Well-being Poverty versus Income Poverty and Capabilities Poverty in South Africa?

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Well-being poverty versus income poverty and capabilities poverty?

Abstract

The conventional approach of economists to the measurement of poverty in poor countries is to use measures of income or consumption. This has been challenged by those who favour broader criteria for poverty and its avoidance. These include the fulfilment of 'basic needs', the 'capabilities' to be and to do things of intrinsic worth, and safety from insecurity and vulnerability. This paper asks: to what extent are these different concepts measurable, to what extent are they competing and to what extent complementary, and is it possible for them to be accommodated within an encompassing framework? There are two remarkable gaps in the rapidly growing literature on subjective well-being. First, reflecting the availability of data, there is little research on poor countries. Second, within any country, there is little research on the relationship between well-being and the notion of poverty. This paper attempts to fill these gaps.

Any attempt to define poverty involves a value judgement as to what constitutes a good quality of life or a bad one. We argue that an approach which examines the individual's own perception of well-being is less imperfect, or more quantifiable, or both, as a guide to forming that value judgement than are the other potential approaches. We develop a methodology for using subjective well-being as the criterion for poverty, and illustrate its use by reference to a South African data set containing much socio-economic information on the individual, the household and the community, as well as information on reported well-being. We conclude that it is possible to view subjective well-being as an encompassing concept, which permits us to quantify the relevance and importance of the other approaches and of their component variables. The estimated well-being functions for South Africa contain some variables corresponding to the income approach, some to the basic needs (or physical functioning) approach, some to the relative (or social functioning) approach, and some to the security approach. Thus, our methodology effectively provides weights of the relative importance of these various components of well-being poverty.

1. Introduction

Empirical research by economists on poverty in developing countries has generally been concerned with its measurement in terms of income and consumption. Behind this metric lies the concept of utility, or welfare, which people are assumed to derive from income and consumption. Yet there has been little attempt to measure poverty in terms of subjectively perceived welfare. In this paper we shall explore the latter approach, attempting to gain insights from new research on the economics of happiness for understanding poverty in developing countries.

Economic research on happiness (or subjective well-being, or satisfaction with life – we use the terms interchangeably) is sparse and recent but growing rapidly. It is apparent from this literature that there are two important gaps to be filled. First, reflecting the availability of data, there is little research on poor countries (Diener and Biswas-Diener, 2000)[1]. Second, within any country, there is little research on the relationship between well-being and conventional measures of poverty. The purpose of this paper is to help bridge these two gaps.

Some theoretical research on poverty in developing countries has eschewed income or consumption as the evaluative criterion. Alternative criteria have been put forward, e.g. the fulfilment of basic needs and the extent of peoples' capabilities to be and to do things of intrinsic worth. Such approaches suggest a broader set of measures for assessing poverty than just income and consumption, including public provision of non-marketed services, such as sanitation, health care and education (inputs) or healthiness, life expectancy and literacy (outputs). While retaining subjectively perceived welfare as our criterion for assessing poverty, we shall propose a method of incorporating not only income or consumption but also other determinants of welfare or quality of life indicators (such as these) into the analysis of poverty.

In this paper we shall consider the relationship between what we shall call "well-being poverty" and poverty as it is otherwise measured in poor countries. The paper is methodological in emphasis, setting out the issues, the appropriate methods and the data requirements for a programme of research.

[1] Ravallion and Lokshin (2001) and Graham and Pettinato (2002) are the only papers we have come across on developing countries.

Section 2 will provide a review of the literature on happiness, explaining the solid results so far and the hypotheses that they suggest for the study of poor people in poor countries. Section 3 provides the methodology, explaining the estimation of subjective well-being functions, their relationship to income functions, and their relationship to various other concepts of poverty. The argument is illustrated in Section 4 with an available data set, the SALDRU national household survey for South Africa, 1993. Section 5 draws conclusions from the analysis.

2. Literature Survey

There is a good survey of the literature on economic aspects of happiness – some of it interdisciplinary and some by non-economists – by Frey and Stutzer (2002). Their evaluation of this growing field is upbeat and their prognosis is promising. Layard (2003a), in surveying the field, takes an even more sanguine view: "The scientific study of happiness is only just beginning. It should become a central topic in social science".

Much of the research has involved the estimation of happiness functions, in which happiness (subjectively rated on an ordinal or cardinal scale) is the dependent variable and various socio-economic characteristics of the individual, household or community are used as explanatory variables. Some of the research relates to particular countries (generally advanced economies), using either cross-section or panel data sets; and some covers many countries, normally using comparable data sets derived from the *World Values Survey*.

The main findings from the general literature are the following. First, happiness increases with absolute income, ceteris paribus, but not proportionately and at a diminishing rate (Frey and Stutzer, 2002). Moreover, differences in income explain only a small proportion of the variation in happiness among people. The importance of income appears to vary among countries: happiness levels are lowest in the poorest countries but the relationship between income and happiness is weak beyond a fairly low international level of income per capita. This is consistent with the argument that happiness depends in part on the gratification of certain absolute biological and psychological needs (Veenhoven, 1991).

The limited role of absolute income is further suggested by the fact that income and happiness are positively related in cross-section but not in time-series studies. For instance, in the United States and in Japan, real income per capita increased over time but the mean happiness score remained constant. It is possible that mean happiness did not rise over time because aspiration levels adjusted to, and so rose along with, mean incomes in the society, and happiness varied positively with income but negatively with aspirations (Easterlin, 2001). The second main finding, therefore, is that happiness depends on relative income, defined by the reference group or the reference time that people have in mind.

Absolute and relative income are not the only economic determinants of happiness. Being unemployed is found to reduce happiness independently of its effect on income (Clark and Oswald, 1994; Winkelmann and Winkelmann,1998). The general unemployment rate also has a depressing effect, suggesting that having a higher risk of becoming unemployed reduces happiness. Another indication of economic insecurity is inflation: countries and periods with higher inflation display lower happiness, ceteris paribus (Di Tella *et al*, 2001). Subjective well-being is influenced by several factors that are non-economic or potentially so, such as age, sex, marital status, health status, education, social capital, religion, and social and political institutions (Helliwell, 2002).

Sen (1983) introduced the concept of a person's "capabilities" to be and to do things of intrinsic worth, i.e. resources adequate to achieve a specified set of "functionings". He argued that absolute deprivation in terms of a person's capabilities can imply relative deprivation in terms of income, resources or commodities, e.g for taking part in the life of the community, for the avoidance of shame, or for the maintenance of self-respect. He favoured the capability to function as the criterion for assessing the standard of living, and by implication poverty, rather than the utility that might be derived from using that capability. Thus, Sen eschewed the "welfarist" approach to poverty with its underlying assumption that the evaluative criterion is the utility that people derive from goods and services. However, he neither offered a practical criterion for evaluating the various capabilities to function nor sought any aggregation of the social values of the separate capabilities.

Atkinson and Bourguignon (1999) use the same framework but from a welfarist perspective. They regard poverty as 'inadequate command over economic resources' but view this as an intermediate concern, the ultimate concern being in terms of 'capabilities' in the sense of Sen.

The absolute set of capabilities translates into a set of goods requirements which is relative to a particular society and its standard of living. This leads them to formulate a concept in line with the World Bank's *World Development Report* (1990, p.26), that a "…poverty line can be thought of as comprising two elements: the expenditure necessary to buy a minimum level of nutrition and other basic necessities and a further amount that varies from country to country, reflecting the cost of participating in the everyday life of the society". There is a hierarchy of capabilities. The first concerns physical functioning and requires a set of goods fixed in absolute terms; this capability has priority. The second capability concerns social functioning and requires a set of goods that depends on the mean level of income.

