

## COVERSHEET

### *Income Mobility and Household Dynamics in South Africa*

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In this paper we study and analyse household income mobility dynamics among Africans in South Africa's most populous province between 1993 and 1998. Compared to industrialized and most developing countries, mobility has been quite high, as one would have expected after the transition in South Africa. This finding is also robust to various ways to control for measurement error. When disaggregating the sources of mobility, we find that demographic changes and employment changes account for a most of the mobility observed which is related to rapidly shifting household boundaries and a very volatile labour market in an environment of high unemployment. In a multivariate analysis, we see that transitory incomes play a large role. We also find three types of poverty traps, associated with large initial household size, poor initial education, and poor initial employment access.

*Key words* income mobility, poverty traps, South Africa

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## 1. Introduction

As an upper middle income country with a per capita GNP of \$3020 in 2000, South Africa fares extremely poorly on international comparisons of poverty and other social indicators (World Bank, 2001; Klasen, 2002). Much of this poor record is related to the apartheid legacy which also produced very high inequality in South Africa. South Africa's Gini coefficient of 0.60 is among the highest anywhere in the world (Klasen, 2002). Reducing poverty and inequality thus are obvious areas of concern for policy-makers in the post-apartheid governments.

A less discussed issue is that of inter-temporal income mobility – who is getting ahead, who is falling behind and who is standing still and why? Measuring the level of income mobility is complementary to measuring the level of income inequality in a given income distribution. Mobility and inequality are closely-related, but distinct, concepts. Inequality measures the dispersion of income in any given time period while mobility measures how individuals or households move within the distribution between two time periods. Income mobility studies are thus concerned with quantifying the movement of a *given* recipient unit (individual or household) from one point in the income distribution to another. This is of particular relevance in the South African context, as the post-apartheid government promised to reduce poverty and racial disparities and which implies that they were aiming in the process to increase mobility, with particular emphasis on enabling upward mobility of previously marginalized Africans (Government of South Africa, 1994). Policies that explicitly aimed at generating such upward mobility of Africans were affirmative action legislation, racial equalization and expansion of education spending, the expansion of a social safety net for Africans including the introduction of a child maintenance grant for the poor, greater labour market protection for low-skilled workers, a land reform programme for poor rural and a housing subsidy for poor urban dwellers, expansion of water supply, electricity, and other infrastructure to previously underserved areas, and a macroeconomic reform package that was to

deliver faster growth with redistribution.<sup>1</sup> To what extent these policies have succeeded so far and which groups of Africans appear to have benefited the most thus deserves close scrutiny.

Beside documenting and interpreting trends in income mobility, the sources of observed income mobility deserve closer inspection. In particular, the importance of two possible sources of mobility should be examined more closely. These we call demographic and economic events. The former refers to changes in the household size and composition, while the later refers to changes in incomes in that household. Among the economic events, we can further distinguish between a change in employment, changes in earnings of those who are employed, and changes in unearned incomes. Given the fluidity of household boundaries in South Africa that are affected by a variety of demographic changes as well as prevailing high unemployment, we expect demographic events and employment changes to play a significant role in accounting for mobility in South Africa (Case and Deaton, 1998; Klasen and Woolard, 2001).

This paper builds on a methodology developed in a literature that has primarily analysed earnings mobility. While some studies have looked at the dynamics of household income, these have often been focused on the dynamics of earnings of household members (see for example Lillard & Willis, 1978; Gottschalk, 1982) rather than total household income. Here this framework is applied to equivalised household incomes to measure the degree of mobility observed between 1993 and 1998 for African households in KwaZulu-Natal. This paper focuses on the 1003 African households in the KwaZulu-Natal Income Dynamics Study (KIDS) which collected follow-up data on households in KwaZulu-Natal that had previously formed part of the 1993 Project for Statistics on Living Standards and Development (PSLSD) survey.

Given that we only have two observations per household, measurement error might well influence our results. Consequently, we use a variety of procedures to test and,

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<sup>1</sup> See Klasen (2002) for a discussion of these policies.

to the extent possible, correct for measurement error and re-examine the robustness of our results. Our controls for measurement error do not necessarily provide unbiased estimates but will help us get a sense of the magnitude of possible biases and thus the robustness of results, a strategy suggested, among others, by Bound, Brown, and Mathiowetz (2001).

The next section (2) discusses the analytical issues which arise and Section 3 discusses the data-set. Section 4 presents data on the extent of mobility using several alternative measures, Section 5 disaggregates causes of upward and downward mobility in a univariate setting, while section 6 examines them in a multivariate analysis. Section 7 concludes.

## **2. Analytical Issues and Findings**

In the income mobility literature, one generally distinguishes between short-to medium-term mobility of the same households or individuals over time and inter-generational mobility examining the mobility of children vis-à-vis their parents (e.g. Piketty, 2001). Short-to medium-term mobility is then often further differentiated by examining year-on-year changes (short-term mobility) and medium-term mobility which typically compare two years further apart. Given the data we have at hand, a two-wave panel 5 years apart, we focus on medium-term mobility.

In contrast to the voluminous theoretical and applied income inequality literature, the literature on the measurement and interpretation of mobility is more limited and generally more ad hoc (Fields and Ok, 1999). Important distinctions are made between relative and absolute mobility. The former examines changes in rank of households between two periods and is thus mainly concerned with the ability of individuals to move up (and down) in the rankings of incomes while the latter examines absolute changes in income between two periods and thus is additionally concerned with changes in absolute well-being (and poverty). For these reasons, we will report on both in this paper with our regression analysis being focused on

absolute mobility as this conveys information on changes in rank as well as on the dynamics of poverty.

As far as measures of mobility is concerned, one first needs to distinguish between what Cowell and Schluter (1998) call single-stage and two-stage indices. Single-stage indices consider the entire distribution in both years and examine mobility using that entire distribution, while two-stage indices first allocate individuals to income groups (either exogenously fixed income groups or endogenously determine ones like quintiles) and then examines mobility between these groups. Examples of single-stage indices are the correlation coefficient of incomes between two periods, Shorrocks's rigidity index, Fields's and Ok's measures, and King's measure (Fields, 2001; Cowell and Schluter, 1998).<sup>2</sup> They have the advantage of using all available information inherent in the actual distributions and thus give the most comprehensive assessment of mobility. They have the disadvantage, however, of being particularly sensitive to measurement error which is a particular problem when data from only two waves are available, as it happens to be in our case. The one index which, in simulation studies, was least sensitive is Shorrocks's rigidity index using the Gini coefficient (Cowell and Schluter, 1998) which compares the Gini of the average income between the periods with the weighted average of the Gini in each period. It is defined as:

$$R = \frac{G(x, y)}{(\bar{x} G_x + \bar{y} G_y) / (\bar{x} + \bar{y})}$$

where  $G(x)$  refers to the Gini in the first period and  $\bar{x}$  to mean income. We will use this measure, also to compare our results with other studies.

Regarding two-stage indices, the most commonly used measure is the transition matrix and indices derived from it. For a transition matrix, the matrix is divided into  $n$  equally sized income classes (e.g. deciles or quintiles) which are

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<sup>2</sup> For a careful discussion of the axiomatics of these measures and their inter-relationships, see Fields and Ok (1999) and Fields (2001).

endogenously determined by the data for each year. Let  $P$  be a matrix of  $n \times n$  transitions, the  $ij$ -th element of which,  $P_{ij}$ , is the percentage in the income class  $i$  at time  $t_0$  of those who at time  $t_1$  were in class  $j$ . The units which transitioned from one income class to another ( $i \neq j$ ) between time  $t_0$  and time  $t_1$  I will refer to as "mobiles". Those who remain in their original income class will be called "immobiles". Mobiles who experienced a positive change in relative well-being ( $i < j$ ) will be referred to as "winners" as opposed to "losers" ( $i > j$ ).

