One Kind of Freedom: Poverty Dynamics in Post-apartheid South Africa

MICHAEL R. CARTER and JULIAN MAY *

Department of Agricultural and Applied Economics, University of Wisconsin, USA

Summary. — A 1993 South African living standards survey documented the legacy of apartheid in the form high levels of inequality and human insecurity. Drawing on a 1998 re-survey of households in the 1993 study, this paper explores whether this legacy has been superseded, or whether apartheid’s end has been only one kind of freedom that has left households in a poverty trap from which they cannot escape. After proposing a theoretically grounded dynamic poverty typology that distinguishes stochastic from structural poverty transitions, the paper goes on to estimate that significant numbers of the South African poor are potentially trapped in a structural poverty trap and lack the means to escape poverty over time. © 2001 Elsevier Science Ltd. All rights reserved.

Key words — income dynamics, poverty measures, South Africa

1. INTRODUCTION

Analysis of South Africa’s first nationally representative household income and living standards survey 1 indicated that half of all black South Africans lived in poverty in 1993, a stunning portrayal of material deprivation and inequality in an upper middle-income country with a per capita income in excess of $3,000. 2 In a report for the South African Inter-Ministerial Committee on Poverty and Inequality, May and Woolard (1998) calculated the UNDP’s Human Development Index (HDI) for specific South African ethnic and regional groupings, and found that the 1992 HDI for the “African” population of South Africa ranked between the HDI of Swaziland and Lesotho, while the HDI for whites was between that of Italy and Israel.

Drawing on a 1998 re-survey of households in the 1993 dataset, this paper explores post-apartheid poverty dynamics, asking whether the end of apartheid has been only one kind of freedom that has left a majority of black households stuck in a poverty trap from which they cannot escape. 3 The goal of this paper is to not only document the gross degree of mobility into and out of poverty during 1993–98, but also to look for clues regarding the degree to which those observed to move out of poverty were simply “stochastically poor” in 1993 (i.e., unlucky in 1993), or whether the new freedoms permitted by the post-apartheid economy enabled them to successfully accumulate and structurally move out of poverty.

This paper is organized as follows. Using concepts from dynamic programming analysis,

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Section 2 develops the dynamic analogues to single-period poverty measures that are needed for the empirical analysis and tries to move the theoretically important idea of poverty traps closer to empirical implementation. It also suggests that the commonly used dynamic poverty concepts of chronic and transitory poverty confuse distinct sorts of poverty and in particular are an unreliable guide to the number of households caught in a poverty trap. Section 3 then introduces the 1993–98 panel dataset and describes the South African macroeconomic situation over this time period. Section 4 explores the dataset as two cross-sections, documenting a pattern of increasing poverty and inequality for this cohort of African and Indian households. Section 5 then exploits the panel nature of the data and explores mobility within South Africa, first estimating the joint distribution of well-being and then exploring various log-linear mobility models based on the transition matrix which describes the movement of households across real livelihood levels. While these estimates show a class-differentiated mobility pattern (with the initially well-off tending to move ahead and the initially poor tending to fall behind), they do not distinguish stochastic from structural mobility. Using various measures of shocks to distinguish unlucky from structurally poor households, it is estimated that up to 60% of South Africa’s poor households are caught in a structural, post-apartheid poverty trap. Section 6 concludes the paper with a few reflections on the need for South Africa to shift toward microeconomic policies that can make markets, and time, work better for its least well-off citizens.

2. DYNAMIC POVERTY CONCEPTS

Apartheid in South Africa actively dispossessed black people and limited their ability to accumulate and use assets. Using data from the 1993 national household survey, Carter and May (1999) tried to move beyond an enumeration of apartheid’s poverty with an exploration of the structural bases of that poverty. They showed that in the immediate post-apartheid era, the poor were disproportionately found among households that shared similar endowments and faced similar constraints to the use of those endowments. A goal of this paper is to lay foundations for a similarly structural analysis of post-apartheid poverty dynamics. Given the endowment distribution inherited from apartheid, are there structural positions—poverty traps—from which households are unable to take advantage of the new freedoms of the post-apartheid era, to accumulate and to move ahead? While not intended as a formal theoretical analysis of this problem, the section will heuristically rely on a general intertemporal choice problem to develop the concepts needed to answer this question.

(a) Time as opportunity and vulnerability

People can be poor at any point in time because they posses few assets. They can also be poor because of financial and other constraints that limit their ability to use the assets they have. Time can be an arena of opportunity to resolve both of these problems. Time gives people an additional degree of freedom to build up the additional assets they need. It also gives them the opportunity to work their way around constraints to the effective use of the assets they already have (e.g., through the accumulation of self-finance capacity). But, time is not only an arena of new opportunity. It is also the space in which negative shocks occur that push people further behind. The dynamics of poverty thus depend on how these two dimensions of time interact, and on people’s strategic choices given their awareness of time as both opportunity and vulnerability.

Economic models of intertemporal choice provide language and concepts to assist in thinking about time and poverty. We begin by assuming that a household $i$ at time $t$ has a vector of assets, $A_t$ (comprised of land, human capital, financial wealth, social claims, grain stocks, etc.). Every period, we assume that the household chooses consumption ($c_t$) and investment ($I_t$) in order to maximize its discounted stream of expected well-being. In order to emphasize the nature of the intertemporal tradeoffs involved, we use Bellman’s equation to write the dynamic optimization problem in the following form:

$$J^* (A_t) \equiv \max_{c_t, I_t} u(c_t) + J^* (A_{t+1})$$

subject to

$$c_t = F(A_t, \theta_t) - P_t I_t, \tag{1}$$

$$A_{t+1} = A_t + I_t - \Theta_t,$$

$$A_{t+1} \geq 0,$$

where $J^*(A_t)$ is the true value function for the underlying optimal problem and defines the
maximal discounted stream of future livelihoods that household $i$ can expect given a starting asset endowment of $A_t$ and optimal future behavior. As (1) makes clear, in choosing its current period consumption and investment, the household faces a tradeoff between current utility (ut) and future well-being ($J'(A_{t+1})$).

Three constraints confront household choice. The first is a budget constraint that is built around $F(\cdot)$, a generalized earnings or livelihood function that gives the real purchasing power available to the household as a function of its assets and the stochastic income shock, $\theta_t$, that it receives. The household’s endowments could include the social capital of familial relationships that “pay off” when the household experiences a negative shock, as well as other forms of social or market insurance.

The second constraint shows how the household’s asset base evolves over time in response to investment decisions as well as to the vector of stochastic asset shocks, $\Theta_t$ (e.g., the death of wage earner, livestock deaths, destruction of a business through fire or theft). For simplicity, the budget constraint is written as if all assets and entitlements can be purchased and sold at a vector of market prices, $P$. A more realistic representation would partition assets into those that are irreversible or sunk, and those that can be cashed-in in the event of need. The third constraint says that the household cannot hold negative asset stocks—i.e., the household cannot borrow.

Under the usual assumption of diminishing marginal utility of consumption, a household in the face of an intertemporal choice problems such as (1) would prefer a smooth consumption stream rather than face a consumption stream that fluctuates from year to year. But, in order to smooth consumption over time, the household must solve two problems. First, it must be able to borrow against its higher future earnings (when it has built up larger stocks of assets) to boost early period consumption above the levels that could be afforded based on early period income alone. When a household can borrow in this way, its current consumption will be divorced from current period asset holdings and income generation) and depend only on its long term or permanent income stream. When the household faces binding borrowing constraints, however, consumption will tend to track the household’s current asset levels (and the income expected on the basis of those assets) rather than its permanent income.