The notion that both absolute and relative poverty measures are relevant has implications for the use of happiness measures in poverty analysis. We expect inadequate physical functioning (such as hunger, lack of shelter and lack of warmth) to cause unhappiness. It is also plausible that inadequate social functioning (such as alienation, shame and lack of self-respect) results in unhappiness. Insofar as inadequate functioning reduces happiness, ceteris paribus, the relationship between income and functioning determines the relationship between income and happiness. If income is more important for physical than for social functioning, then the greater the proportion of the population with inadequate physical functioning, the more sensitive is average happiness to a rise in income in the society. Thus we might expect a non-linear cross-country relationship between income per capita and average happiness, with happiness more responsive to income in poor than in rich countries. Within a country: when an individual's income rises from a low level, happiness rises as the extent of both absolute and relative poverty is reduced; when the absolute poverty level is exceeded, a further rise in income also raises happiness as the extent of relative poverty (as perceived by the individual) is reduced. Ceteris paribus, a negative relationship between inadequacy of functioning and happiness might therefore produce diminishing gains in individual happiness as income rises beyond first the absolute and then the relative poverty level.

A variant of the notion that poverty is a relative concept stems from the long-established literature on relative deprivation (Duesenberry, 1949; Runciman, 1966). Perceptions of well-being depend on the context: people compare themselves with others in society or with themselves in the past, and they feel deprived if they are doing less well than the comparator. This raises the questions: what comparisons do people make; how wide are the orbits of comparison? Duesenberry (1949) stressed previous income or consumption, and better-off

people, as the frames of reference. Runciman (1966) suggested informational and social reasons why the frame of reference can be narrow. Perceptions of relative deprivation are expected to reduce happiness. It is also possible that perceptions of relative advantage will raise happiness. Thus, a person's position in the income distribution of the relevant reference group may govern happiness. Happiness might be responsive to income ranking over the range (say, below the median) in which people feel relatively deprived, or it might increase monotonically throughout the income distribution.

Laderchi et al (2003) examine and contrast four different approaches to the definition of poverty (not including the subjective well-being approach). They show empirically that there is little overlap in individuals falling into the different types of poverty, for instance (their definitions of) income poverty and capabilities poverty. They favour aggregation of the various dimensions of poverty but conclude that "in general there is no right way of aggregating" (p. 246).

Ravallion and colleagues have pioneered the use of subjective perceptions in the analysis of poverty in developing countries. Pradhan and Ravallion (2000) use household surveys for Jamaica and Nepal which ask whether total consumption (or consumption of food, or housing, etc.) is adequate for household minimum needs. This enables them to estimate "subjective poverty lines". They compare these with objective poverty lines and note interesting differences, e.g. a greater subjective than objective urban-rural difference in poverty, and greater perceived than actual household scale economies in consumption.

Ravallion and Lokshin (2001, 2002) use a household panel data set for Russia which asked people to classify themselves on a nine-step ladder along a dimension from "poorest" to "rich". Households are ranked both according to their subjective poverty/wealth status and according to their income (normalised by the relevant objective poverty line). The two rankings are significantly positively correlated but the matching is nevertheless weak: many who classify themselves as subjectively poor are not objectively so, and vice versa. The reason for the discrepancy is explored by incorporating into the subjective ranking equation such factors as education, employment status, health status and permanent income. The subjective classification takes these factors into account as well as current income. Although rank changes are treated as representing changes in utility (Ravallion and Lokshin, 2001), the ranking is not necessarily an indication of happiness or subjective well-being. Rather, it

appears to ask people to gauge their relative position in the hierarchy of self-defined poverty and wealth, and is partly a test of how well informed they are about this.

The underlying criticism of Sen (1983), Ravallion and Lokshin (2002), and Diener and Biswas-Diener (2002) of happiness as a measure of poverty is that it represents a particular mental reaction to the use of a capability rather than the capability itself (Sen), that it need not be closely related to subjectively perceived poverty (Ravallion and Lokshin), that it is too broad (Sen, Ravallion and Lokshin), and that it is a necessary but not a sufficient condition for assessing quality of life (Diener and Biswas-Diener). In our view the most serious criticism is the first of these. In the words of Sen (1984, pp.308-9): "The most blatant forms of inequalities and exploitations survive in the world through making allies out of the deprived and exploited. The underdog learns to bear the burden so well that he or she overlooks the burden itself. Discontent is replaced by acceptance…suffering and anger by cheerful endurance. As people learn to adjust …the horrors look less terrible in the metric of utilities".

We intend nevertheless to explore the happiness approach, for the following reasons. First, the objective of alleviating subjectively felt misery and raising peoples' sense of well-being is a commonly held value judgement, which underlies much of the concern that is voiced about poverty in developing countries. Second, the use of a multivariate analysis makes it possible to isolate the average effects of selected particular determinants of happiness without having to worry about the many unobservables that contribute to human happiness which make some people naturally happier than others (unless they are correlated with the observed determinants). Third, it is possible to treat subjective well-being as an encompassing concept, which enables us to quantify the relevance and importance of the other approaches to poverty and of their components. It will be necessary, however, to consider how human ability to adapt and to take a rosy view of a bad situation can affect our estimates of the relationship between subjective well-being and its determinants.

3. Methodology

Our objective is to discover whether and how happiness can be explained by economic and non-economic variables, and what light this can throw on the concept of poverty. We therefore begin with the subjective well-being function

$$W_i = a_i + b_n.X_{ni} + u_i \qquad (1)$$

where W_i represents well-being and X_n is a vector of *n* socio-economic variables. W_i is normally available as a multiple choice variable (of the sort "are you 1. very happy; 2. happy; 3. so-so; 4. unhappy; 5. very unhappy?"). The appropriate estimation procedure is therefore by means of a polychotomous probit or logit equation. The selection of X_n depends on the research hypotheses but also on what variables the data set has to offer. In the absence of a well-articulated model carrying theoretical predictions, our approach is exploratory and is influenced by the criteria that have been proposed in the literature for defining and assessing poverty.

The vector of estimated coefficients b_n provides the weights that indicate the relative importance of different contributors to subjective well-being. The potential value of this exercise can be illustrated by the deficiencies of the UNDP's Human Development Index. This is calculated by according equal weights to its three components – income per capita, educational attainment, and life expectancy (UNDP, 2000). The value judgement implicit in this weighting need not correspond at all well to the valuations of these capabilities made by individuals in society. Subjective well-being may be a narrow metric but at least it corresponds to individual valuations and it is a metric that can be measured.

The estimated well-being function can be harnessed to examine the relationships between the subjective well-being criterion for poverty and other criteria. These include the conventional income criterion and, within the capabilities approach, the physical functioning criterion and the social functioning criterion. Consider first the relationship between subjective well-being poverty and income poverty. An obvious question concerns the extent of overlap between the two. This can be examined by dividing the sample into *m* quantiles according to the values of W and then into *m* quantiles of corresponding sizes according to income ranking. A second exercise is to include income (X_y) among the explanatory variables in the well-being equation and to examine its importance in determining W relative to other determinants (the importance of income is indicated by the coefficient b_y and the contribution of X_y to explaining the variation in W)[2].