While sometimes the brackets of a transition matrix are exogenously fixed income classes, the more common method are endogenously determined income groups based on quantiles of the distribution in a given year (such as quintiles or deciles). The advantage of the transition matrix is that it can nicely summarize mobility at various points in the distribution which is harder to gauge from a single index. Also, it turns out to be more robust to measurement error (Cowell and Schluter, 1998). These are serious costs as well, including the disregard of important information, such as income changes within a bracket and the different absolute income changes that underlie a change in income bracket (Fields and Ok, 1999). This last point can be important also in international comparisons of mobility. In a country with low inequality, the same transition matrix may mean much smaller changes in absolute income levels compared to a country with very high inequality. To the extent, one wants to capture these absolute changes as well, a transition matrix may not be the right tool. Despite these problems, the advantages of the transition matrices are considerable and we will thus use them, again also for international comparisons.

The choice of income groups in these transition matrices is largely arbitrary and, in general, tends to take the form prevalent in the literature to allow for the comparison of results. The most popular choices seem to be quintiles and deciles. Nevertheless, the choice of groups influences the results. The smaller (in terms of income range) the brackets, the more likely that people will move between brackets and thus mobility will appear larger. Thus using deciles usually will generate higher perceived mobility than quintiles. Here we selected quintiles rather than deciles because the data-set is quite small.

Lastly, there is the question of the appropriate income concept for mobility analyses, in particular the choice between incomes and expenditures. The case for incomes is that this is the only way one can analyse sources of mobility (particularly distinguish between demographic and economic events), which is an important part of our analysis here. Moreover, in some contexts income might actually be more accurately reported than expenditures or the latter is not readily available (Fields, Cichello, Freije, Menendez, and Newhouse (2001) and Glewwe, Gragnolati and Zaman (forthcoming)). On the other hand, expenditures are typically a better guide to longer-term well-being of the household (or its 'permanent income'), as household will exercise some consumption smoothing and use savings and dissavings to deal with erratic incomes (Deaton, 1997). If we are interested in mobility in these longer-term incomes, expenditures are clearly preferred. Moreover, expenditures might be more accurately captured, particularly among the poor who have relatively constant and well-known expenditures on relatively few items while their incomes can be very erratic and unpredictable (Ravallion, 1992, Deaton, 1997, Klasen, 2000). We have access to income and expenditure data and will use both, thereby also pointing to the differences between them which gives some indication on the importance of transitory income shocks as well as measurement error issues.

On the substantive findings from the mobility literature, most of the literature is concentrated on industrialized countries. Important findings from the literature are that (male) labour income mobility is generally lower than household income mobility which might be due to the impact of demographic events as well as the particular impact of high female earnings mobility on household incomes (Jarvis and Jenkins, 1998; Fabig, 2000; Burkhauser and Poupore, 1997). Also, and somewhat surprisingly, labour income mobility in the US is smaller than in Germany with Britain being in-between (Jarvis and Jenkins, 1998; Fabig, 2000; Burkhauser and Poupore, 1997).

The literature also suggests that there may be negative relationship between income inequality and income mobility. For example, in the United States (a country with high levels of inequality) the increase in income inequality during the 1980s and 1990s was accompanied by low income mobility (Burkhauser and Poupore, 1996), while Sweden, Norway and Denmark (which have much lower income inequality than

the United States) experienced greater income mobility over the same period (Aaberge, Bjorklund, Janti, Palme, Pedersen, Smith and Wennemo, 1996). Also, rising inequality in Sweden over the past 20 years appears to be correlated with lower income mobility during the same time period (Eriksson and Pettersson, 2000). Research on the income distribution in Britain (Jarvis and Jenkins 1998) indicates that the slow decline in income inequality since the 1980s has been accompanied by moderately high levels of mobility. Cantó (2000) illustrates that this has also been the experience of Spain: while income inequality in Spain was declining in the 1980s, mobility was increasing.

There are few studies on income mobility in developing countries and even fewer that are roughly comparable. This is largely due to the paucity of panel data from developing countries. Some short-term panels exist, such as in Cote d'Ivoire, but it is unclear to what extent observed mobility is simply due to measurement error (Deaton, 1997).

Generally, these studies suggest that income mobility in developing countries is somewhat higher than in industrialized countries, particularly at the bottom end of the distribution. They also seem to suggest increasing mobility over time in most places. Panel data from Peru based on expenditures points to increased mobility in the 1990s (Fields, 2001). Data from rural China point towards rapidly increasing mobility from a very low levels in the 1980s (Nee, 1994). These studies as well as studies from Chile and Malaysia suggest that changes in employment and the demographic composition of the household play a large role in explaining existing mobility and in distinguishing between the transient and the chronic poor (Fields, 2001).

There is one study by Carter and May (2001) that examine mobility dynamics in South Africa using the same data set. Their focus is movements in and out of poverty in relation to the asset base of the poor, asset and entitlement shocks. They exclusively rely on expenditure data and use transition matrices with exogenously fixed boundaries. They find considerable mobility between 1993 and 1998 and



attempt to distinguish between structural and stochastic causes for this mobility.<sup>3</sup> Our study differs substantially from their very interesting approach in our focus on overall income mobility (not just movements in and out of poverty), the disaggregation of mobility into demographic and economic events, the use of income *and* expenditure information, and the thorough analysis of measurement error issues.

### 3. Data and Measurement Issues

The sample data used in this chapter consist of the 1003 African households in KwaZulu-Natal (KZN) that were interviewed in both the 1993 PSLSD and 1998 KIDS surveys.<sup>4</sup> KwaZulu-Natal is South Africa's most populous of the nine provinces, containing about 20% of South Africa's population. It also contains much of the social and racial stratification present in all of South Africa. In particular, the province includes a wealthy metropolitan area (Durban) with poor shantytowns surrounding it, a poor and largely rural former homeland (KwaZulu) with high levels of unemployment and poverty, and poverty as well as inequality within the province appear to be relatively similar to the national level (Leibbrandt and Woolard, 1999). As Table 1 shows that Africans in KZN are comparable to Africans elsewhere, although the share coming from former homelands is higher, as is the unemployment rate and the poverty rate in 1993. The table also shows that Africans in 1993 were doing much worse than the minority of other races (the total mean income is much

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<sup>3</sup> Structurally poor are people whose predicted incomes are below the poverty line while stochastically poor are people whose predicted incomes are above the poverty line but who experienced a negative stochastic shock. It is unclear to what extent one can distinguish these stochastic elements from measurement error problems. Also, by relying exclusively on expenditures, they do not address the problems and issues of inconsistency between expenditures and incomes in the two years (see below).