Shocks are the second barrier to smooth consumption. While the literature has tended to stress income shocks, smooth consumption requires that the household have insurance or be able to borrow against future earnings to spread out over time the negative effects of either income or asset shocks ($\theta_t$ and $\Theta_t$, respectively, in maximization problem (1)). Absent such capital access, households can also try to accumulate assets that can be sold in event of need to self-insure and smooth out consumption in the face of shocks. When households are unable to defend their consumption standard against shocks, consumption may deviate from what would be expected either on the base of their permanent income, or on the base of the income that would be expected based on their current asset holdings.

The circumstances under which households will actually have smooth consumption over their lifecycles is a subject of both theoretical and empirical research, and is not the immediate interest of this paper. Instead, we simply note that in the presence of binding borrowing constraints, it is not obvious that poor households can smooth consumption (Jalan & Ravallion, 1999, among others provide empirical evidence concerning the limited capacity of the poor to smooth consumption). To capture this possibility, we can decompose realized consumption or well-being, $c_t$, into the following pieces:

$$ c_t = c_{0t} + c(A_t) + e_t. $$  \hspace{1cm} (2)

If consumption were perfectly smooth, the latter two terms in (2) would be zero and the household would enjoy the steady level of well-being ($c_{0t}$) that it can afford based on its long term average or permanent income. If borrowing constraints prevent households from borrowing against future earnings, the second term on the right-hand side of (2) will become non-zero and consumption will begin to track asset holdings and expected current income. Finally, when the household cannot smooth out shocks, the third term also becomes non-zero. To simplify subsequent discussion, we combine the first two terms on the right-hand side and rewrite (2) as:

$$ c_t = \hat{c}(A_t) + e_t, $$  \hspace{1cm} (2')

where $\hat{c}(A_t)$ is now the consumption level that would be expected for a household $i$. In the spirit of Sen’s (1981) pioneering work, we will call $e_t$ an entitlement failure when it takes on
a negative value, and an entitlement windfall when it takes on a positive value. Sen’s analyses of poverty and destitution in terms of entitlement failure testifies to the inability of households to smooth their consumption over time.

(b) Single period poverty measures and their dynamic analogues

Denote the standard, money metric poverty line as $c$, such that a person $i$ is said to be poor in period $t$ if

$$c_{it} \leq c.$$  \hspace{1cm} (3)

While single-period poverty analysis is often cast in terms of realized levels of well-being, $c_{it}$ (the vertical axis in Figure 1), Carter and May (1999) estimate $\hat{c}(A)$ directly to explore the structural or asset basis of poverty in terms of an asset poverty line ($A$), defined as:

$$A = \{ A \mid \hat{c}(A) = c \}. $$ \hspace{1cm} (4)

In words, $A$ is the locus or combination of assets that yield an expected level of well-being exactly equal to the single-period poverty line. Figure 1 illustrates this asset poverty line for the (visually) simple case in which the asset vector is one-dimensional.

The asset poverty line permits us to distinguish two types of poverty that are often lumped together in static, single-period poverty analysis. The stochastically poor are households that are observed to be poor based on their realized consumption ($c_{it} \leq c$), but whose asset levels place them above the asset poverty line (e.g., a household observed at point $B$ in Figure 1). The structurally poor are poor households ($c_{it} \leq c$) whose assets place them below the asset poverty line (e.g., a household observed at $\hat{c}(A^*)$ in Figure 1). Note that the non-poor can be analogously disaggregated into the structurally non-poor ($\hat{c}(A^*)$ in Figure 1) and the stochastically non-poor ($C$ in Figure 1).

We can now define dynamic analogues to these single-period poverty lines. First, recalling that $c$ is the standard single-period poverty line, define the dynamic poverty line ($J$) as:

$$J(u, \delta_p) = \left( \sum_{t=0}^{\infty} \delta_p^t c \right),$$  \hspace{1cm} (5)

where $t$ indexes years and $\delta_p$ is a discount factor. In words, $J$ is the discounted present value of a sequence of poverty-level living standards. We can now straightforwardly extend the standard definition of poverty to a multiperiod context. Using (1) and (5), a household is dynamically poor if:

$$J^*(A_{it}) < J.$$  \hspace{1cm} (6)

![Figure 1. Dynamic income and asset poverty lines.](image)
In words, a household is dynamically poor if their long-term expected stream of well-being (conditional on optimal accumulation behavior) is less than the certain equivalence value of a stream of single-period poverty living standards.\footnote{9}

Will dynamically poor households as defined by (6) actually exist? Important clues come from an emerging neoclassical economics literature that explores the circumstances under which the rich and poor will accumulate assets differently such that initial wealth and income differences become accentuated over time. Provocative contributions include Banerjee and Newman (1991, 1993), Dasgupta (1997a,b), Mookherjee and Ray (1999) and Zimmerman and Carter (2000). In all these analyses, shocks, vulnerability and imperfect financial markets play key roles in preventing initially poor agents from using time as a way to build up asset stocks and achieve a higher level of well-being.\footnote{10} Effectively, initially poor agents are caught in a poverty trap from which neither time, nor the opportunity to save and accumulate assets will deliver them.

Davies (1996) offers complementary insights from an anthropological perspective. She notes that there are two forces that interact when households experience an economic shock: resilience and sensitivity. While the former refers to the depth of the impact of a shock on a household’s well-being, resilience refers to the ability of the household to recover from the shock. Households that are highly sensitive to shocks, with a low resilience, are in an extremely hazardous state and may be forced to sell off or neglect the accumulation of productive assets in order to survive. In the face of multiple shocks, low-resilience households may thus ratchet down over time to the point at which they become trapped in a situation from which they cannot escape through successful accumulation. As in the neoclassical economic analyses just considered, Davies’ concept of low resilience suggests that what might be termed accumulation failure rests at the heart of persistent poverty.

The notion that there are initial asset positions from which successful accumulation and upward mobility are not possible suggests a dynamic analogue to the single-period asset poverty line defined in (4) above. Specifically, define the dynamic asset poverty line, \(A_d\), as:

\[
A_d = \{ A | J^*(A_d) = \varphi \}.
\]

This dynamic asset poverty line divides those asset combinations from which successful accumulation and escape from poverty is possible, from those combinations from which it is not.\footnote{11} In the more colorful language of Zimmerman and Carter (2000), the dynamic asset poverty line is the “Micawber Threshold” that divides those able to engage in a virtuous Victorian circle of accumulation from those who cannot.\footnote{12}

Because the value function of the dynamic optimization problem, \(J^*(A_0)\), is defined over the space of assets and entitlements as is \(\hat{c}(A)\), we can illustrate both the dynamic poverty line and the Micawber Threshold in Figure 1. Because it is equal to the discounted present value of a sequence of poverty-level living standards, the dynamic poverty line will lie above the single-period poverty line, as shown. It seems likely that if it exists, the Micawber Threshold, \(A_d\) will lie at a lower asset level than the single-period asset poverty line, \(A\).\footnote{13} Figure 1 illustrates this particular configuration. Households that begin with endowments below \(A\) and \(A_d\) would thus expect to escape poverty over time. Those below the Micawber Threshold, \(A_d\), would not.\footnote{14}

\[\text{(c) A theoretically grounded dynamic poverty typology}\]

A key challenge facing the empirical analysis of poverty is distinguishing between households that can expect to escape poverty over time and those that are dynamically poor according to (6) and caught in a poverty trap below the Micawber Threshold. In contrast to these theoretically grounded concepts, the empirical literature that has studied poverty dynamics typically measures what is termed chronic and transitory poverty. Households that are observed poor by criterion (3) at each point in time are said to be chronically poor. Households that move between poor and non-poor categories are labeled as transitorily poor. As with single-period poverty measurement, however, these conventional measures can mask very different kinds of poverty that carry very different implications.