[2] There are obvious issues of endogeneity and causality which will be discussed below.

Although they are conceptually distinct, there is potentially a good deal of overlap between the capabilities and the subjective well-being approaches to poverty. Both capabilities and subjective well-being are likely to be positive functions of income. The various other characteristics that are normally hypothesised to give people the capability to function well are also prime suspects for raising happiness. The well-being function should thus include variables ($X_1,...X_e$) that correspond to physical functioning. These might comprise components of "basic needs" such as nutrition, clothing, shelter, sanitation, health and literacy. The function should also include variables ($X_{e+1},...X_h$) that correspond to social functioning. These might take the form of proxies for the capability to meet the norms of society and to interact well with society. Relative concepts are likely to figure: the relevant reference groups need to be investigated. The group might be defined in terms of income, ethnicity, residence or even time. It is thus possible to attach weights to physical and to social functioning, and to their components. It is also possible to measure the relative importance of the variables hypothesised to denote capabilities in the determination of subjective well-being.

By introducing a time dimension and using panel data, the literature on poverty often distinguishes between chronic and transient poverty. Underlying this distinction is the notion that the ill-effects are best measured by aggregating the indicator of poverty over time. Expectations do not necessarily enter the story. However, by introducing proxies for insecurity into the well-being function, the subjective well-being approach can be used to incorporate expectations. It is possible to examine the effect of prospective future poverty on current happiness.

Finally, it is appropriate to include certain variables which do not fit into any of the approaches to poverty outlined above, some of which fall outside the normal purview of economists or policy-makers. These might include such demographic, geographic and social variables as age, gender, family composition, marital status, residential location, religion, social network, trust, and social participation. In part they serve as control variables; in part they serve to emphasise that subjective well-being can depend on a broad range of factors, many of which are non-economic.

The coefficients estimated in the well-being function isolate the average effects of each explanatory variable for the sample as a whole, whereas we are interested primarily in the

poor. Consider the relationship between subjective well-being (*W*) and the vector of "resources" (*X*) that produce well-being. For simplicity, assume that resources can be aggregated and measured cardinally (*X*). Figure 1 illustrates. If the poor (those with low *X*) are subject to the same "happiness production function" as the non-poor (the continuous curve $W = W_1(X)$), we might expect the function to exhibit diminishing returns to resources, i.e. to be concave (to the *X* axis). Apart from their corresponding to the normal assumption of diminishing marginal utility, diminishing returns might reflect the fulfilment first of physical functionings (basic needs) and then of social functionings (position in society). By contrast, we have noted Sen's argument (Sen, 1984) that the poor manage to adjust to hardship, i.e. of necessity they become more efficient "pleasure machines", so increasing their happiness relative to their resources. In that case the well-being function can be linear instead of concave, or even convex (the continuous curve $W = W_2(X)$).

It is possible that both functions are relevant: the effect of additional resources on the well-being of the poor might depend on whether there is an accompanying change in attitudes or aspirations. The current poor (at point *a*, corresponding to (*X', W'*)) may experience the steeper, continuous curve, $W = W_1(X, a)$ in the short run, given an expectation of remaining poor. Thus they move to point *b* if their resources increase to *X''*. Gradually over time, however, they adjust to the higher level of resources, so moving to point *c*. Thus the long run well-being function is depicted by the flatter, dashed curve $W = W_2(X)$, reflecting full adjustment to each level of resources. Similarly, a fall in resources from point *c* corresponding to (*X'', W''*) involves a short term move along $W = W_1(X, c)$ to point *d* at *X'*. Given time to adjust to their new situation, however, the newly poor become reconciled to their lot, their aspirations are lowered and point *a* is restored. We need to discover whether and how the poor and the non-poor differ in the way that their happiness responds to additional resources.

The subjective well-being concept of poverty might be treated as competing with income, capabilities and other concepts of poverty. We prefer to view it as an encompassing concept, which permits us to quantify the relevance and importance of the other approaches and of their components. Ultimately, the concept of poverty requires a value judgement as to what constitutes a good life or a bad one. Our starting point is that an approach that examines the individual's own perception of well-being is less imperfect, or more quantifiable, or both, as a guide to forming that value judgement than are the other possible approaches.

4. An Illustration from South Africa

The SALDRU national household survey of 1993 in South Africa was carried out by the South African Labour and Development Research Unit (SALDRU) of the University of Cape Town. The dataset contains information on about 8,800 households and is patterned on the World Bank's Living Standards Measurement Studies, with modules on household demographics, employment, health, income and expenditure, etc. as well as community information. Section 9 of this survey is on perceived quality of life and it contains, *inter alia*, the question: "Taking everything into account, how satisfied is this household with the way it lives these days?" The five options available in the pre-coded response were 'very satisfied', 'satisfied', 'neither satisfied nor dissatisfied', 'dissatisfied', and 'very dissatisfied'.

While the individual respondent to the survey answered the question, the question itself related to the satisfaction of the household as a whole rather than to that individual's personal well-being only. This raises the possibility that the individual was giving the answer mostly with his own personal satisfaction level in mind rather than that of the household as a whole. In order to address this concern, we check the robustness of the findings to inclusion of the individual respondent's own personal characteristics in the analysis. Appendix Table 2 shows that, controlling for household characteristics, individual characteristics are generally unimportant in our subjective well-being equations. This is not surprising if, as is likely, there are interdependencies in perceived well-being among members of the household.

The discussion comes in two parts: First, we ask to what extent our measure of subjective well-being corresponds with the income measure that is most commonly used as a proxy for well-being. We also examine whether the determinants of these two measures affect them in the same direction and with similar intensity. Second, we examine the impact on subjective well-being of factors that meet basic needs (physical functioning), social needs (social functioning), and security needs of households.

4.1 Well-being poverty versus income poverty?

The survey yields data on about 8,300 households after removing observations with missing values for key variables. Table 1 presents a cross-tabulation of subjective well-being category and income category. The former takes five values, from 'very dissatisfied' (coded as 1) to

'very satisfied' (coded as 5). The distribution of households across happiness categories is uneven: 23% of all households reported being 'very dissatisfied'; 33% as being 'dissatisfied'; only 10% as 'neither satisfied nor dissatisfied'; 26% as 'satisfied' and a mere 8% as being 'very satisfied'. Instead of using household per capita income quintiles, therefore, we have divided the data into income categories as follows: the poorest 23% of the households (in terms of per capita income) are in income category 1 (to correspond with the 23% of households in the lowest subjective well-being category); the next 33% of households - in the ordering of households by per capita income - are in income category 2, to correspond with the 33% that are in the second happiness category, and so on.

The table shows that there is a poor degree of coincidence between these two measures. Only in the second and fourth cells on the leading diagonal is the cell percentage frequency highest among all cells in that row. For instance, of all the households in the poorest income category, only 29% are in the lowest happiness category, although 75% are in the lowest two happiness categories. Similarly, of those in the richest income category, only 28% are in the highest happiness category. The best fit comes when we consider the two lowest categories together: 70% of households defined as income-poor in this way were also well-being poor (and, by construction, vice versa). The overall correlation coefficient between income category and subjective well-being category is +0.358. Thus, while income is positively correlated with happiness, it is an imperfect predictor of happiness.