<sup>4</sup> Sample attrition between the two periods is surprisingly low. 85% of Africans in rural areas, and 90% of Africans in urban areas who had participated in 1993 could be re-interviewed in 1998, despite the fact that the survey was not originally designed as a panel. Two types of attrition took place: Households who were known to have moved away (40%) and households for which there was no information (60%). Maluccio, Thomas, and Haddad, (1999) show that the former do not differ from substantially from the sample that was traced while the latter had lower per capita expenditure in the first period than the sample that was traced. It is a priori unclear to what extent this might bias mobility estimates. Given the very low overall attrition, the bias should not be very large.

higher than the African mean income) and that income poverty fell for Africans by some 14 percentage points as mean income rose considerably.<sup>5</sup>

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<sup>5</sup> Using expenditure data, poverty is believed to have risen (see below and Carter and May, 2001).

**Table 1: Comparisons of Sample with Africans and all races in South Africa**

	1993-Africans in KZN	1993-Africans	1993- all races	1998- Africans in KZN
% Households in urban areas	32.0	37.1	53.0	27.8
% Household in (former) homelands	84.9	56.1	40.1	87.1
Unemployment Rate	45.2	38.2	29.8	60.6
Poverty Rate (income)*	58.8	44.0	32.9	45.6
Mean adult equivalent income	287.54	392.07	823.72	433.70
Mean adult equivalent expenditure	352.72	401.55	719.80	285.34

\*: poverty rate is based on R212 per adult equivalent in 1993 Rands.

Our unit of analysis is the household and the income variable used is disposable equivalized net income using the following formula for dealing with economies of scale and adult equivalence:

$$\text{Adult equivalent income} = \frac{\text{Household income}}{(\text{Adults} + 0.5 \text{ children})^{0.9}}$$

The expenditure variable uses the same adult equivalence procedure. Both the expenditure and income variable used imputations either for missing data or for items where there is only an implied income stream, particularly the income stream one derives from living in one's own home (or living rent free in someone else's home). In the case of housing, these income streams were imputed and added both on the expenditure side as well as on the income side. They make up 4% of expenditures and 7% of incomes in 1993 and 13% of expenditures and 15.4% of incomes in 1998. This rising share of imputations is somewhat worrying as it is unclear that the value of housing or the quality of housing stock rose that much in these five years. In addition, on the income side, quite a few missing income components were imputed, often using regression-based methods.<sup>6</sup>

Almost two-thirds (63%) of the sample reported that household income had increased over the period, while only 39% reported an increase in expenditures. Median monthly income (in 1998 Rands) increased from R990 to R1270 over the five-year period, while median monthly expenditures fell from R1470 to R1220. While some

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<sup>6</sup> They make up another 3% of income in 1998 and 1% of expenditures.

of this discrepancy can be real and relates to the timing of the survey, changes in perceptions of permanent incomes (and thus expenditures) and the large role of transitory incomes, this large discrepancy in levels and trends raises some questions about the data.<sup>7</sup>

These discrepancies could also indicate that measurement error is significant. To address the issue of measurement error we use the following procedures:

- a) We replicate all of our analyses using incomes and expenditures to see to what extent the results differ. Given the large discrepancy between incomes and expenditures, this procedure alone should provide some bound on possible measurement error.
- b) We purge the 1993 and 1998 labour income data by specifying an earnings regressions of hourly earnings on gender, location, industry, age, age square, education and throwing out all observations that are outside two standard deviations from the point estimate of this earnings regression. The earnings regressions have a good fit (adjusted R-Squares around 0.5) and confirm the usual findings from the human capital literature (regressions available on request). Using this procedure, we end up eliminating about 5% of observations.
- c) We use an instrumental variable approach to measurement error. Using a regression of household adult equivalent income (and expenditure) on household size, demographic structure, average education, age of household head, female headship, location, land and other asset ownership, and the employment and

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<sup>7</sup> There is reason to believe that the expenditure figures in 1998 are somewhat understated and the than the income figures in 1993 were similarly understated which can contribute to this converse movement in these aggregates. In particular, the 1998 income and expenditure figures seem to tally very well, while the 1993 figures do not. In 1993 expenditures exceeded incomes by more then 20% in 40% of households, which seems too high even in the face of income smoothing and suggests that incomes were not completely listed. Similarly, in 1998 the list of expenditure items solicited in the questionnaire was reduced and media and mean food spending is reported to have declined by nearly 40% between 1993 and 1998 which seems unlikely given the high poverty and large food shares of households. Thus understated incomes in 1993 may mean that income growth was smaller than reported and understated expenditures might mean that expenditure decline was smaller so that the two trends at least converge. All the more is it important to address issues of measurement error.

unemployment situation of adults, we predict household incomes in 1993 and 1998 and assess our mobility using these predicted incomes. Clearly, we are thereby throwing away quite a lot of true mobility that would not be captured by these regressions but this approach should give us sense of the maximum extent to which our measurement error affects incomes or expenditures.<sup>8</sup>

- d) We eliminate the imputed parts of the income and expenditure aggregate and then perform our analysis on the sample without imputations on the presumption that imputations might be bringing in a fair amount of measurement error (Jarvis and Jenkins, 1998).<sup>9</sup>

#### **4 The extent of household income mobility 1993-1998**

We begin by reporting Shorrocks's rigidity index using the Gini coefficient for our various income concepts to get a feel for the data and the changes over time. The Ginis for the two years are presented as well as those for the average income and the rigidity index which is calculated using the formula above. Several items in the table are noteworthy. First, there is a considerable difference between inequality when using income or expenditures. The expenditure Gini is much lower than the income Gini. This is to be expected as consumption smoothing makes expenditure less erratic and thus less unequal and as recall error among respondents tends to be inequality-reducing when it comes to expenditures (the poor report it well, the rich forget items) while recall error is inequality-enhancing when it comes to incomes (the rich tend to have more stable and predictable incomes than the poor whose income is more erratic and therefore often tends to be understated, e.g. Bound et al. 2001, Deaton, 1997). The two measures do agree, however, on rising inequality among Africans between 1993 and 1998 which is to be expected given that the educated and upwardly mobile

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<sup>8</sup> Carter and May (2001) interpreted these differences between predicted and actual incomes (in a slightly different regression framework using expenditures) in their entirety as stochastic elements of income that can make households stochastically poor or non-poor.

<sup>9</sup> In particular, we drop observations with imputed incomes and subtract imputed housing services from both expenditures and incomes but retain these observations without the imputations. Please note that we use this procedure in addition to purging outliers based on the wage regressions.

Africans are likely to benefit more quickly from the end of race-based restrictions (and affirmative action) than poor and educated rural dwellers (Klasen, 2002; Carter and May, 2001).

Second, the rigidity index for incomes and expenditures indicates a fairly high degree of mobility, when compared to mature industrialized countries where the rigidity index is usually around 0.95 or above countries such as the US, Britain, Germany, or Sweden (e.g. Jenkins and Jarvis, 1998; Eriksson and Pettersson, 2000). It is closer to countries undergoing rapidly structural change such as Spain, where it was estimated to be around 0.9 on a comparable basis (Cantó 2000).

Third, while the various adjustments for presumed measurement error do affect the Gini coefficients considerably, particularly in the case of leaving out imputations for the income Gini and using predicted incomes for both income and expenditure Gini, the rigidity index is scarcely affected by any of these adjustments, particularly on the income side. It is somewhat more affected on the expenditure side, but also here only the predicted expenditures really have a significant effect. This seems to suggest that to the extent there is measurement error in the data, it seems to be positively correlated across time and thus only has a muted impact on mobility, which was also, for example, found for longitudinal earnings data in the US (Bound and Krueger, 1991; Bound et al., 1994).