First note that as conventionally defined, the transitorily poor would include households who were structurally mobile, and changed their poverty status by either successfully accumulating assets and moving from \(A^*\) to \(A''\) in asset space (and from well-being level \(\hat{c}(A^*)\) to
\( \dot{c}(A'') \); or, by suffering an asset shock and moving from \( A'' \) to \( A''' \) (or even to \( A' \)).

Second, the transitorily poor would include households who were stochastically mobile or made a stochastic transition. Included in this group would be households who were stochastically poor in one period (e.g., point \( B \) in period 1) and who regressed to their expected level (\( \dot{c}(A'') \)) in the other period. Also in this group would be households who were stochastically non-poor in one period and regressed to their expected poverty living standard in the other period (e.g., a household observed at point \( C \) in period 1, and at their expected well-being level \( \dot{c}(A'') \) in period 2).

Third and finally, note that the conventional “chronically poor” would category include dynamically poor households with assets below the Micawber Threshold \( A \), as well as households that were twice stochastically poor (e.g., a household with assets \( A'''' \) that twice suffered an entitlement failure and was observed at point \( B \)).

Distinguishing between these different types of structural versus stochastic mobility (and immobility) is of much more than academic interest. A society in which structurally poor households can expect to successfully accumulate assets and escape poverty over time would be very different economically (and politically) than a society in which the same aggregate mobility is generated by stochastic poverty transitions and where there are significant numbers of households trapped below the Micawber Threshold. The policy implications would also clearly differ between the two circumstances. In the first case, time would be an ally that eliminates structural poverty. In the other, time would merely oversee the reproduction of a poverty class. We turn now to the task of using panel data on approximately 1,200 households in the South African province of KwaZulu-Natal to decompose mobility into its stochastic and structural components with an eye toward identifying the number of dynamically poor households stuck in poverty traps.

3. THE KWAZULU-NATAL INCOME DYNAMICS STUDY (KIDS)

Several panel data sets exist which have been used to analyze income mobility and poverty transitions. Examples include studies of the determinants of income mobility using the Côte d’Ivoire Living Standards Survey (Grootaert & Kanbur, 1995), access to rural assets using the International Crops Research Institute Semi-Arid Tropics Village Level Studies in India (Gaiha & Deolalikar, 1993) and the influence of family history on children’s well-being using the Panel Study of Income Dynamics in the United States of America (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993). Baulch and Hoddinott (2000) provide a useful review of further examples.

In the spirit of promoting similar analysis in South Africa, in 1998, the KwaZulu-Natal Income Dynamics Study (KIDS) reinterviewed households from the 1993 PSLSD study (see Note 1) that were located in the KwaZulu-Natal province. This province is home to approximately 20% of South Africa’s population of 40 million and was formed in 1994 by combining the former Zulu homeland with the old Natal province. Although KwaZulu-Natal is not the poorest province in South Africa, it arguably has the highest incident of deprivation in terms of access to services and perceived well-being (Klasen, 1997; Leibbrandt & Woolard, 1999). KwaZulu-Natal is also home to most of South Africa’s ethnically Indian people who constitute 12% of the province’s population. Africans comprise about 85% of the province’s population, with people of European descent (largely British) comprising most of the remainder.

The 1993–98 period covered by the KIDS data coincides with Nelson Mandela’s presidency. While a five-year presidency is scant time to resolve social problems of the magnitude measured by the 1993 PSLSD survey, identifying the nature and severity of chronic poverty and its attributes is a clear priority. During Mandela’s presidency, the South African government’s orientation toward addressing the problems of poverty and inequality underwent some marked shifts, in language and emphasis, if not in substance. The 1996 closure of the Office of the Reconstruction and Development Program (RDP) signaled to some an at least symbolic reduction in the priority given to improving the access of the majority of South Africans to adequate shelter, sanitation and education. While programs to provide such social services continued to reside within relevant ministries, the dominant acronym in South African public policy debate shifted from the RDP to the GEAR (Growth, Employment
and Redistribution), the label attached to the government's macroeconomic stabilization and structural adjustment framework. Under the GEAR, liberalizing reforms were carried out in agriculture, industry, labor and finance markets. The stated intention of these reforms—together with the removal of the discriminatory policies associated with apartheid—was to "level the economic playing field." Aside from any temporary dislocation induced by structural adjustment, the expectation was that this reform package would boost the well-being of South Africa's poor majority.

Before examining the KIDS data for evidence on the evolution of individual well-being, it is worth taking a closer look at the macroeconomic environment that conditioned household economic possibilities. During the 1960s the South African economy grew at some 6% per annum, while total employment grew in line with population growth at 3% per annum. By the late 1980s, however, the real economy was shrinking, as was formal sector employment. After the country's first democratic elections in 1993, this trend was briefly reversed with sustained growth throughout 1995. By the middle of 1998, economic growth fell to less than 0.5% per annum. As a result, throughout the period between the two waves of the KIDS survey, aggregate growth was scant, limiting the income earning opportunities for the majority of South Africa's population. According to official statistics, formal employment declined by some 12%, or some 642,000 jobs between 1993 and mid-1998 (CSS, 1993; Stats SA, 1999a). Job losses were highest in those sectors that employ unskilled labor, with the manufacturing sector suffering a 6% loss in jobs during 1993–98, compared to 21% in construction 27% in mining (CSS, 1994; Stats SA, 1999b).

The South African government's response to this period of poor economic performance has been constrained both by international economic trends as well as by inherited fiscal realities. The apartheid government left a total public debt of R189.9 billion of which foreign debt amounted to some R5.2 billion (South African Reserve Bank, 1999). During 1993–98, some 6.7% of GDP, and 24% of the budget has annually been absorbed by interest on this debt. Further, in line with the conventional macroeconomic stance taken by the GEAR, government contained growth in public expenditure and reduced its public sector borrowing requirement from 9.3% of GDP in 1993–94 to 3.4% in 1998–89. Despite this fiscal conservatism, there was an increase in the share of total expenditure going to social services during Mandela's presidency. With a decrease in the budget share allocated to military expenditures, the social services share rose from 54% in 1994 to 60% of non-interest spending in 1997–98. Of this allocation, education has received the largest share followed by health, social security and housing (Department of Finance, 1998).

