations that are only inadequately captured by expenditure poverty. In particular, access to services such as water, electricity, modern sanitation, and modern housing is usually much better for the urban poor than the rural poor and most public spending tends to favor urban areas (Lipton, 1977; van de Walle and Nead, 1995). The deprivation index is more likely to incorporate these disadvantages in its assessment of well-being than an expenditure-based measure would.

Apart from the empirical differences between the two measures, one should bear in mind the conceptual differences between the two. While the expenditure poverty measure relies exclusively on one important input to well-being which is more or less well correlated with many facets of basic capabilities, the deprivation index examines capability outcomes directly. Policies that aim to reduce the multifaceted dimensions of deprivation can therefore be much more adequately monitored, analyzed, and disaggregated by using an outcome-based measure such as the deprivation index proposed here. Moreover, to the extent that description always implies an inevitable element of prescription, the deprivation index may shift the anti-poverty efforts of government towards policies intended not only to raise incomes, but to reduce the many other deprivations suffered by the worst-off in society, particularly those that are often not addressed through an increase in income alone.

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