Lastly, despite large differences in inequality between incomes and expenditures, the rigidity index is quite similar, although somewhat lower for expenditures. Thus in the five years between 1993 and 1998, incomes and expenditures experienced the same, relatively high mobility pattern.<sup>10</sup>

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<sup>10</sup> One may wonder how this is consistent with the lower Gini reported for expenditures in each year and the presumption that consumption smoothing makes expenditures less erratic and unequal. It may be the case that over the medium term horizon of five years, (presumed) permanent incomes have changed as much or as or possibly even more than actual incomes and thus are reflected in the relatively high mobility in expenditures.

**Table 2: Rigidity Index using the Gini Coefficient and Various Income Definitions**

		1993 Gini	1998 Gini	Average Y Gini	Rigidity Index
Incomes	Unpurged	0,488	0,547	0,470	0,897
	Purged	0,490	0,546	0,470	0,898
	W/out Imputations	0,498	0,581	0,489	0,896
	Predicted	0,414	0,398	0,367	0,907
Expenditures	Unpurged	0,320	0,375	0,300	0,868
	Purged	0,319	0,375	0,300	0,868
	W/out Imputations	0,312	0,365	0,287	0,857
	Predicted	0,233	0,255	0,218	0,896

Note: The purged data refer to the income and expenditure data where labour income was outside of two standard deviations from predictions based on a wage regression. Without imputations drops implied income and expenditure streams associated with housing and drops observation where other incomes were imputed. Predicted is based on the household income (expenditure) regression.

While these statistics already tell us quite a lot, we want to unpack mobility beyond this one measure and thus turn to transition matrices for a more disaggregated look.

The quintile mobility matrix below (Table 3) shows the distribution of households by quintile for 1993 and 1998. (Quintiles are numbered from 1 for poorest to 5 for richest.) It can be seen that 56% of households who were in the richest quintile in 1993 remained there in 1998 and another 23% moved down just one quintile. Likewise, 34% of those who began in the poorest quintile were still there 5 years later and another 25.5% had moved up just one quintile. It is immediately evident that there is less mobility in the top and bottom quintile than in the middle of the distribution. This is, however, unsurprising given that the bottom (top) quintile can only stay in the same quintile or move up (down); also, the income brackets that make up the quintile is much larger for the richest quintile where the right-hand tail is particularly large which is the reason why persistence in that group is particularly high.<sup>11</sup> While the Also these figures suggest quite a high degree of income mobility among Africans in KwaZulu-Natal, certainly higher than that observed in most industrialized countries (e.g. Jarvis and Jenkins, 1997), but also higher than in rural China between 1978 and 1983, Malaysia between 1967 and 1976, and Peru in the

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<sup>11</sup> While in the lower four quintiles, the income brackets cover a range of 90-400 Rands in adult equivalent incomes, the top quintile ranges from 792 to 11300 Rands. Clearly, it is harder to leave this much larger bracket than the lower ones.

1980s and 1990s (Fields, 2001). It is quite similar, however, to rural China between 1983 and 1989 although the structure of mobility appears to be somewhat different.<sup>12</sup>

When purging the data of outliers based on our earnings regressions, we get more persistence and very large movements between income groups, particularly downward movements, are now reduced. For example, there are now fewer households that jumped up but particularly down two, three, or even four quintiles. As a result, we get quite a lot more persistence, particularly in the top quintile where the data now look more similar to industrialized countries. At the bottom, however, mobility continues to be much higher than in industrialized countries.

**Table 3 Quintile mobility matrix for African households in KwaZulu-Natal, 1993-1998**

**a) Using raw data**

	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	34.00	25.50	16.50	15.50	8.50	100.0
2	32.50	26.00	23.00	12.00	6.50	100.0
3	17.50	25.00	28.00	20.00	9.50	100.0
4	10.00	18.00	23.00	29.50	19.50	100.0
5	6.00	5.50	9.50	23.00	56.00	100.0

*Source: own calculations on PSLSD/KIDS data*

**b) Using data purged by outliers from wage regressions**

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<sup>12</sup> In rural China, (downward) mobility from the top quintile is higher than in South Africa. This may be due to the fact that overall income inequality among rural areas was much lower to begin with so that the income change required to change income bracket is smaller than in South Africa.



	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	37.44	28.44	18.01	11.85	4.27	100.0
2	31.90	27.62	25.71	13.33	1.43	100.0
3	19.05	26.19	27.62	22.38	4.76	100.0
4	10.00	16.19	24.76	37.62	11.43	100.0
5	1.90	1.43	3.81	14.76	78.10	100.0

*Source: own calculations on PSLSD/KIDS data*

When using expenditures, incomes without imputations, and predicted incomes or expenditures (see appendix for transition matrices), the general impression of high mobility is not changed considerably. In particular, the mobility matrix based on expenditures is quite similar to the (raw) income mobility matrix. There are, however, some differences in the extent of estimated mobility. The *predicted* income and expenditures based on our instruments show, not surprisingly, less mobility, particularly at the bottom of the distribution as the underlying household characteristics have not changed so much over the intervening five years. But this adjustment clearly exaggerates the extent of measurement error as any stochastic element in income determination is now eliminated although a good part of this stochastic variation is likely to be real rather than simply due to measurement error.<sup>13</sup> Thus the high mobility observed appears to be real rather than simply a result of measurement error.

## 5 The determinants of welfare changes

An individual's well-being is a function of the total income of the household in which he/she resides and the demographic composition of that household, that is, individual welfare is taken to be total household income divided by the number of adult

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<sup>13</sup> Carter and May (2001) assume that the stochastic variation of expenditures is all real which is seems equally implausible as some measurement error is likely to play a role. Conversely, the transition matrix without imputations suggests the highest mobility of all estimates including considerable mobility across two, three, or even four quintiles, but here it is equally unclear whether this might be due to additional measurement error introduced by subtracting the housing income imputations.

equivalents. Therefore changes in an individual's well-being arise through changes in money income (of one's own or other household members, via the numerator) which we call economic events and/or changes in household composition (via the denominator) which we refer to as demographic events. This distinction between welfare changes as the result of *economic events* and *demographic events* is often not considered but is of considerable relevance also from a policy point of view. The economic events can be further broken down into economic events that relate to changes in income sources (e.g. through a changes in employment status, changes in sources of non-labour income) and changes in existing income sources.

Table 4 considers which is the biggest contributing “event” associated with a movement into poverty (where poverty is defined as having income of less than R212 per adult equivalent per month in 1993 terms<sup>14</sup>). First, it is determined whether the change in adult equivalent income was the result of a demographic event or an economic event by looking at the percentage change in the numerator and denominator between 1993 and 1998. Clearly, there may be cases where, for instance, income fell *and* household size increased – in these cases only the bigger of the two effects is recorded.

Table 4 shows that more than one-quarter of households that moved into poverty did so because of a change in demographic composition rather than because of a fall in income. However, the majority of households became poor because of a fall in income. For these households it is then determined what type of income event had the greatest (absolute) impact on household earnings. For nearly half of the households those income changes are associated with job-loss. However, a significant number of households fell into poverty because of a decline in remittance income, non-labour earnings (usually the loss of a state pension or grant), a change in earnings, or small-scale agriculture.

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<sup>14</sup> This is a relative poverty line that is chosen so as to make the poorest 40% of households “poor” in 1993.