Table 2 examines whether various factors affect income and happiness in the same way. Since our subjective well-being variable, and thus by design our income variable, is discrete and takes values from 1 to 5 that are inherently ordered, the ordered probit is used to model both income category and happiness category[3]. The pseudo R-square in an ordered probit can be expected to take a low value. However, it has a higher value in the income than in the happiness equation. All variables are defined in the notes to the table. The gender and education level of individual members of the household are averaged across all household members aged 16 and above. Thus the variable *male* represents the proportion of male members and the education dummy variables *primary*, *junior*, *secondary* and *higher* represent the proportion of household members with these levels of education. The age variables represent the proportion of adult household members (16 years and older) within the specified

[3] In Table 2 (and throughout the paper) standard errors have been corrected for clustering.

age ranges. Persons aged 0-15 are included by way of the variable 'number of children in the household' (*hhnchild*). Other variables are household-level variables or community-level variables.

In Table 2, household per capita income category is significantly determined by productive characteristics such as age and education, but also by the household unemployment rate (*hhurate*), race (*African, Coloured, Indian*), and location (*urban, metropol, province*), etc. Several variables have quite different, or even opposing, effects on income and life-satisfaction levels. For instance, comparing *columns* (*a*) and (*b*), youth (*age16-25*) is associated with low income but high subjective well-being. Living in a metropolitan city (*metropol*) raises income but lowers happiness. Poor health, as measured by number of days household members have been sick in the past 14 days (*hhdaysic*), has no significant impact on income but lowers perceived well-being significantly. The percentage of male members in the household (*male*) significantly raises income but has no impact on happiness. Six of the eight coefficients on the province dummy variables have opposing signs in the income and happiness equations. Thus, not all factors or conditions that raise income also raise happiness, and some even lower happiness.

Even when the signs are the same, the extent of association of several variables with income differs substantially from that with happiness. For instance, while being African depresses both income and happiness, the negative coefficient on *African* is very significantly greater in the income equation than in the happiness equation. Similarly the association of age with income rank is much greater than its association with happiness rank. The same remarks apply to the coefficients on household size (*hhsize*), number of children aged 15 or below (*hhnchild*), household unemployment rate *(hhurate*) and the education variables (*primary, junior, secondary, higher*). We cannot assume that if a characteristic is good for generating income, it is commensurately good, or even good at all, for generating happiness.

Several of the variables included in the subjective well-being equation in *column* (*b*) have a direct impact on well-being and also an indirect impact via their effect on household income. *Column* (*c*) adds the natural log of household per capita income (*lnhhpci*) to the happiness equation. Happiness increases powerfully with income, but the inclusion of income does not affect the coefficients of other variables. The marginal effect of *lnhhpci* on the probability of being in well-being poverty (i.e. being in the lowest two life-satisfaction categories) is 0.0572.

Given a standard deviation of 1.4121, an increase in *lnhhpci* from one standard deviation below to one standard deviation above the mean would reduce the risk of well-being poverty by 16.2 percentage points, which is not a particularly large effect, given that 55% of all households are in the bottom two satisfaction categories. When income is not constrained to enter linearly, there appear to be increasing returns to income: if *lnhhpci* and its square are included, only the squared term is positive and significant; when no quadratic form is imposed and log of household per capita income quintiles are included instead (quintile one being the base or reference quintile), the coefficients on quintiles two, three, four and five are 0.073, 0.166, 0.377, and 0.505 respectively, and all four are statistically significant[4]. These cross-section results suggest that the relationship between well-being and income corresponds to the dashed, convex curve in Figure 1, i.e. people do to some extent adjust and accommodate their perceptions of well-being to their economic circumstances.

A comparison of *columns* (*b*) and (*c*) shows that the effect of education on happiness falls (but the effect of higher education does not disappear) when income is included, suggesting that much of the effect of education on happiness comes via its effect on income. Similarly, just under half of the negative association between unemployment and happiness is due to the impact of unemployment on income. In common with other studies (Clark and Oswald, 1994), unemployment has a powerful negative relationship with life-satisfaction even after controlling for income, perhaps because it imposes a psychological cost. The lack of panel data means that we are unable convincingly to test the direction of causality. However, Winkelmann and Winkelmann (1998), who control for individual fixed effects, find that causality runs from unemployment to unhappiness.

Table 3 re-estimates the income and subjective well-being equations with cluster fixed effects, i.e. a set of cluster dummy variables. Variables that do not vary within clusters, such as location (*urban, metropol, homeland* and *province*) and cluster characteristics such as whether community roads become impassable at certain times of the year (*impass*) and whether community is served by public transport (*pubtran*), are excluded from the estimation. Including cluster fixed effects increases the explained variation in income from 38 to 43

[4] An instrumentation procedure can in principle be used to address the likely endogeneity of income in a happiness equation. Empirically justifiable instruments available are the variables proportion of males in the household and household size, both of which are statistically significant in the income equation and insignificant in the happiness equation. However, there is no strong a priori theoretical justification for them. Studies using panel data and exogenous variation in income (e.g. a lottery win) have found that causality runs from income to happiness (e.g. see Gardner and Oswald, 2001).

percent and in happiness from 8 to 15 percent. Table 3 shows that apart from the effect of race – which changes dramatically - the coefficients on unemployment, education, home ownership, health, crime and income remain more or less unchanged with cluster fixed effects. The fact that race coefficients collapse in size and significance suggests that race *per se* is not associated with happiness (members of certain races are not intrinsically happier than those of others) but rather that unobserved circumstances that matter to happiness differ across the races. For instance, the huge negative coefficient on the *African* (and to a lesser extent on *Coloured* and *Indian*) race dummies in Table 2 may be due to the fact that Africans are concentrated in locations where public services and amenities – what might be termed 'social wages' - are very poor. While we do include certain measures of community characteristics, such as whether community roads become impassable at certain times of the year (*impass*) and whether public transport passes by the community (*pubtran*) – and also experimented with others[5] – these arguably do not capture all the relevant amenities and services that matter to perceived well-being.

To summarise, income is the most commonly used proxy for well-being – being apparently objective, accurately measurable and readily available – and the most commonly used measure of poverty. However, although household per capita income is indeed positively correlated with household subjectively evaluated well-being, the correlation is not strong. Subjective well-being is also related to a range of non-monetary factors, including education, employment, health and safety from crime. The ways in which these factors affect income differ substantially from the ways in which they affect happiness. Researchers who adhere to the income approach to poverty do so at peril of oversimplifying.

4.2 Well-being poverty versus capabilities poverty

This section examines the relationships between the subjective well-being criterion for poverty and, within the capabilities approach, the physical functioning (or basic needs) criterion and the social functioning (or social needs) criterion. The methodology based on equation (1) in Section 3 allows us to attach weights to different components of physical and social functioning to estimate their contribution to well-being.

[5] We experimented with variables from the cluster questionnaire including distance from the cluster to various facilities (such as health clinic, school, shops, bank, post-office, market etc.), number of such facilities within the cluster, and distance to nearest source of transport, as well as with cluster averages of household variables such as distance to nearest source of water for the household, etc.

Table 4 presents ordered probits of subjective well-being. Province dummies are included in all specifications but not reported. The first column (*column a*) starts with the inclusion only of control variables, namely age, household demographics, gender and whether the household migrated to its current location in the previous five years. *Column (b)* includes basic needs variables such as education, health, employment and living conditions that can affect physical functioning. The last set includes household variables such as distance to water (*dwater*), type of house roof - *ironroof* (a corrugated iron roof would mean that the home is too hot in the summer and too cold in the winter), electricity connection (*connecte*), and persons per room (*personpr*), as well as cluster variables such as the condition of roads (*impass*) and whether public transport is available in community (*pubtran*). The inclusion of these variables causes the pseudo R-square to rise dramatically. Almost all the basic needs variables are statistically significant determinants of happiness.