Against this macroeconomic backdrop, the KwaZulu-Natal households from the 1993 PSLSD study were reinterviewed over the three-month span stretching from March to June, 1998. Because the number of white households interviewed in KwaZulu-Natal in 1993 were few and clustered in a few enumerator districts, they were eliminated from the study, creating a potential starting sample of about 1,400 households from the 1993 survey. Because the 1993 survey sampled physical dwellings (and then built up households based on the set of people who lived in those dwellings 18), decisions had to be made about the definition of the unit that was to be reinterviewed in 1998. For each household in the 1993 survey, a set of core household members was identified based on age, economic activity and likely status and decision-making power within the household. The fieldwork protocol developed dictated that in the event that a 1993 household fractured (in the sense that core people split off into multiple household units), then all new household units would enter the 1998 survey.

The study presented here can thus be seen as a random panel study of the households of 1993 core economic decision-makers. Note that this sample is NOT representative of the universe of 1998 core decision-makers as it obviously excludes (largely younger) individuals who were not core decision-makers in 1993. Of the KwaZulu-Natal households identified in the 1993 survey, 1,183 were successfully located in 1998 (including 50 who had moved to a new location). Of these 1,183 households, 50 had fractured in the sense that core people no longer lived together, creating a 1998 sample of 1,223 households. For purposes of the analysis in this paper, these 50 fractured households were recombined, yielding 1,183 households. Data problems reduced the usable observations to 1,171. The next section discusses attrition from the sample.
4. CHANGES IN POVERTY AND INCOME DISTRIBUTION, 1993–98

Table 1 presents a headcount poverty measure constructed using information from the 1993 and 1998 household subsistence lines (HSLs) calculated by the Institute for Planning Research at the University of Port Elizabeth (see Potgieter, 1993a,b; Potgieter, 1998). The HSL is built up based on fixed household subsistence costs (to cover shelter, fuel and transport), as well as food and basic clothing costs calibrated to individual resident household members’ age and sex. Using the HSL cost parameters, a specific HSL was calculated for each household based on its demographic and residency structure. For 1993, separate HSL cost parameters are provided by Potgieter (1993b) for both rural and urban households. The 1998 HSL was calculated only for urban households (Potgieter, 1998). Rural cost parameters for 1998 were derived by inflating the 1993 rural cost parameters.

Households whose total expenditures fall below their HSL will be deemed poor. Because subsistence food costs constitute approximately 50% of the HSL, a household will be deemed as indigent if their total expenditures are less than 50% of their HSL. Using these definitions, Table 1 shows that about 30% of South Africa’s population were poor in 1993, with an average expenditure shortfall equal to 35% of their household subsistence needs. Also reported is a second-degree Foster–Greer–Thorbecke (FGT) poverty measure and a shelter-sanitation and energy score discussed in more detail below. The table also gives the same poverty statistics when the lower indigency line is used to measure poverty.

Examining first the 1993 poverty measures for the KIDS sample of 1,171 households, we see in Table 1 that these KwaZulu-Natal households had lower poverty rates than the national figures calculated using the full 1993 PSLSD data for the black population. The differences are most striking when looking at the measures based on the indigency line for which the headcount and FGT measures are noticeably lower for KwaZulu-Natal than for the national level. These difference are not surprising given that the poorest areas of South Africa are outside KwaZulu-Natal.

The third column of figures in Table 1 presents in square brackets the suite of 1993 poverty measures for those households that were not successfully reinterviewed in 1998. Comparing these figures with the 1993 measures for those households that were reinterviewed gives some idea about the nature of the attrition that took place. As can be seen, the 1993 headcount measure of poverty is lower for those households that were not located for reinterview versus those that were reinterviewed (23% versus 27%). At the same time, the headcount measure of poverty at the indigency line was slightly higher among attrition households (4% versus 3%). These figures suggest that attrition had the greatest impact on the tails of the income distribution.

Comparing the 1998 measures with the measures based on the same cohort of households in 1993, we see that the expenditure-based poverty measures increased. The basic headcount measure increased from 27% to

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*Figures in square brackets are the 1993 data for those households that could not be relocated for reinterview in 1998.
43%, while the headcount using the indigency line increased from 3% to 10%. While both of these headcount measures increased, the severity of poverty for individuals below the indigency line diminished as shown by the drop in the FGT measure. In addition, the average income shortfall for households below the indigency line decreased from 30% to 5%. In contrast, the average income shortfall for those below their HSL increased from 27% to 33% of that poverty line, and the FGT measure rose sharply from 0.03 to 0.06. A bright spot in the picture is the improvement in the shelter-sanitation-energy source scores. Lower values for this score indicate better shelter, sanitation and energy sources. The scores range from 4 (best) to 16 (worst). The improvement in the average score likely reflects the efforts of the Mandela government to provide poor communities with improved housing and piped water.

Figure 2 displays the cumulative distribution function (CDF) of real expenditure as a percentage of subsistence needs for both 1993 and 1998. The visually striking shift in the distribution is statistically significant. The dotted vertical line marks the HSL poverty line. As can be seen, the CDF’s for the 1993 and 1998 cross at about the 80th percentile where measured expenditures are about 250% of subsistence needs. Below that level, the 1998 CDF lies clearly above that for 1993, indicating that there are greater numbers of households at the low real income levels in 1998 than in 1993. This finding does not mean that the initially poorest 80% of households have become worse off. Some initially poor households may have swapped places with initially better-off households. The next section specifically examines this mobility issue.

In contrast to the lower tail of the income distribution, beyond the 80th percentile we see that the 1998 distribution lies to the southeast of the 1993 distribution, indicating that the top 20% of households are better off in 1998 than they were in 1993. When combined with the opposing shift in the bottom eight deciles, this shift in the upper tail reflects increasing inequality among the black population. The Gini coefficient for the KIDS sample rose by four points over 1993–98, increasing from 0.38 to 0.42.

This increase in the upper tail of the income distribution arguably signals an increase in “productive inequality” that reflects the desirable operation of an incentive system that encourages accumulation of skills and human capital (Sheehan & Iglesias, 1998). By placing a ceiling on the job and income-earning possi-

![Figure 2. Distribution of well-being, 1993 and 1998.](image-url)
bilities for Africans, Indians and coloreds, apartheid is likely to have maintained artificially low levels of inequality among the black population. Apartheid’s demise might be expected to lead to the inequality-increasing shift seen in the upper tail of the distribution function. This logic does not, however, explain the deterioration in the lower tail of the income distribution.

5. MOBILITY AND POVERTY DYNAMICS

While provocative in its portrayal of an unequalizing post-apartheid income distribution process within the African and Indian populations, the analysis in the prior section is uninformative about whether initially poor households have become systematically worse off over time, or whether Figure 2 has been generated by significant upward and downward mobility in which initially poor and non-poor households have swapped places in the income distribution. Distinguishing between these two cases is of more than academic interest. A society in which initially poor households are trapped in poverty is clearly very different from a society in which poverty is a matter of transitory spells from which poor households expect to periodically escape.

(a) Joint distribution of well-being

As a first window into this question of mobility, Figure 3 graphically portrays the estimated joint distribution of well-being (expenditures divided by subsistence needs) using the KIDS data. The contour map in the top panel displays what might be termed the mobility plane. The x-axis uses a logarithmic scale to display a household’s 1993 consumption as a percentage of its subsistence needs (its HSL). The y-axis displays the same measure for 1998. Hence a household whose expenditures exactly equals its subsistence needs will have a value of zero. Other multiples of the poverty line are given in the legend accompanying the figure.