**Table 4** Main event associated with the movement of a household *into* poverty

	% of households
Fall in money income as result of:	
<i>Demographic events</i>	28.7%
<i>Income event, change in income from :</i>	
Head losing job	18.6%
Fall in head's labour earnings	7.0%
Other family member losing job	15.5%
Fall in other household members' labour earnings	4.7%
Fall in remittances	9.3%
Fall in non-labour income of head/spouse	5.4%
Fall in non-labour income of other household members	0.8%
Fall in self-employment income	4.7%
Fall in farm income	5.4%
Total	100.0%
Observations	129

*Source: own calculations on PSLSD/KIDS data.*

Table 5 studies the type of events associated with a movement out of poverty. One-fifth of households escaped poverty as a result of shedding household members. However, as in the case of movements into poverty, labour market activities were the most common reason for a significant change in household well-being. Again, getting a job is much more important than changes in earnings for movements out of poverty. A significant proportion of households moved out of poverty because of an increase in state support or other non-labour income.

Altogether, demographic events and employment changes account for more than 60% of mobility into poverty, and over 50% out of poverty. Clearly, rapidly shifting household dynamics and employment changes in a situation of mass unemployment are the biggest determinants of mobility in this economy. These assignments hardly change when purging the data of outliers and change only slightly when imputations are taken out (not shown here). In the latter case, the importance of demographic and

employment events rises even further, to 63% of movements into, and 55% of movements out of poverty.

**Table 5** Main event associated with the movement of a household *out of poverty*

	% of households
Rise in money income as result of:	
<i>Demographic events</i>	19.3%
<i>Income event, change in income from :</i>	
Head getting a job	14.4%
Increase in head's labour earnings	5.4%
Other household member getting a job	17.0%
Increase in other household members' labour earnings	9.0%
Increase in remittances	9.4%
Increase in non-labour income of head/spouse	7.6%
Increase in non-labour income of other household members	3.6%
Increase in self-employment income	9.9%
Increase in farm income	4.5%
Total	100.0%
Observations	223

*Source: own calculations on PSLSD/KIDS data.*

Given the importance of demographic and employment changes on movements into and out of poverty, one can look at absolute changes in income more generally in response to demographic and employment events. To reduce false reporting resulting from minor measurement error and to focus only significant income changes, a household is only considered to have “got ahead” (“fallen behind”) if household adult equivalent income increased (decreased) by at least 10% in real terms over the period. The tables that follow consider some of the demographic and labor market covariates of these absolute income changes.

Table 6 looks at the absolute income mobility of households by the change in household size. Very few households (20%) remained the same size and half of the households grew or shrank by two or more persons. Not surprisingly, households that

grew were the least likely to get ahead since the additional persons were usually children who increase household size without bringing any additional income into the household. Households that lost members were generally better off than before, although in some cases the loss of economically active members resulted in a reduction in household income. But also a significant portion of household who added members were able to move ahead, as it clearly depends on what type of members they added (workers or dependents, see below and Klasen and Woolard, 2001).

**Table 6 Absolute change in real adult equivalent income by change in household size**

	Change in household size				
	lost 2 or more persons	Lost 1 person	no change	gained 1 person	gained 2 or more persons
Number of observations	222	112	191	179	256
Got ahead	69.4	65.2	56.5	49.7	46.1
No change in income*	5.0	5.4	15.2	6.7	6.3
Fell behind	25.6	29.5	28.3	43.6	47.7

\* refers to households whose (inflation-adjusted) income in 1998 was within 10% of their 1993 income

*Source: own calculations on PSLSD/KIDS data.*

Table 7 shows that households headed by a person over the age of 60 were the least likely to have experienced a loss of income; in fact, more than three-fifths of these households "got ahead". The households are heavily reliant on state support which is not only a secure form of income, but has increased appreciably in real terms since 1993. Households with a head in his/her 40s were the most likely to have experienced a fall in income, largely related to worsening employment prospects. Among younger people, the picture is somewhat brighter. While poor employment prospects worsened incomes, improved earnings due to higher education and more opportunities for Africans post-apartheid might have off-set this.

It is also interesting to note that female-headed households had a higher propensity to move ahead than male-headed households (table not shown). This is probably mostly

due to the better prospects for elderly households which are often headed by female pensioners.

**Table 7 Absolute change in real adult equivalent income by age of household head in 1993**

	Age of household head					
	<30	30-39	40-49	50-59	60-69	70+
Number of observations	46	167	227	200	207	113
Got ahead	47.83	57.49	45.81	62.00	60.87	61.95
No change in income*	13.04	4.71	8.31	6.50	8.21	9.71
Fell behind	39.13	37.72	45.81	31.50	30.92	28.32

\* refers to households whose (inflation-adjusted) income in 1998 was within 10% of their 1993 income

*Source: own calculations on PSLSD/KIDS data.*

Not surprisingly, households where additional people obtained employment were the most likely to experience upward income mobility (Table 8). Nevertheless, some households that gained workers actually experienced a decline in adult equivalent income. Many of these households experienced an increase in household size which more than compensated for the additional wage income (see Klasen and Woolard, 2001).

**Table 8 Absolute change in real adult equivalent income by change in number of employed**

	Change in the number of employed persons in the household				
	lost 2 or more jobs	lost 1 job	no change	gained 1 job	gained 2 or more jobs
Number of observations	76	177	430	193	84
Got ahead	30.3	44.6	54.7	71.5	79.8
No change in income*	6.6	7.3	9.8	5.7	3.6
Fell behind	63.2	48.0	35.6	22.8	16.7

\* refers to households whose (inflation-adjusted) income in 1998 was within 10% of their 1993 income

*Source: own calculations on PSLSD/KIDS data.*

Table 9 looks at the impact of a change in the number of unemployed household members. Clearly, this is related to the change in the number of employed, but also relates to changes in household membership and to movements in and out of the state of being economically inactive. Table 9 indicates that shedding unemployed members (through them finding jobs, dying or moving to other households) was a strong indicator of “getting ahead”. Interestingly, an increase in the number of unemployed members resulted in roughly similar numbers of households getting ahead as falling behind. Many households that gained workers also gained unemployed members, either through new unemployed members attaching themselves to the household or through encouraging previously inactive household members to seek work (Klasen and Woolard, 2001).

**Table 9 Absolute change in adult equivalent income by change in number of unemployed**

	Change in the number of unemployed persons in the household				
	2 less unemployed	1 less unemployed	no change	gained 1 unemployed	gained 2 or more unemployed
Number of observations	100	160	340	2078	152
Got ahead	78.00	66.25	54.41	50.24	45.10
No change in income*	3.00	7.50	9.12	8.2	7.17
Fell behind	19.00	26.25	36.47	41.55	47.71

\* refers to households whose (inflation-adjusted) income in 1998 was within 10% of their 1993 income

*Source: own calculations on PSLSD/KIDS data.*

Also here, we use our different income definitions and corrections for measurement error to see to what extent they drive the results (not shown here). It turns out that all the univariate relations discussed above remain qualitatively and roughly even quantitatively the same when we use our various controls for measurement error. The one difference is that the relationship between age of household head and changes in employment and mobility is weaker (although qualitatively the same) when expenditures are used. This might suggest that the elderly and those households that have increased the number of workers see the higher incomes as temporary and thus

have not adjusted their expenditures to the full extent of their changes in incomes (see below). But altogether, these relations appear to be robust to various different ways to control for measurement error.

This section has shown that demographic events, particularly changes in household size, as well as changes in employment status are the predominant influences on mobility for Africans in post-apartheid South Africa. Given high unemployment and thus great labour market uncertainty for many workers and rapidly shifting household boundaries to cope with these uncertainties, it is therefore not surprising that mobility in South Africa has been fairly high.