Column (*c*) adds to (*a*) only the monetary poverty variables, i.e. income (log of household per capita income) and wealth (value of assets owned). Both *lnhhpci* and *assetval* are important determinants: the inclusion of these two variables raises the pseudo R-square by more than does the set of 14 basic needs variables (*column* (*b*)).

Column (*d*) includes control variables together with both basic needs and income/asset variables. The coefficient on income falls significantly compared with *column* (*c*), but remains large and statistically highly significant. Controlling for income and assets reduces the coefficients of the basic needs variables and renders most of them insignificant. The physical functioning variables that have a statistically significant relationship with subjective well-being even after controlling for monetary poverty are health, employment and condition of community roads (which probably proxies for other community factors as well). Higher education is the only level of education that remains significant, but that is hardly a *basic* need.

Column (e) of Table 4 adds three types of social functioning variables: race dummies (*African, Coloured, Indian* – the base category being *White*), location dummies (*urban, metropol*, and *homeland*) and whether the household is a racial minority in the cluster in which it lives (*racialm*). In order to function socially, people must be able to relate well to others in society. Each of these variables can affect the ability to function within the society:

race can reflect discrimination and prejudice, location can identify the type of community or life-style to which one relates, and being a racial minority in a cluster can reflect social disadvantage. The inclusion of the race and location variables raises the explanatory power of the model but makes little difference to the original variables. Race is important even after controlling for income and physical functionings. As discussed in Section 4.1, when cluster fixed effects are used, race becomes insignificant, suggesting that here it is picking up the effect of unobserved cluster conditions that matter to life-satisfaction. People in urban areas and metropolitan cities are significantly less happy than those in rural areas. Households that are racial minorities in their cluster are happier than others. This is contrary to our expectation, but it is possible that *racialm* proxies for the high achievement among non-white households which enables them to live in predominantly white areas.

C*olumn* (*f*) adds what we have termed 'security/insecurity' variables. These capture how insecure the household is physically (in terms of exposure to crime, *n_victim*) and economically, in terms of *debt*, risk of unemployment (as captured by the cluster unemployment rate, *urateb*) and lack of assets that could be liquidated in time of need (home ownership, *ownship*)[6]. Inclusion of these variables does not alter the existing coefficients, and it raises explanatory power only modestly. The variables themselves are mostly statistically significant, and have the expected signs: insecurity reduces subjective well-being.

Column (g) provides our preferred, parsimonious version of *column (f)*, together with the marginal effects of the variables on the probability of being well-being poor, i.e. of being dissatisfied or very dissatisfied with life. The means, standard deviations and the full set of marginal effects of the variables are shown in Appendix Table 1. If the proportion of household members aged 16-25 increases from one standard deviation below to one standard deviation above the mean, the probability of being in the bottom two life-satisfaction categories falls by 7 percentage points. A rise in log of per capita household income from one standard deviation below to one standard deviation above the mean reduces the probability of well-being poverty (i.e. of being dissatisfied or very dissatisfied with life) by 12 percentage points. Considering that overall probability of being dissatisfied/very dissatisfied is 55%, this is not a large increase. The African probability of being well-being poor is 23 percentage points higher than that of Whites, even after controlling for observed income, education and

[6] The *ownship*, *debt* and *urateb* variables could be included under the monetary variables category, together with income and assets, and the crime variable included under the physical functionings (basic needs) category.

employment, etc. Those who live in metropolitan cities are 11 percentage points more likely to be in well-being poverty than are rural-dwellers. The household's own unemployment rate has a smaller effect on the probability of being in the bottom two happiness categories than does the cluster unemployment rate. Going from one standard deviation below to one standard deviation above the household unemployment rate increases that probability by 4 percentage points but doing the same for the cluster unemployment rate reduces it by 10 percentage points. The effects of higher education, health, crime and debt are also small, compared with the effect of household income, household assets, and race.

What do these results enable us to say about the relationships among the various criteria for poverty? Subjective well-being poverty is related to both income poverty and capabilities poverty. The comparison of the R-squares in *columns (b)* and *(c)* of Table 4 suggests that it is somewhat better related to income poverty than it is to capabilities poverty but this may be because our measures of capabilities poverty are imperfect. Certainly the results do not support the notion that income poverty is an adequate measure of capabilities poverty since variables that measure physical and social capabilities to function - such as health, employment, mobility, and freedom from forms of insecurity - matter to happiness even after controlling for economic factors such as income and assets. The parsimonious version of the all-inclusive equation *(column (g)*) indicates that, in addition to the control variables, the economic variables (income and assets), some physical functioning variables, some social functioning variables and some security variables have a statistically significant influence on subjective well-being. The subjective well-being approach to poverty is not necessarily in competition with the other approaches. Rather, it can be viewed as an encompassing approach which incorporates, evaluates and weights the others.

We experimented with the inclusion of both the income (*lnhhpci*) and also the race-specific income quintile of the household (*r_pciqj, j*=1, ...5); *r_pciq1*, the lowest quintile being the omitted category). Table 5 shows the results for these variables; a full set of conditioning variables were included but are not reported. The equation was estimated for two groups: the income-poor and the income-non-poor. There is an interesting difference between the income-poor (who represent roughly half of the households) and the non-poor. The coefficient on *lnhhpci* is significantly positive for the poor but not for the others. However, the coefficients on the race-specific income quintiles rise monotonically, and the highest two are highly significant, in the non-poor group, whereas there is no such relationship in the poor

group. For those in income poverty, it is absolute income that matters, whereas for others it is relative income – in particular relative income within their race – that affects their well-being. This suggests that the need to function physically predominates when income is low but that social functioning takes over as income rises[7].

5. Conclusions

We have developed a methodology for using subjective well-being as the criterion for poverty, and have illustrated its use by reference to a South African data set. We conclude generally that the new research on the economics of happiness, although still in its infancy, does indeed offer promise of successful adaptation for the analysis of poverty in poor countries.

Our main conceptual and empirical conclusions are the following. Survey-based indicators of subjective well-being are amenable to quantitative analysis, and can be explained in terms of numerous socio-economic variables. There are powerful regularities to be found, both generally and in our own illustrative analysis. This raises the possibility of using explanations of subjective well-being to examine poverty. Any attempt to define and describe poverty involves a value judgement as to what constitutes a good quality of life or a bad one. We argued that an approach which examines the individual's own perception of well-being is less imperfect, or more quantifiable, or both, as a guide to forming that value judgement than are the other potential approaches. Thus, we combined positive and normative analysis. We used the positive results on the determinants of subjective well-being to infer value judgements about the nature and components of poverty that were based on the aggregation of individual perceptions.

In our illustrative case study we found that income and happiness are positively correlated but that the association is not exclusive. Income enters positively and significantly into the well-being function but so also do several other variables. These include proxies for the fulfilment of various needs which cannot normally be met by spending income. Many of the variables that determine income also determine well-being, but their effects can differ in relative importance and even in direction.

[7] The various forms of social functioning, including altruism and envy, are explored in greater detail in Kingdon and Knight (2003).