The position of any household in the KIDS panel can be displayed as a point in the mobility plane. The dashed 45° “immobility line” that cuts across the plane shows those positions in which real living standards have not changed during 1993–1998. Note that the plane is positioned such that the front area contains higher income positions, while lower income positions are at the rear of the figure. Positions to the left of the immobility line thus indicate deterioration in economic well-being, while positions to the right indicate improvement.

The diamond-shaped area demarcated by dashed lines at the top of the mobility plane contains what are conventionally referred to as the “chronically poor.” Two categories of so-called transitorily poor (those observed poor in one period, but not in the other) are found in the rectangular areas below and to the left and right of the chronic poverty diamond. Never-poor households occupy the remaining space of the mobility plane.

In order to explore how families in the KIDS sample are distributed over this mobility plane, we estimate the joint distribution of well-being over the two periods. In addition to rendering the data in a visually useful fashion, estimation of the joint density removes noise from the data. The estimated distribution shown in Figure 3 was derived using the Epanechnikov nonparametric kernel estimator with an optimal bandwidth. The greater the height of the estimated surface over a portion of the mobility plane, the greater is the estimated probability that a family occupies that portion of the mobility space. Both the contour map and a three-dimensional representation of the joint distribution are presented for clarity. The contour levels in the top panel are strictly increasing as one moves to the center of the figure.

As is apparent from visual inspection of Figure 3, there is a large clump of initially poor households that have either held steady or fallen behind. In the language of conventional empirical analysis of poverty dynamics, these households are chronically poor. Upward mobility appears concentrated among households that were initially better off. This second point is perhaps seen most easily using the contour map, though it can also be seen in the three-dimensional surface as well. Together these two observations suggest that a pattern of class-based mobility underlies the shift in the cumulative distribution of income shown in Figure 2 as the probability of getting ahead is correlated positively with initial income level. The remainder of this section will explore these differentiated patterns of mobility in greater detail. In keeping with Section 2’s discussion, it will attempt to identify the portion of the poor (both chronic and transitory) who are struc-
turally poor and potentially caught in a poverty trap.

(b) The poverty transition matrix and class-based mobility tests

While the estimated joint distribution of well-being permits us to see the pattern of mobility stripped of noise, it not amendable to any simple tests of the degree to which the visually distinct patterns of mobility across initial income classes are in fact statistically signifi-
cantly different from each other. This section’s log-linear mobility analysis of the transition matrix defined by the KIDS data permits us to conclude that the class-based pattern of mobility is statistically (and economically) significant.

The transition matrix displayed in Table 2 presents mobility information in the form of the percentage of households in each 1993 well-being class (given by the rows of the table) that was observed in the 1998 well-being classes (the columns of the table). Note that these classes

Figure 3. Joint distribution of well-being, 1993–98.
are defined in terms of absolute levels of well-being (total expenditures divided by HSL), not percentiles of the expenditure distribution. The main diagonal elements of the matrix are printed in bold and show the percentage of households in each row that did not change their position over 1993–98. The initial distribution of the sample across these well-being classes is shown in the square brackets in the leftmost column.

Following Hout (1983), we can ask whether the observed transition frequencies in Table 2 are sufficiently different from what would be expected under various models of homogenous or class-independent mobility that we can reject these models. The simplest such model is one of perfect mobility in which a household’s destination in the 1998 income distribution is independent of its 1993 starting position. Perfect or class-independent mobility is decisively rejected as the p-value for the $L^2$ statistic (see Note 25) is less than 0.0001.

Rejection of this perfect mobility model is not, however, especially surprising. Inertial forces might at least make it more likely that households will tend to maintain their initial position rather than exhibiting upward or downward mobility. The class of log-linear models can be used to test this and other hypotheses. The log-linear model that captures this inertia and permits the main diagonal elements to differ from the off-diagonal elements (what Hout calls the constrained quasi-perfect mobility model) is, however, also decisively rejected. Indeed the data reject the restrictions implied by the full series of increasingly less-restricted log-linear models that ask whether there are any common mobility patterns that cut across classes. The most general model tested (the “Quasi-Diagonals” model in Hout’s nomenclature) is rejected at the 5% level, giving clear indication that the mobility patterns are heterogeneous across income classes, and that class-specific probabilities of upward and downward mobility are different.

Unable to statistically accept any of the restrictions implied by commonly used mobility models, we proceed to use the observed transition matrix frequencies as our best estimates of the mobility pattern. Looking now at these numbers reported in Table 2, we can see that with the exception of the best-off group in 1993, none of the main diagonal elements exceed 50%, signaling substantial mobility among well-being classes. But, focusing solely on those households with expenditures below their HSL in 1993 (the shaded portion of the table), it can be seen that about 65% of them remained below the poverty line in 1998. Some 28% of the 39 households that were indigent in 1993 (i.e., with expenditures less than half their HSL) remained indigent in 1998.

Looking at the next two well-being classes (those that had 1993 expenditures between 1 and 1.5 times their HSLs), we see that about one-quarter of them had moved up to higher income groups in the 1998 survey, while about half had fallen below the poverty line. The observed shift in the CDF seen in Figure 2 is thus the product of a relatively large group of chronically poor and a process of bifurcation among those just above the poverty line in 1993, with just over half that group falling...
behind, and the others holding steady or moving ahead.

A final way to appreciate the economic significance of this statistically significant pattern of heterogeneous mobility is to draw out what its long run implications would be if the transition process were stationary over time. Note that each element in transition matrix can be treated as an estimated transition probability (e.g., the 1,2 element indicates that there is a 48.5% chance that a household observed in lowest class will move up to the next highest expenditure category). The longer run implications of this class-based mobility pattern can be examined under the assumption that income distribution follows a stationary Markov process:

\[ p_t = M^t p_0, \quad (8) \]

where \( p_0 \) is the initial distribution, \( p_t \) is the proportion of households in each well-being income category five years later, and \( M \) is the estimated (five-year) transition matrix. Recursively applying (8), we can write projected distribution of households across well-being classes as:

\[ p_t = (M^t)' p_0, \quad (8') \]

where \( t \) is the number of five-year periods we want to project forward. Finally, define the long-term equilibrium distribution, \( \bar{p} \) as the distribution that once attained reproduces itself:

\[ \bar{p} = M^t \bar{p}. \quad (9) \]

Note that if the off-diagonal elements in the transition matrix simply reflected noise in the data with no underlying structural mobility pattern, then the longer term or limiting distribution should appear to be quite similar to the initial distribution.

The far right column of Table 2 presents long-term distribution \( \bar{p} \) as defined by (9). The convergence to this distribution is rapid. Using (8') to project the 1993–98 mobility pattern 50 years into the future gives an estimated distribution for the year 2043 that is nearly identical to the limiting distribution. Compared to the actual 1993 distribution, the overall percentage of indigent households in the long run distribution increases from 5% to 10%, those in the second category increase from 29% to 32%. The near poor in the next two categories both decrease from 12% to 10% and 7%, respectively, while the percentage of households with incomes between 1.5 and 2.5 times their HSL decreases from 23% to 21%, while the top category increases slightly from 18% to 18.5%. Examined this way, the data again evidence a pattern of class-differentiated mobility.