The univariate analyses show that household did best if they were headed by an elderly, increased the number of workers, reduced the number of unemployment, and shed other household members. Given the correlation between these different factors, it is unclear which of these factors are just proxying for one another and which ones hold up in a multivariate setting. It is to this multivariate analysis to which we now turn.

## **6. Modelling Determinants of Welfare Change**

In this section, we attempt to identify the factors which influence whether a household gained or lost over the five year period between the first and second wave of the household survey.<sup>15</sup> The model that is proposed is derived directly from the standard household utility maximization model with adult equivalent household income as a money metric measure of utility. The underlying assumption of this model is that household income is a function of household assets (both physical and human) and the economic environment in which these assets can be utilized to generate income. In addition, the well-being of individual household members will depend additionally on the number of people who have to share these assets and the incomes derived from them.

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<sup>15</sup> For a similar type of analysis for Cote d'Ivoire, see Grootaert and Kanbur (1990, 1995).



Consequently, the dependent variable in our model is change in the real adult equivalent household income between 1993 and 1998.

A model of the following form was used:

$$\ln\left(\frac{E_i}{AE_i}\right) = f(A_i, R_i)$$

where  $E_i$  = real income of household  $i$

$AE_i$  = number of "adult equivalent" household members in household  $i$

$A_i$  = physical and human assets of household  $i$

$R_i$  = a set of characteristics which summarize the economic and demographic environment in which  $i$  operates.

The regression was estimated separately for urban and rural households and allowed for further segmentation through the use of dummy variables for the gender of the household head and regional dummies for homeland/non-homeland households. In the urban regression we also include a dummy for the Durban metropolitan area.

Originally the model included income composition variables as proxies for a household's ability to respond to economic change since it has been argued that a diversified income base helps reduce household vulnerability to shocks (May *et al.*, 1995). Since none of the variables were significant, they were dropped from the model. It was also attempted to include "shock" variables identified by the household – such as the occurrence of a fire, crop loss or death – but none of these were significant.

Finally, the first-difference variables include changes in human assets as well as demographic composition and employment changes as they might reasonably be seen as exogenous to the dependent variable.<sup>16</sup>

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<sup>16</sup> We did not include changes in physical assets in the regression which are likely to be endogenous.

Table 10 summarizes the explanatory variables and shows their means and standard deviations. In the case of "initial conditions" variables, the figures pertain to 1993, while the change variables were calculated by subtracting 1993 values from 1998 values.

**Table 10 Mean and standard deviation of variables used in model**

	Urban households		Rural households	
	Mean	Std dev.	Mean	Std dev.
<b>Income variables</b>				
Change in ln (adult equivalent income)	0.40	1.06	0.25	1.17
Ln Adult equivalent income 1993	5.68	1.01	4.99	0.95
<b>Human Capital variables</b>				
Household Size	6.13	3.65	8.03	4.10
Share of children in household	0.31	0.22	0.40	0.21
Share of female adults (under 60) in household*	0.29	0.19	0.29	0.17
Share of male adults (under 65) in household*	0.35	0.29	0.25	0.18
Share of elderly in household	0.05	0.11	0.06	0.11
Average years of education of those not in school	5.84	2.63	3.66	2.65
Age of household head	49.79	14.2	52.53	14.54
<b>Segmentation variables</b>				
Female headed households (1=female headed, 0 otherwise)	0.35	0.48	0.33	0.47
Homeland (1=former KwaZulu, 0 otherwise)	0.79	0.41	0.90	0.30
Durban Metropolitan Areas (1=yes, 0=no)	0.35	0.48		
<b>Physical capital variables</b>				
Home owner (1=home-owner, 0 otherwise)	0.71	0.46	0.90	0.30
Number of durables owned by household	4.20	2.80	3.02	2.29
Grazing or farming rights (1=rights, 0 otherwise)	0.02	0.12	0.58	0.49
<b>Labour market variables</b>				
Share of persons in household with jobs	0.40	0.32	0.26	0.31
Share of unemployed persons in household	0.25	0.29	0.19	0.24
<b>Change variables between 1993 and 1998</b>				
Change in Household Size	-0.132	2.48	-0.97	3.40
Change in the share of children in household	-0.006	0.21	0.124	0.22
Change in the share of female adults in household	0.024	0.20	-0.092	0.18
Change in the share of male adults in household	-0.036	0.19	-0.034	0.20
Change in the share of elderly in household	0.018	0.11	0.031	0.14
Change in the average years of education	0.65	2.47	0.49	2.34
Change in share of persons in household with jobs	-0.112	0.33	-0.074	0.28
Change in share of unemployed persons in household	-0.041	0.37	0.012	0.29
<b>N</b>	266		672	

*Source: own calculations on PSLSD/KIDS data . \*We choose different cut-offs for male and female elderly as the eligibility for the fairly generous non-contributory pensions follow these age cut-offs.*

**Table 11 Determinants of change in ln (adult equivalent income)**

	Urban households		Rural households	
Adjusted R <sup>2</sup>	0.68		0.55	
Number of observations	266		672	
	Coefficient	Std error	Coefficient	Std error
<b>Intercept</b>	<b>4.15***</b>	0.76	<b>4.95***</b>	0.56
<b>Income variable</b>				
ln (adult equivalent income 1993)	<b>-0.87***</b>	0.06	<b>-0.94***</b>	0.04
<b>Human Capital variables</b>				
Household Size	<b>-0.03**</b>	0.02	<b>-0.01*</b>	0.01
Share of children in household	-0.56	0.51	<b>-1.58***</b>	0.35
Share of female adults (under 60) in household*	0.12	0.48	<b>-1.52***</b>	0.34
Share of male adults (under 65) in household*	0.62	0.44	<b>-0.96***</b>	0.37
Total years of education of those not in school	<b>0.07***</b>	0.02	<b>0.11***</b>	0.02
Age of household head	0.008	0.02	-0.006	0.01
Squared age of household head	-0.000008	0.0002	-0.00001	0.0001
<b>Segmentation variables</b>				
Female headed households (1=female headed, 0 otherwise)	-0.06	0.09	<b>-0.12*</b>	0.07
Homeland (1=former KwaZulu, 0 otherwise)	0.03	0.10	<b>0.40**</b>	0.17
Metropolitan area of Durban (1=Durban, 0 otherwise)	<b>0.15*</b>	0.09		
<b>Physical capital variables</b>				
Home owner (1=home-owner, 0 otherwise)	0.02	0.10	0.02	0.15
Number of durables owned by household	<b>0.04**</b>	0.02	<b>0.04**</b>	0.02
Grazing or farming rights (1=rights, 0 otherwise)	0.18	0.31	0.07	0.07
<b>Labour market variables</b>				
Number of persons in household with jobs	<b>1.42***</b>	0.25	<b>1.37***</b>	0.19
Number of unemployed persons in household	<b>-0.82***</b>	0.27	<b>-1.00***</b>	0.22
<b>Change variables between 1993 and 1998</b>				
Change in Household Size	<b>-0.06***</b>	0.02	<b>-0.03**</b>	0.01
Change in the share of children in household	<b>-1.14***</b>	0.44	<b>-0.96***</b>	0.30
Change in the share of female adults in household	-0.47	0.42	<b>-0.91***</b>	0.29
Change in the share of male adults in household	0.35	0.41	-0.41	0.30
Change in the average years of education	<b>0.07***</b>	0.02	<b>0.09***</b>	0.02
Change in share of persons in household with jobs	<b>1.37***</b>	0.20	<b>1.33***</b>	0.17
Change in share of unemployed persons in household	<b>-0.79***</b>	0.20	<b>-0.95***</b>	0.17

*Source: own calculations on PSLSD/KIDS data*

Note: Coefficients in bold are significant. Those denoted with \* are significant at a 10% level, with \*\* at a 5% level, and with \*\*\* at the 1% level. \*We choose different cut-offs for male and female elderly as the eligibility for the fairly generous non-contributory pensions follow these age cut-offs. Left-out categories are the share of elderly and the change in the share of elderly.