Our main contribution is to view subjective well-being as an encompassing concept, permitting us to quantify the relevance and importance of the other approaches to poverty and of their component variables. In estimating well-being functions for South Africa we found that our preferred equation contained some variables corresponding to the income approach, some to the basic needs (or physical functioning) approach, some to the relative (or social functioning) approach, and some to the security approach. Our methodology effectively provided weights of the relative importance of these various components of well-being poverty. We regard this approach as superior to one that arbitrarily attaches weights – quite likely equal weights, for lack of a reasoned alternative – to certain pre-selected components. We would not, however, wish to generalise from the South African case: the possibility that different preferences across countries will generate different sets of weights opens a new avenue of research.

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Table 1
Cross-tabulation of subjective well-being category and income category

Income category	Subjective well-being category					
	1	**2**	**3**	**4**	**5**	**Total**
1	**568** 29.2 29.2	**880** 45.3 31.7	**156** 8.0 19.8	**296** 15.2 13.5	**44** 2.3 7.1	**1,944** 100 23.3
2	**781** 28.1 40.2	**1,078** 38.8 38.8	**257** 9.2 32.7	**568** 20.4 25.9	**96** 3.5 15.4	**2,780** 100 33.4
3	**167** 21.2 8.6	**265** 33.7 9.5	**81** 10.3 10.3	**214** 27.2 9.8	**60** 7.6 9.7	**787** 100 9.5
4	**406** 18.5 20.9	**498** 22.7 17.9	**248** 11.3 31.5	**793** 36.1 36.1	**250** 11.4 40.2	**2,195** 100 26.4
5	**22** 3.5 1.1	**59** 9.5 2.1	**45** 7.2 5.7	**324** 52.1 14.7	**172** 27.7 27.7	**622** 100 7.5
Total	**1,944** 23.3 100	**2,780** 33.4 100	**787** 9.5 100	**2,195** 26.4 100	**622** 7.5 100	**8,328** 100 100

Note: the numbers in each cell present the frequency, row percentage, and column percentage respectively.

Table 2
Comparison of ordered probit of income and of subjective well-being

	Income Category (a)		Subjective well-being Category (b)		Subjective well-being Category (c)	
	Coefficient	**robust t**	**coefficient**	**robust t**	**coefficient**	**robust t**
age16-25	-0.421	-4.6 ***	0.216	2.5 ***	0.258	3.0 ***
age26-35	0.443	6.5 ***	0.056	0.9	0.012	0.2
age46-55	0.368	5.2 ***	0.078	1.0	0.037	0.5
age56-65	0.732	7.5 ***	0.206	2.1 **	0.132	1.3
age>=66	1.197	10.3 ***	0.379	3.6 ***	0.231	2.1 **
hhsizem	-0.063	-5.0 ***	-0.009	-0.7	-0.004	-0.4
hhnchild	-0.196	-9.5 ***	0.017	1.0	0.035	2.0 **
hhurate1	-1.487	-23.1 ***	-0.400	-8.3 ***	-0.238	-4.8 ***
nolfpb	-1.133	-19.8 ***	-0.183	-3.8 ***	-0.063	-1.2
primary	0.143	2.0 **	-0.015	-0.2	-0.028	-0.4
junior	0.468	6.2 ***	0.039	0.6	-0.005	-0.1
secondary	1.158	13.1 ***	0.215	2.8 ***	0.100	1.4
higher	1.937	15.0 ***	0.523	5.4 ***	0.347	3.8 ***
migrate	0.170	2.6 ***	0.229	2.0 **	0.221	1.9
ownship_	0.121	2.5 ***	0.104	2.4 ***	0.099	2.3 **
hhdaysic	0.001	0.2	-0.006	-2.3 **	-0.006	-2.3 **
n_victim	0.102	2.3 **	-0.074	-1.9 *	-0.085	-2.2 **
male	0.680	7.6 ***	0.060	0.7	-0.012	-0.1
african	-1.500	-15.2 ***	-1.042	-10.4 ***	-0.908	-8.9 ***
colored	-0.948	-8.8 ***	-0.458	-4.1 ***	-0.374	-3.4 ***
indian	-0.728	-4.8 ***	-0.343	-3.3 ***	-0.280	-2.8 ***
metropol	0.340	3.5 ***	-0.171	-1.5	-0.208	-1.8 *
urban1	0.091	1.0	-0.197	-2.1 **	-0.211	-2.2 **
homeland	0.029	0.3	0.014	0.1	0.012	0.1
wcape	-0.293	-3.1 ***	0.163	1.6	0.192	1.8 *
ncape	-0.351	-1.5	0.344	1.8 *	0.379	1.9 *
ecape	-0.345	-3.7 ***	0.107	0.8	0.156	1.2
natal	-0.230	-2.5 **	0.361	2.8 **	0.385	2.9 ***
ofs	-0.123	-0.8	0.311	1.9 *	0.319	2.0 **
etvl	0.029	0.2	0.523	2.6 **	0.523	2.5 ***
ntvl	-0.394	-4.2 ***	0.247	1.7 *	0.295	2.0 **
nw	0.113	1.0	0.307	1.6	0.299	1.5
impass	-0.186	-3.4 ***	-0.177	-3.0 ***	-0.156	-2.6 ***
pubtran	0.106	2.0 **	0.045	0.7	0.037	0.6
lnhhpci	-	-	-	-	0.146	6.7 ***
N	8279		8279		8279	
LogL	-7555.56		-11251.83		-11205.38	
Restr LogL	-12203.979		-12199.69		-12199.69	
Pseudo R^2	0.3809		0.0777		0.0815	

Note: The age variables= proportion of persons in each age range within the household. hhsizem = household size; hhnchild=number of children below age 16 within the household; hhurate1= household unemployment rate, i.e. proportion of household labour force participant members that are unemployed. hhurate is undefined (missing) for households with no labour force participants, so for these households, the included variable hhurate1 takes value 0 and the indicator variable nolfpb takes the value 1; nolfpb=0 for households with >=1 labour force participant; Primary, junior, secondary and higher= proportion of household members with these different levels of education; migrate=whether household migrated to its current area within the past 5 years; ownship_=whether household lives in owned home; hhdaysic=total number of person days that household members were sick in the past 14 days; n_victim=number of times in the past 12 months that household members have been victims of crime (robbery, assault, rape, murder, and abduction and 'other'); male=proportion of males in household; African, coloured, Indian= race dummies (base category is 'white'); metropol=household lives in metropolitan city; urban1=household in urban non-metropolitan area (base category is rural); homeland=household lives in a former 'homeland'/Bantustan. Wcape – nw =province dummies; impass=whether community roads become impassable at certain times of the year; pubtran=whether community has public transport; lnhhpci=natural log of household per capita income.