(c) Measuring entitlement failures and entitlement losses

While the Table 2 transition matrix analyzed above provides information on what is conventionally defined as chronic versus transitory poverty, it fails to distinguish structural from stochastic mobility. It also gives no indication as to whether the twice poor were unlucky twice, or whether they are stuck in a structural poverty trap. In an effort to distinguish these cases, this section will examine and estimate the stochastic factors that shape realized levels of well-being.

The discussion in Section 1 above identified two types of shocks related to mobility and poverty transitions. Entitlement shocks (\( e_{it} \) in the notation of Section 1) are termed “entitlement failures” when they are negative and “entitlement windfalls” when positive. The second type of shock occurs when the household experiences an unexpected, permanent reduction in its asset base or set of entitlements (e.g., a wage earner suddenly dies, a fire destroys a business, or a friend, family member or government abandons reneges on a long-standing remittance or other financial transfer). We label these shocks \( \Theta_{it} \) in the notation of Section 1) “asset losses.”

By estimating the livelihood function, or expected well-being, \( \hat{c}_{it}(A_{it}) \), we could use (2') to obtain an estimate of the entitlement shock:

\[ \hat{e}_{it} = c_{it} - \hat{c}(A_{it}). \quad (10) \]

However, an estimate of the entitlement shock obtained from (10) would contain measurement and other random errors, as well as genuine shocks experienced by the household. In general, the less precise the estimate of \( \hat{e}_{it}(A_{it}) \), the larger would be the estimate \( \hat{e}_{it} \), irrespective of the magnitude of shocks actually experienced by the household. If we used \( \hat{e}_{it} \) to measure who was stochastically poor, we would tend to overstate the incidence of stochastic poverty and stochastic mobility and poverty transitions.

Rather than using \( \hat{e}_{it} \) directly to gauge when a household has received an entitlement shock, we will instead say that household \( i \) in period \( t \)
has suffered an entitlement failure and is stochastically poor if

\[ c_{it} < \text{HSL}_{it} \text{ AND reject } H_0 : \hat{c}_{it} < \text{HSL}_{it}. \]  \hspace{1cm} (11)

In words, we identify a household as stochastically poor if it is observed to be poor and yet we can reject the hypothesis that it is expected to be poor given its assets. By rejecting this hypothesis, we have accounted for the imprecision in the estimation \( \hat{c}_{it}(A_{it}) \) and are quite confident that these households are indeed above the single-period asset poverty line (\( \text{HSL} \) in Figure 1), and that their observed poverty is the result of unlucky outcomes or entitlement failures. Note that this is a very stringent criterion.

To say that an observed poor household is stochastically poor, we require that the confidence band around the estimate of \( \hat{c}_{it} \) lie completely above the HSL. There will be observed poor households who have a predicted well-being level above the HSL that we will not classify as stochastically poor because their predicted level of well-being is not enough above their HSL that we can be completely confident that they really are above the single-period asset poverty line, taking into account the imprecision of our estimate of \( \hat{c}_{it} \).

By a similar logic, we identify a household as stochastically non-poor if

\[ c_{it} > \text{HSL}_{it} \text{ AND reject } H_0 : \hat{c}_{it} > \text{HSL}_{it}. \]  \hspace{1cm} (12)

We can be confident that a household that fulfills these conditions has in fact received a positive shock (an entitlement windfall) and is observed to be non-poor despite having assets that place it below the single-period asset poverty line.

For reasons detailed in Carter and May (1999), there are a number of reasons why \( \hat{c}_{it}(A_{it}) \) should depart from strict linearity or asset additivity. Following on the methodological suggestion of that earlier paper, we employ flexibly local regression methods to derive an 80% confidence interval estimate of \( \hat{c}_{it}(A_{it}) \) for each time period. \(^{31}\) The 80% interval estimate will let us test the above (one-sided) hypotheses in (11) and (12) at the 10% significance level. Hence, there will be a 10% (Type I error) probability that any household that we deem to be stochastically poor is not.

To measure asset shocks, the KIDS survey queried all respondents about the economic shocks experienced over 1993–98. Information was solicited to measure the economic cost of each recorded shock. In the case of the theft or destruction of a physical asset, respondents were asked to supply the (asset) value of the item lost. When a wage earner was permanently disabled, a social welfare payment eliminated, or a source of remittance cut off, respondents were asked to report the report the resulting decrease in monthly income. \(^{32}\) A present value calculation over a 20-year time horizon using a 5% real discount rate was then utilized to approximate the asset value of the lost entitlement. In principle, this present value formulation makes the loss of human capital or of a remittance comparable to the loss of non-human income earning assets.

(d) Decomposing mobility into its structural and stochastic components

The structure of Table 3 is a simplified version of Table 2 poverty transition matrix in which the various well-being categories have been compressed into poor and non-poor. Some 18% of all households are observed to be poor in both periods of the KIDS data (the chronic poor in conventional parlance), while

<table>
<thead>
<tr>
<th>Table 3. Decomposing poverty transitions in South Africa (% surveyed households)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
</tr>
<tr>
<td>Poor</td>
</tr>
<tr>
<td>18% Chronically poor, of which:</td>
</tr>
<tr>
<td>−8% Dual entitlement failures***</td>
</tr>
<tr>
<td>−Structurally poor/trapped ≤92%</td>
</tr>
<tr>
<td>25% Fell behind, of which:</td>
</tr>
<tr>
<td>−15% Stochastically mobile**</td>
</tr>
<tr>
<td>−Structurally poor/trapped ≤85%, of which 51% had entitlement losses</td>
</tr>
</tbody>
</table>

∗Households for which reject \( H_0 : \hat{c}_{98} < \text{HSL}_{98} \).

** Household for which reject \( H_0 : \hat{c}_{98} < \text{HSL}_{99} \).

*** Households for which reject \( H_0 : \hat{c}_{99} < \text{HSL}_{99} \) and \( H_0 : \hat{c}_{98} < \text{HSL}_{98} \).
another 35% are contained in the two off-diagonal “transitory poverty” cells. The challenge is to decompose this mobility and immobility into stochastic and structural components. Using definitions (11) and (12) above, we will say that a household is

—Stochastically upwardly mobile if it was stochastically poor in 1993 and observed to be non-poor in 1998; or, if it was poor in 1993 and stochastically non-poor in 1998.

—Stochastically downwardly mobile if it was observed to be non-poor in 1993 and stochastically poor in 1998; or, if it was stochastically non-poor in 1993 and poor in 1998.

—A Dual entitlement failure (or stochastically immobile) if it was stochastically poor in both 1993 and 1998.

Households whose mobility or immobility cannot be accounted for by stochastic factors will be classified as candidates for structural mobility (or immobility). Under this procedure, households that appear as structurally poor in 1998 are candidates for being dynamically poor as defined by (6) above.

Of those upwardly mobile households that moved from poor to non-poor status during 1993–98, we find that over half (58%) had entitlement failures in 1993 (i.e., we could reject the hypothesis that they were expected to be poor in 1993). The upward mobility of this group can thus be inferred to be a regression to their expected level of livelihood rather than a story of successful accumulation or escape from structural poverty. This places an upper bound of 42% on the number of the upwardly mobile who escaped poverty though accumulation. It is possible that some of these 42% simply had an entitlement windfall in 1998. It was impossible to identify unambiguously any of the upwardly households mobile as beneficiaries of 1998 entitlement windfall (i.e., stochastically non-poor in 1998), so we cannot further reduce that upper bound estimate of upward structural mobility. 33

Of the downwardly mobile households, we estimate that 15% were stochastically downwardly mobile and suffered a 1998 entitlement failure as evidenced by the fact that we could reject the hypothesis that their expected 1998 level of well-being was below their HSL. The other 85% of these households were potentially structurally poor in 1998, although it was impossible to identify any of them as clear 1993 entitlement windfall beneficiaries who had simply regressed in 1998 to an expected level of well-being below the poverty line.