Table 11 presents the results for the regressions run separately for rural and urban households. The models both fit very well, with the urban model explaining slightly more of the variation in the data than the rural model. In both models, 1993 income has a negative coefficient, suggesting a strong tendency towards the mean. Thus the higher adult equivalent income was in 1993, the more likely the household was to experience a drop in welfare over the five year period. This suggests that there are large transitory components in the income of most households, which is consistent with the picture of high mobility which was presented above. It would also be consistent with typical findings about measurement error which also tend to find regression towards the mean (Bound et al, 2001); we examine this issue further below.

Among the human capital and household composition variables, we find that both large initial household sizes as well as increases in household size reduce the changes in adult equivalent income in urban and rural areas. The latter item is to be expected given the arithmetic of deriving adult equivalent expenditures. The former is more interesting and suggests some demographic poverty trap. Large households appear to have greater difficulty in improving their economic position. Household composition affects mobility differently in rural and urban areas. In urban areas, only a high share of male adults improves prospects for positive income change but the effect is only approaching significance, and only an increase in the number of children significantly reduces these prospects. Both findings are quite intuitive. In rural areas, however, only a large share of elderly in 1993 (the omitted category) greatly improves the chance of increasing incomes, while an increase in the share of children or female adults reduces it. This points to the great importance of old-age pensions as an income source in rural areas, while the presence of adult males is not very important due to poor employment opportunities there.

High initial education and change in education improves upward mobility in both urban and rural areas. This also supports the notion of poverty traps, now in relation to those with poor initial education which not only depresses incomes in both periods but also reduces the change to increase one's income. Physical capital appears to be a much less important determinant of welfare change than human capital. Only the

number of durables owned by the household were positively related to changes in income in both rural and urban areas.<sup>17</sup>

Turning to the segmentation variables, households in the Durban metropole improved their situation by more than other urban households. Surprisingly, homeland households increased their well-being by more than their non-homeland rural counterparts. After controlling for all other factors, female headed households did not fare any differently from male-headed households in urban areas, but fare slightly worse in rural areas. Thus the univariate finding of female-headed households improving their situation more often than male-headed households does not carry over to the multivariate analysis. The age of the household head was also not significant.

The employment variables came in very strongly, with coefficients larger than any of the human capital and demographic variables. Both the initial state variables and the change variables were important predictors of change in welfare. Interestingly, the effect of an additional employed person more than compensates for the acquisition of an unemployed person. The coefficient of the share of persons with jobs and unemployed in 1993 is about the same size as the coefficient of an increase in these shares, which is surprising given that what is being modelled is the *change* in welfare. Similarly, while it is intuitive that an increasing share of unemployed is associated with downward mobility, it is interesting to note that the initial share of unemployed has such a sizeable negative impact on subsequent mobility. Thus here we have evidence of a further poverty trap, this one based on employment.

It is particularly worrying to see three types of poverty traps emerging separately in this multivariate framework. Many households might be subject to all three of these traps at the same time as they have a large household, poor average education, and a low share of employed and a high share of unemployed in 1993. All three items combined will militate against such a household improving its position subsequently.

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<sup>17</sup> The variable for home ownership was not significant, which probably reflects that it was a poor measure: the vast majority of households reported that they owned their homes, but this does not reflect the vast variation in housing type and value.

Of the three, the impact of the initial employment situation is by far the most important.

Also here, we consider our alternative specifications to check to what extent these results might be driven by measurement error. When we use the purged income data set (not shown here), the changes are minute and virtually identical to the ones reported above. The purged regressions do have a slightly better fit, as one would expect. The regression towards the mean is, surprisingly, larger than previously suggesting that measurement error is not so much behind this.

When using the expenditure regressions (Table 12), the results are surprisingly similar to the income regressions given that there were both significant level and trend differences to the income variables. In particular, there is a similarly strong negative effect of initial expenditures, suggesting regression towards the mean. Moreover, we also find the triple trap of having a large household, being poorly educated, and having many unemployed people in the household at the initial period. The latter influence is only significant in relation to the share of unemployed and the employment variables are less important in general in the expenditure regressions, confirming what we already discussed in the univariate analysis. This seems to support that households are smoothing over temporary employment changes. In contrast, the household size and change in household size effect is larger and more significant in urban and rural areas. There are other minor changes in the importance of some variables. The fit of the expenditure regressions is generally poorer than the income regressions.

Lastly, we consider the income regressions without imputations (see Table 13). The results are qualitatively very similar again. We find strong regression towards the mean, we find poverty traps associated with poor education and initial employment. The trap associated with household size is not significant in rural areas and in general the model has a worse fit.

**Table 12 Determinants of change in ln (adult equivalent expenditures)**

	Urban households		Rural households	
Adjusted R <sup>2</sup>	0.51		0.43	
Number of observations	270		673	
	Coefficient	Std error	Coefficient	Std error
<b>Intercept</b>	<b>5.09***</b>	0.70	<b>4.73***</b>	0.44
<b>Income variable</b>				
ln (adult equivalent expenditures 1993)	<b>-0.89***</b>	0.08	<b>-0.85***</b>	0.05
<b>Human Capital variables</b>				
Household Size	<b>-0.08**</b>	0.01	<b>-0.05*</b>	0.01
Share of children in household	-0.05	0.44	-0.31	0.26
Share of female adults (under 60) in household*	-0.34	0.42	<b>-0.86**</b>	0.26
Share of male adults (under 65) in household*	-0.20	0.39	-0.30	0.27
Total years of education of those not in school	<b>0.06***</b>	0.02	<b>0.09***</b>	0.01
Age of household head	0.011	0.01	-0.003	0.01
Squared age of household head	-0.0001	0.0001	0.00006	0.0001
<b>Segmentation variables</b>				
Female headed households (1=female headed, 0 otherwise)	0.03	0.08	-0.04	0.05
Homeland (1=former KwaZulu, 0 otherwise)	-0.08	0.09	-0.07	0.11
Metropolitan area of Durban (1=Durban, 0 otherwise)	0.09	0.07		
<b>Physical capital variables</b>				
Home owner (1=home-owner, 0 otherwise)	0.02	0.08	0.18	0.10
Number of durables owned by household	<b>0.06***</b>	0.01	<b>0.04***</b>	0.01
Grazing or farming rights (1=rights, 0 otherwise)	0.23	0.26	0.09	0.05
<b>Labour market variables</b>				
Number of persons in household with jobs	-0.18	0.20	0.04	0.12
Number of unemployed persons in household	<b>-0.58***</b>	0.21	<b>-0.71***</b>	0.14
<b>Change variables between 1993 and 1998</b>				
Change in Household Size	<b>-0.07***</b>	0.01	<b>-0.04***</b>	0.01
Change in the share of children in household	0.11	0.36	0.01	0.19
Change in the share of female adults in household	-0.30	0.34	<b>-0.30*</b>	0.19
Change in the share of male adults in household	0.18	0.35	-0.05	0.19
Change in the average years of education	<b>0.05***</b>	0.02	<b>0.07***</b>	0.01
Change in share of persons in household with jobs	<b>-0.31*</b>	0.16	-0.18	0.11
Change in share of unemployed persons in household	<b>-0.53***</b>	0.16	<b>-0.56***</b>	0.11

*Source: own calculations on PSLSD/KIDS data*

Note: Coefficients in bold are significant. Those denoted with \* are significant at a 10% level, with \*\* at a 5% level, and with \*\*\* at the 1% level. \*We choose different cut-offs for male and female elderly as the eligibility for the fairly generous non-contributory pensions follow these age cut-offs. Left-out categories are the share of elderly and the change in the share of elderly.