Table 3
Comparison of ordered probit of income and of subjective well-being,
With cluster fixed effects

	Income category		Subjective well-being category		Subjective well-being category	
	coefficient	**robust t**	**coefficient**	**robust t**	**Coefficient**	**robust t**
age1625	-0.319	-4.3 ***	0.183	2.7 ***	0.208	3.0 ***
age2635	0.428	6.5 ***	0.017	0.3	-0.023	-0.4
age4655	0.398	4.8 ***	-0.003	0.0	-0.041	-0.6
age5665	0.788	8.4 ***	0.129	1.5	0.057	0.7
age_66	1.214	11.6 ***	0.263	2.8 ***	0.127	1.3
hhsizem	-0.061	-5.7 ***	-0.004	-0.4	0.000	0.0
hhnchild	-0.198	-11.3 ***	0.004	0.3	0.020	1.3
hhurate1	-1.528	-30.9 ***	-0.334	-7.8 ***	-0.186	-4.0 ***
nolfpb	-1.138	-22.4 ***	-0.094	-2.1 **	0.012	0.3
primary	0.006	0.1	0.040	0.7	0.041	0.7
junior	0.303	4.8 ***	0.095	1.6	0.072	1.3
secondary	0.929	12.5 ***	0.237	3.5 ***	0.156	2.3 **
higher	1.691	17.4 ***	0.431	5.2 ***	0.298	3.5 ***
migrate	0.063	1.2	0.040	0.9	0.036	0.8
ownship_	0.184	4.6 ***	0.104	2.8 ***	0.089	2.4 ***
hhdaysic	-0.001	-0.5	-0.006	-3.0 ***	-0.006	-3.0 ***
n_victim	0.056	1.4	-0.127	-3.5 ***	-0.134	-3.7 ***
male	0.523	9.2 ***	0.115	2.2 **	0.070	1.3
african	-1.622	-15.5 ***	-0.194	-2.1 **	-0.055	-0.6
colored	-1.356	-7.0 ***	-0.208	-1.2	-0.107	-0.6
indian	-0.452	-1.8 *	0.090	0.4	0.145	0.7
lnhhpci	--	--	--	--	0.141	8.4 ***
Cluster dummies	yes		yes		yes	
N	8279		8279		8279	
LogL	-7004.32		-10365.02		-10329.37	
Restr LogL	-12203.98		-12199.69		-12199.69	
Pseudo R^2	0.4261		0.1504		0.1533	

Note: variable definitions in Table 2.

Table 4
Determinants of subjective well-being

	With only control variables (a)		Control plus basic needs (b)		Control plus income/assets (c)		Control plus basic needs and income/assets (d)	
	Coeff	**Robust t**	**Coeff**	**Robust t**	**Coeff**	**Robust t**	**Coeff**	**Robust t**
Control variables								
age16-25	0.118	1.1	0.247	2.5 ***	0.388	3.9 ***	0.390	4.0 ***
age26-35	0.026	0.3	0.006	0.1	0.076	1.2	0.075	1.2
age46-55	0.191	2.2 **	0.150	1.9 *	0.059	0.8	0.071	0.9
age56-65	0.223	2.0 **	0.292	2.7 ***	0.177	1.7 *	0.201	1.9 *
Age>=66	0.306	2.9 ***	0.505	4.8 ***	0.306	3.2 ***	0.359	3.3 ***
hhsizem	-0.028	-2.2 **	-0.005	-0.4	-0.049	-4.2 ***	-0.028	-2.2 **
hhnchild	-0.005	-0.3	0.042	2.2 **	0.083	4.7 ***	0.070	3.7 ***
male	0.008	0.1	0.005	0.1	-0.017	-0.2	-0.022	-0.2
migrate	0.370	3.5 ***	0.244	2.4 ***	0.259	2.2 **	0.233	2.2 **
Basic needs variables								
primary			-0.047	-0.6			-0.036	-0.5
junior			0.013	0.2			-0.072	-1.1
secondry			0.300	3.7 ***			0.010	0.1
higher			0.838	7.5 ***			0.256	2.8 ***
hhdaysic			-0.004	-1.8 *			-0.005	-1.9 *
ironroof			-0.094	-1.4			-0.087	-1.3
pipeint			0.310	2.8 ***			0.080	0.7
wdist			0.000	1.6			0.000	1.6
personpr			-0.078	-3.6 ***			-0.031	-1.5
connecte			0.143	1.9 *			0.037	0.5
hhurate1			-0.373	-7.7 ***			-0.193	-3.8 ***
nolfpb			-0.121	-2.5 ***			-0.018	-0.3
impass			-0.164	-2.8 ***			-0.144	-2.5 ***
pubtran			-0.029	-0.5			0.000	0.0
Income/assets variables								
lnhhcpi					0.174	8.2 ***	0.117	5.9 ***
assetval					0.027	12.7 ***	0.022	8.7 ***
Province	yes		yes		yes		yes	
LogL	-12000.89		-11405.41		-11291.39		-11228.89	
Psuedo R^2	0.0163		0.0651		0.0745		0.0796	

N=8279, restricted LogL=-12199.69.

Note: Variable definitions as in Table 2 and as follows: Racialm=household is a racial minority in its cluster; assetval=value of assets owned by the household, calculated as follows: assetval = (ncar*8)+(nphone*3)+(nkettle*0.5)+(nradio*0.2) +(nfridge*5)+(nbike*1)+(nestove*0.5)+(ngstove*1)+(ntv*3)+(ngeyser*2), where the preface 'n' before each variable means 'number of'. Thus, ncar is number of cars, nbike means number of bikes, ntv means number of TVs, nestove is number of electric stoves and ngstove is number of gas stoves, etc.; debt=whether household owes any debt; urateb=cluster unemployment rate.

Table 4 continued

	Control, basic needs, income, social needs (e)		Control, basic needs, social needs, security and income (f)		Parsimonious version of (f) (g)		
	Coeff	**Robust t**	**Coeff**	**Robust t**	**Coeff**	**Robust t**	**Marginal effect**
							on probability of being dissatisfied or very dissatisfied
Control variables							
age16-25	0.318	3.6 ***	0.322	3.7 ***	0.339	3.9 ***	-0.133
age26-35	0.062	1.1	0.060	1.1	0.067	1.1	-0.026
age46-55	0.043	0.6	0.031	0.4	0.036	0.5	-0.014
age56-65	0.148	1.5	0.117	1.2	0.128	1.2	-0.050
Age>=66	0.295	2.7 ***	0.253	2.3 **	0.266	2.4 ***	-0.104
hhsizem	-0.015	-1.3	-0.014	-1.2	-0.018	-1.6	0.007
hhnchild	0.047	2.7 ***	0.051	2.9 ***	0.052	3.1 ***	-0.020
male	0.005	0.1	0.000	0.0			
migrate	0.217	2.1 **	0.213	2.1 **	0.213	1.9 *	-0.084
Basic needs variables							
primary	-0.017	-0.2	-0.031	-0.4			
junior	-0.032	-0.5	-0.036	-0.6			
secondary	0.033	0.5	0.018	0.3			
higher	0.205	2.3 **	0.199	2.2 **	0.218	2.8 ***	-0.086
hhdaysic	-0.006	-2.4 ***	-0.005	-2.3 **	-0.005	-2.2 **	0.002
ironroof	-0.127	-2.0 **	-0.123	-2.0 **	-0.120	-1.9 *	0.047
pipeint	-0.012	-0.1	-0.047	-0.4			
wdist	0.000	0.7	0.000	0.8			
personpr	-0.025	-1.2	-0.023	-1.1			
connecte	0.061	0.8	0.041	0.6			
hhurate1	-0.218	-4.4 ***	-0.152	-3.2 ***	-0.145	-3.0 ***	0.057
nolfpb	-0.053	-1.0	-0.010	-0.2	0.001	0.0	-0.001
impass	-0.086	-1.4	-0.072	-1.2	-0.057	-0.9	0.023
pubtran	0.088	1.4	0.103	1.7 *	0.107	1.7 *	-0.042
Income/assets variables							
lnhhcpi	0.104	5.2 ***	0.105	5.2 ***	0.110	5.0 ***	-0.043
assetval	0.014	5.7 ***	0.014	5.4 ***	0.014	5.9 ***	-0.006
Social functioning variables							
african	-0.664	-6.0 ***	-0.597	-5.3 ***	-0.576	-5.0 ***	0.227
colored	-0.287	-2.4 ***	-0.225	-2.0 **	-0.228	-1.9 *	0.087
indian	-0.224	-2.1 **	-0.193	-1.8 *	-0.209	-2.0 **	0.080
racialm	0.233	2.5 ***	0.246	2.7 ***	0.249	2.6 ***	-0.099
metropol	-0.276	-2.2 **	-0.244	-1.9 *	-0.291	-2.8 ***	0.112
urban1	-0.238	-2.4 ***	-0.212	-2.2 **	-0.251	-3.0 ***	0.097
homeland	0.041	0.4	0.103	1.0			
Security variables							
n_victim			-0.091	-2.3 **	-0.089	-2.3 **	0.035
ownship_			0.079	1.8 *	0.097	2.2 **	-0.038
debt			-0.065	-1.6 *	-0.062	-1.5	0.024
urateb			-0.581	-3.2 ***	-0.529	-2.7 ***	0.208
Province	yes		yes		yes		
LogL	-11140.15		-11111.19		-11117.50		
Psuedo R^2	0.0869		0.0892		0.0887		