Further clues about the downward mobility of this group are found in the asset shock data. Slightly more than half of this group suffered asset losses over 1993–98. (This figure contrasts with the sample average of 30% of households as victims of asset losses.) While we cannot precisely decompose this group into stochastically and newly structural poor, it seems likely that a significant portion of the households that fell behind are in structural as opposed to a stochastic poverty situation, perhaps as much as 85% of them.

Looking at the households in the twice-poor cell of the mobility matrix, we find that 8% are dual entitlement failures (i.e., we can reject the hypothesis that they were structurally poor in both periods). 34 This defines an upper bound estimate of 92% of the chronically poor who are actually structurally poor and, so far at least, stuck in a poverty trap. In an effort to define a lower bound on the estimate of those who are structurally and chronically poor, we tested whether we could reject the hypothesis that any of these chronically poor households were non-poor in both periods. We were unable, however, to reject this hypothesis for any of the chronically poor households in the sample, leaving us with an estimate that between 0% and 92% of the twice-poor households are structurally poor. Adding together these households with the apparently structurally poor households in the downwardly mobile cell of Table 3 yields an estimate that as many as 37% of all households in the sample were structurally poor in 1998.

6. CONCLUSIONS

Just over five years ago, South Africa’s first freely elected, post-apartheid government inherited an economy marked by deep economic inequality and levels poverty and living standards characteristic of much poorer economies. This paper takes a first look at the dynamics of post-apartheid income distribution. Using the KwaZulu-Natal Income Dynamics study of approximately 1,200 black households over 1993–98, this paper finds that poverty rates have increased from 27% to 43% among this cohort, and that the distribution of scaled per capita expenditure (or well-being) has become less equal. Underlying these find-
ings is a skewed or class-based pattern of income mobility in which initially better-off households have shown more upward mobility than initially poorer households.

Under conventional income mobility concepts, the data show that 18% of sampled households were chronically poor (i.e., observed to be poor both periods), while 35% were transitorily poor in the sense that they were poor in one period but not in the other. But the theoretically grounded dynamic poverty concepts developed here motivate a further decomposition of both of these categories. In particular, we have argued that these conventional measures do not permit us to identify how many households are dynamically poor in the sense that their long-term prospects (accounting for subsequent accumulation) are no better than a stream of subpoverty living standards.

In an effort to arrive at an upper bound estimate of the dynamic poverty, this paper has estimated how much of the observed patterns of income mobility can be accounted for by stochastic factors. Of the chronically poor families, only a few (8%) can be identified to be structurally non-poor who have suffered dual entitlement failures. The other 92% of these households are candidates for long-term, dynamic poverty. The transitorily poor can be divided between those households that got ahead over 1993–98 (10% of all households) and those that fell behind (25% of all households). Almost 60% of the transitorily poor who got ahead appear to have simply regressed to their expected livelihood level in 1998. In other words, their escape from poverty does not appear to signal an escape from an initial position of structural poverty. We cannot reject the hypothesis that the other 40% of these households (about 4% of the overall sample) successfully engineered an escape from structural poverty during 1993–98. In terms of Figure 1, these households are candidates for having been above the Micawber Threshold but below the 1993 single-period asset poverty line.

Of the 25% of all households that went from being non-poor to poor, 15% appear to have suffered transitory 1998 entitlement failures. Such households would be expected to regress to non-poor living standards in the future. Of the remaining households that fell behind, nearly half reported asset shocks, meaning they experienced unexpected losses of economic or social assets. We are thus left with a large percentage of these downwardly mobile poor households who are potentially structurally poor for at least the short term and perhaps dynamically poor over the longer term.

Assembling all these results indicates that up to 38% of the households in the KwaZulu-Natal sample may be stuck in a structural trap of chronic poverty. Markov probability estimates indicate that the current income mobility pattern will leave 53% of all households poor over the longer term. Taken together, these figures imply that nearly 70% of South Africa’s poor may be dynamically poor, with the remaining percentage comprised of households that periodically escape poverty.

These results imply that large numbers of South Africans have been unable to take advantage of the liberalized, post-apartheid environment. This finding is consistent with the Carter and May (1999) study that showed that in 1993 the South African poor had few assets and faced severe constraints to the remunerative use of the few assets that they had. The subsequent failure of these households to get ahead in this environment where especially financial market access was weak is not surprising. It would thus seem that the first step for policy is to recognize that it will take more than economic and political liberalization to level the playing field in ways this large group of South Africans to get ahead. In this vein, current South African President Mbeki’s call in his 2001 State of the National speech to move from macroeconomic to microeconomic reform would seem to be on target. The challenge for both researchers and policy makers is to identify the critical constraints that can be relaxed to open the way for the less well off to make time and liberalized markets work for, not against them.

In closing, it is important to keep in mind that a five-year time period is relatively brief, and that it is impossible to discount the South Africa’s poor macroeconomic performance over this period of structural adjustment. There are also a few bright spots, as surveyed households registered an improvement in the quality of their basic services. These caveats not withstanding, the analysis here suggests that there are significant numbers of South Africans whose material well-being is headed downward and who are likely caught in a poverty trap from which neither time nor markets will offer release. For this group, the end of apartheid has thus far at least proven to be only one kind of freedom.
1. Confronted by the absence of information on living conditions in South Africa, a delegation from the African National Congress and the Congress of South African Trade Unions asked the World Bank in 1992 to organize a national living standards survey that could be used to inform policy making in post-apartheid South Africa. The result was the Project for Statistics on Living Standards and Development (PLS LD) that interviewed a nationally representative sample of nearly 9000 households between September and December of 1993, approximately six months before the election of Nelson Mandela (see Project for Statistics on Living Standards & Development, 1994).

2. See the studies of Klassen (1997), Leibbrandt, Woolard, and Woolard (1997), and Moller and Jackson (1997). In addition, using several national surveys undertaken subsequent to the 1993 survey, Leibbrandt and Woolard (1999) calculate a suite of consumption-based poverty measures that confirm this racial distribution of poverty.

3. The phrase “one kind of freedom” comes from Ransom and Sutch’s (1977) poignant description of persistent poverty in the post-slavery US South. In the context of South Africa, the term “black” refers to the African, Indian and colored populations who suffered discrimination under apartheid.

4. Carter and Zimmerman (2000) analyze one type of model in which time works in exactly this way.

5. Formally,

$$J^*(A_0) \equiv \max_{\{c_t, l_t\}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \delta_t u(c_t) \right\},$$

where $\delta_t$ is the household’s discount factor, $(c_t, l_t)$ denote the intertemporal streams of household decisions, and the maximization confronts the constraints shown in the text above.

6. One way in which social relations pay off is by caring for household members in times of stress, as Zimmerman (1998) and others have discussed.

7. A more general representation of the borrowing constraint would indicate that the household’s money stocks (one element of $A_0$) cannot fall below some borrowing constraint.