**Table 13 Determinants of change in ln (adult equivalent income purged and without imputations)**

	Urban households		Rural households	
	Coefficient	Std error	Coefficient	Std error
Adjusted R <sup>2</sup>	0.64		0.47	
Number of observations	227		582	
<b>Intercept</b>	<b>4.01***</b>	0.96	<b>5.35***</b>	0.79
<b>Income variable</b>				
ln (adult equivalent income 1993)	<b>-0.83***</b>	0.08	<b>-0.92***</b>	0.06
<b>Human Capital variables</b>				
Household Size	<b>-0.04*</b>	0.02	-0.01	0.01
Share of children in household	-0.68	0.67	<b>-2.15***</b>	0.54
Share of female adults (under 60) in household*	0.11	0.62	<b>-2.03***</b>	0.52
Share of male adults (under 65) in household*	0.71	0.57	<b>-1.81***</b>	0.55
Total years of education of those not in school	<b>0.07**</b>	0.03	<b>0.09***</b>	0.02
Age of household head	0.002	0.02	0.002	0.02
Squared age of household head	0.00005	0.0002	0.00006	0.0002
<b>Segmentation variables</b>				
Female headed households (1=female headed, 0 otherwise)	-0.06	0.12	<b>-0.14*</b>	0.09
Homeland (1=former KwaZulu, 0 otherwise)	0.03	0.13	<b>0.56**</b>	0.22
Metropolitan area of Durban (1=Durban, 0 otherwise)	0.03	0.11		
<b>Physical capital variables</b>				
Home owner (1=home-owner, 0 otherwise)	-0.03	0.13	-0.21	0.20
Number of durables owned by household	0.03	0.02	<b>0.03*</b>	0.02
Grazing or farming rights (1=rights, 0 otherwise)	0.06	0.36	0.01	0.09
<b>Labour market variables</b>				
Number of persons in household with jobs	<b>1.59***</b>	0.32	<b>1.69***</b>	0.23
Number of unemployed persons in household	<b>-0.69**</b>	0.34	<b>-1.04***</b>	0.27
<b>Change variables between 1993 and 1998</b>				
Change in Household Size	<b>-0.07***</b>	0.02	<b>-0.03**</b>	0.02
Change in the share of children in household	<b>-1.38**</b>	0.53	<b>-1.10***</b>	0.35
Change in the share of female adults in household	-0.60	0.50	<b>-1.12***</b>	0.36
Change in the share of male adults in household	0.40	0.51	<b>-0.59*</b>	0.36
Change in the average years of education	<b>0.09***</b>	0.03	<b>0.09***</b>	0.02
Change in share of persons in household with jobs	<b>1.65***</b>	0.25	<b>1.58***</b>	0.21
Change in share of unemployed persons in household	<b>-0.78***</b>	0.25	<b>-1.06***</b>	0.22

*Source: own calculations on PSLSD/KIDS data*

Note: Coefficients in bold are significant. Those denoted with \* are significant at a 10% level, with \*\* at a 5% level, and with \*\*\* at the 1% level. \*We choose different cut-offs for male and female elderly as the eligibility for the fairly generous non-contributory pensions follow these age cut-offs. Left-out categories are the share of elderly and the change I the share of elderly.

These different ways of examining potential biases suggest that the substantive results presented above are not mainly driven by measurement error. In particular, the regression towards the mean is not mainly a result of measurement error and instead suggests a large role played by temporary incomes. The three poverty traps associated with initial household size, initial employment status, and initial education show up in all three analyses, although the importance of each differs in the various approaches.

## **7. Concluding comments**

In this paper we have examined the determinants of household income mobility in among Africans in South Africa's most populous province of KwaZulu Natal between 1993 and 1998. We find a fairly high degree of mobility, compared to industrialized and also most developing countries. Part of this mobility might be spurious and due to measurement error but our various attempts to correct for this problem do not drastically alter the impression of high mobility. When disaggregating the observed mobility, we find that demographic changes and employment changes are the most important determinants of mobility. Both is related to high unemployment and a resulting great deal of labour market churning as well as to great demographic fluidity which is related both to fertility and mortality, but also to shifting household boundaries. Our multivariate analysis confirms the importance of demographic and employment effects. Apart from a strong tendency of a regression towards the mean, which should facilitate mobility also for the poor, we identify three poverty traps that hinder the advancement of the poor. They relate to large initial household size, poor initial education, and poor initial participation in the labour market. Helping those trapped to participate in the opportunities generated in the new South Africa will be the great challenge for policy-makers.

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**Table A3: Quintile mobility matrix for African households in KwaZulu-Natal****a) Expenditures**

	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	36.50	26.00	22.00	11.00	4.50	100.0
2	32.00	24.50	18.00	17.50	8.00	100.0
3	14.50	26.50	21.00	24.00	14.00	100.0
4	12.50	17.00	22.50	23.00	22.00	100.0
5	4.50	6.00	13.50	24.50	51.50	100.0

**b) Incomes without imputations**

	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	33.53	23.53	17.65	14.12	11.18	100.0
2	30.18	30.18	17.75	13.02	8.88	100.0
3	17.75	20.12	25.44	23.08	13.61	100.0
4	8.28	20.12	26.63	26.04	18.93	100.0
5	10.65	5.92	12.43	23.67	47.34	100.0

**c) Expenditures without imputations**

	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	32.35	28.24	20.00	12.94	6.47	100.0
2	31.95	21.30	20.71	14.20	11.83	100.0
3	15.38	24.85	19.53	21.30	18.93	100.0
4	13.61	17.75	23.67	22.49	22.49	100.0
5	7.10	7.69	15.98	28.99	40.24	100.0

**d) Predicted Incomes**

	Quintile in 1998					
1993 quintile	1	2	3	4	5	(row) total
1	43.28	31.34	14.43	5.47	5.47	100.0
2	27.50	27.50	26.00	13.50	5.50	100.0
3	16.42	21.89	23.38	28.36	9.95	100.0
4	9.50	13.00	24.00	30.50	23.00	100.0
5	3.48	5.97	12.44	21.89	56.22	100.0

**e) Predicted Expenditures**

1993 quintile	Quintile in 1998					(row) total
	1	2	3	4	5	
1	48.26	23.88	16.42	6.97	4.48	100.0
2	29.00	30.50	22.50	14.50	3.50	100.0
3	12.94	27.86	26.87	19.40	12.94	100.0
4	8.50	14.00	20.50	35.50	21.50	100.0
5	1.49	3.48	13.93	23.38	57.71	100.0