N=8279; Restricted LogL=-12199.69

Table 5
The effect of absolute and relative income variables on subjective well-being, by poverty status

	Below poverty line			Above poverty line		
	Coeff	**Robust t**		**Coeff**	**Robust t**	
Absolute income variable						
lnhhpci	0.071	2.2	**	-0.087	-1.0	
Relative income variables						
r_pciq2	0.072	1.3		0.071	0.8	
r_pciq3	0.038	0.6		0.149	1.3	
r_pciq4	0.103	1.0		0.449	3.3	***
r_pciq5	--	--		0.536	2.7	***

Source: Kingdon and Knight (2003)
Notes: A full set of conditioning variables is included but not reported. Income poverty is defined by the "Household supplementary level" poverty line for South Africa of Rand 251 per month in 1993 (Julian May, 1998). The omitted quintile dummy variable is the lowest income quintile *r_pciq1*. ** and *** denote statistical significance at the 5% and 1% level respectively.

Appendix Table 1
Means, standard deviations, and detailed marginal effects of variables, using parsimonious specification of Table 4

	Descriptive		Marginal effects on probability of being			
	Mean	s.d.	Very dissatisfied	dissatisfied	satisfied	Very satisfied
Control variables						
age16-25	0.198	0.244	-0.094	-0.039	0.089	0.032
age26-35	0.186	0.282	-0.018	-0.008	0.017	0.006
age46-55	0.083	0.194	-0.010	-0.004	0.009	0.003
age56-65	0.059	0.166	-0.035	-0.015	0.034	0.012
Age>=66	0.051	0.158	-0.073	-0.031	0.069	0.025
hhsizem	4.562	2.984	0.005	0.002	-0.005	-0.002
hhnchild	1.849	1.963	-0.014	-0.006	0.014	0.005
migrate	0.117	0.310	-0.059	-0.025	0.056	0.020
Basic needs variables						
higher	0.075	0.218	-0.060	-0.025	0.057	0.021
hhdaysic	3.002	6.378	0.001	0.001	-0.001	0.000
ironroof	0.561	0.496	0.033	0.014	-0.031	-0.011
hhurate1	0.218	0.357	0.040	0.017	-0.038	-0.014
nolfpb	0.156	0.363	0.000	0.000	0.000	0.000
impass	0.387	0.487	0.016	0.007	-0.015	-0.005
pubtran	0.731	0.443	-0.030	-0.012	0.028	0.010
Income/assets variables						
lnhhcpi	5.578	1.412	-0.030	-0.013	0.029	0.010
assetval	9.558	13.216	-0.004	-0.002	0.004	0.001
Social functioning variables						
african	0.746	0.435	0.140	0.087	-0.145	-0.070
colored	0.076	0.266	0.068	0.019	-0.059	-0.018
indian	0.029	0.169	0.063	0.018	-0.054	-0.017
racialm	0.103	0.304	-0.063	-0.036	0.064	0.028
metropol	0.283	0.450	0.085	0.028	-0.075	-0.025
urban1	0.220	0.414	0.074	0.023	-0.065	-0.021
Security variables						
n_victim	0.115	0.356	0.025	0.010	-0.023	-0.008
ownship_	0.650	0.477	-0.027	-0.011	0.025	0.009
debt	0.447	0.497	0.017	0.007	-0.016	-0.006
urateb	0.324	0.237	0.146	0.061	-0.138	-0.050

Appendix Table 2
Subjective well-being equation with individual respondent's personal characteristics

	Parsimonious Equation from Table 4 (a)		(a) with personal characteristics of the household respondent (b)	
	Coeff	**Robust t**	**Coeff**	**Robust t**
Control variables				
age16-25	0.339	3.9 ***	0.267	2.9 ***
age26-35	0.067	1.1	0.020	0.3
age46-55	0.036	0.5	0.084	1.1
age56-65	0.128	1.2	0.200	1.8 *
Age>=66	0.266	2.4 ***	0.331	2.7 ***
hhsizem	-0.018	-1.6	-0.012	-1.0
hhnchild	0.052	3.1 ***	0.044	2.5 ***
migrate	0.213	1.9 *	0.218	2.0 **
Basic needs variables				
higher	0.218	2.8 ***	0.250	2.8 ***
hhdaysic	-0.005	-2.2 **	-0.005	-2.2 **
ironroof	-0.120	-1.9 *	-0.114	-1.8 *
hhurate1	-0.145	-3.0 ***	-0.140	-2.7 ***
nolfpb	0.001	0.0	0.013	0.2
impass	-0.057	-0.9	-0.062	-1.0
pubtran	0.107	1.7 *	0.111	1.8 *
Income/assets variables				
lnhhcpi	0.110	5.0 ***	0.115	5.1 ***
assetval	0.014	5.9 ***	0.015	6.2 ***
Social functioning variables				
african	-0.576	-5.0 ***	-0.566	-5.0 ***
colored	-0.228	-1.9 *	-0.210	-1.8 *
indian	-0.209	-2.0 **	-0.197	-1.9 *
racialm	0.249	2.6 ***	0.247	2.6 ***
metropol	-0.291	-2.8 ***	-0.300	-2.8 ***
urban1	-0.251	-3.0 ***	-0.255	-3.2 ***
Security variables				
n_victim	-0.089	-2.3 **	-0.092	-2.3 **
ownship_	0.097	2.2 **	0.099	2.3 **
debt	-0.062	-1.5	-0.061	-1.5
urateb	-0.529	-2.7 ***	-0.542	-2.8 ***
r_age			-0.010	-1.9 *
r_agesq			0.000	1.3
r_edyrs			-0.006	-0.5
r_edyrsq			0.000	0.1
r_male			-0.021	-0.6
r_empld			0.003	0.1
Province	yes		yes	
LogL	-11117.50		-10984.71	
Restr LogL	-12199.69		-12063.84	
Psuedo R^2	0.0887		0.0895	
N	8279		8190	

Note: r_age and r_agesq are respondent's age and its square; r_edyrs and r_edyrsq are respondent's years of education and its square; r_male is gender and r_empld whether the respondent is employed or not.

Figure 1