8. Note that consistent with the literature, we are using a consumption standard to approximate utility or well-being. In empirical work, $\xi$ is often approximated by scaled per capita income or expenditure. In the empirical analysis to follow, we will scale total expenditures by the subsistence needs of the household.

9. Because it is defined in terms of expected utility, the dynamic poverty line $\underline{A}$ thus contains the desirable property that it is sensitive to the degree of transitory poverty risk that the household faces in the future.

10. For example, in the Zimmerman and Carter (2000) model, households face a shared or covariant shock (e.g., draught). The prices of productive assets will therefore tend to move with household income so that when income is low, asset prices also fall. In this circumstance, it is very hard for a household to manage risk by drawing down on stocks of the productive assets. In effect, they would constantly find themselves buying high and selling low in the asset market. For poor agents who are exposed to subsistence risk, their only viable strategy is to build up stocks of a buffer asset (e.g., grain stores) even though the rates of return on such stocks can be very low (grain stores deteriorate over time yielding a negative rate of return on savings invested in them).

11. Note that if households find it desirable and possible to fully smooth consumption over time by boosting present consumption with borrowings against future earnings, then households with assets above $\underline{A}$ would always be observed consuming above the poverty level.

12. Zimmerman and Carter’s (2000) follow Lipton (1993) and use the term Micawber Threshold (named after the character Wilkins Micawber, an apostle of Victorian savings virtue, in Charles Dickens David Copperfield) to evoke the idea that there may be depths of poverty from which cannot be eradicated even by a forward-looking willingness to sacrifice and save.

13. The Micawber Threshold could lie above the single-period asset poverty line if asset level $\underline{A}$ were smaller than the minimum asset threshold needed obtain high rates of return (under increasing returns to scale to assets) and if economic shocks made that asset position indefensible or unsustainable over the longer term such that household soon fell below the single-period poverty line.

14. Note that the value function is the expected value of a stream of utility under optimal accumulation. In a random world, any particular household may do better (or worse) than this expected value. It is thus possible
that some households who are dynamically poor according to (6) could actually escape poverty over a long enough time horizon if there is a non-zero probability of a large enough shock that would permit the household to choose optimally to build up an asset base greater than the Micawber Threshold. This statistical observation does not seem to be of any particular importance in a world of finitely lived individuals.

15. It might also include households that were structurally poor but above the Micawber Threshold who had not yet had enough time to accumulate assets in excess of the single-period asset poverty line.

16. The decision to reinterview only the KwaZulu-Natal subsample was based on financial and data quality limitations. The original PSLSD was not designed as a panel study, and it was only through fortuitous circumstances that records were available on the surveyed KwaZulu-Natal households that made reinterview feasible. See May, Carter, Haddad, and Maluccio (2000) for a more detailed discussion of methodology.

17. Klasen and Woolard (1999, p. 27) have shown serious deficiencies with South African official statistics on employment trends, and also draw attention to periods of job creation during the study period. Nonetheless, the general trend during period under review was that of job losses.

18. A household was defined as the set of people who lived in the dwelling for at least 15 days out of the year and shared food and other resources when co-resident in the dwelling. In addition, a “resident” household member was a person who additionally had lived in the dwelling at least 15 out of the 30 days prior to the survey.

19. The idea was to identify what might more conventionally be called heads of household. While the 1993 survey identified one such individual for each dwelling, analysis of this headship data revealed that the head was almost inevitably the oldest resident of the dwelling. While the decision-making power and social status of these individuals is doubtless real, the concern was that focusing solely on them would overlook other relevant household decision-makers. This concern is supported by Budlender’s (1999) analysis of the problems associated with the ‘head of household’ concept in South Africa.

20. As analyzed in some detail by Maluccio (2000), this pattern of attrition is consistent with what we know about survey quality problems in some Indian communities in 1993 and the bankruptcy of commercial farms that eliminated several poor farm worker communities.

21. It should again be stressed the KIDS sample is not fully representative of all 1998 black households in KwaZulu-Natal.

22. The Kolmogorov–Smirnov statistic rejects the hypothesis at the 0.1% level that the 1993 and 1998 samples were drawn from the same distribution, indicating a statistically significant shift in the expenditure distribution. The distribution free Kolmogorov–Smirnov test compares the empirical cumulative density functions for two distributions, asking if the largest difference that occurs between the two functions is so large that it is unlikely to have happened based on random draws from identical distribution.

23. This Gini is much more modest than the figures commonly reported for the South African economy as a whole because the KIDS sample excludes the white population.

24. Deaton (1997) suggests this estimation procedure. Using results provided in Silverman (1986), the optimal bandwidth was calculated on the assumption that wellbeing is log-normally distributed.

25. Letting \( f_{ij} \) be the observed frequency in cell \( i,j \) of the transition matrix and \( F_{ij} \) be the frequency predicted for that cell under the assumption of perfect mobility (or other homogeneous mobility model), then the statistic:

\[
L^2 = \sum_{i} \sum_{j} f_{ij} \ln\left(\frac{f_{ij}}{F_{ij}}\right)
\]

is distributed \( \chi^2 \) with \( (r - 1)^2 \) degrees of freedom where \( r \) is the number of rows in the transition matrix (Hout, 1983).

26. In general form, the log-linear model specifies the predicted probability of cell \( i,j \) as:

\[
\ln(F_{ij}) = \alpha_0 + \alpha_i + \alpha_j + \beta_{ij},
\]

where the \( \alpha \) and the \( \beta \) are parameters to be estimated subject to adding up restrictions. In Hout’s language, the \( \alpha_i \) is the row effect, \( \alpha_j \) is the column effect and the \( \beta \) are the cell-specific interaction effects. The perfect mobility model assumes that \( \beta_{ij} = 0 \forall i, j \).

27. Using the notation given in Note 26, the constrained perfect mobility model assumes that \( \beta_{ij} = 0 \forall i \neq j \) and that the main diagonal elements (\( \beta_{ii} \)) are all identical.

28. In the notation of Note 26, the Quasi-Diagonal model permits each \( \beta_{ij} \) of main and secondary diagonal
elements to be unique, restricting only the $\beta_{ij}$ for the diagonals $|i - j| > 2$ to be zero.

29. In the language of mobility analysis, we are using the estimates of the “saturated” model in which none of the $\beta_{ij}$ are restricted to be zero (see Note 26).

30. The stability of this group is partially an artifact of the fact that it is an open-ended category.

31. Explanatory variables used in the local regression analysis are educated labor, uneducated labor, rural/urban dummy variable, productive capital, transfer income, and number of adult equivalent consumers. See Cleveland, Devlin, and Eric Grosse (1988) for details on local regression methods.

32. Only when there was evidence of a permanent loss of the income stream was a shock considered an asset shock.

33. It also proved impossible to unambiguously identify any of the upward movers as households that were structurally poor in 1993 (by rejecting the hypothesis that they were non-poor) and structurally non-poor in 1998.

34. It may also be that these households have low levels of a latent asset and hence are genuinely structurally poor. Unfortunately, we have no way to disentangle these two alternative possibilities as they would both appear as a negative error in the livelihood regression both periods.

REFERENCES


Leibbrandt, M., Woolard, I., & Woolard, C. (1997). The contribution of income components to income inequal-