Southern Africa Labour and Development Research Unit

Income Mobility in South Africa:
Evidence from the First Two Waves of the National Income Dynamics Study

by
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1.   Introduction

As is clear from the title of the National Income Dynamics Study (NIDS), one of the major reasons for undertaking South Africa's first national panel study has been to gain an understanding of income mobility. In 2008, a nationally sampled set of South African residents were visited for the first time in wave 1 of NIDS. During this visit, the baseline information was gathered to track and understand changes in their well-being going forward. This sample was nationally representative in order for NIDS to provide an assessment of these changes at the aggregate level. Also, it was large enough to enable NIDS to provide information on key sub-sets of this national story. We need to know who is making progress in terms of escaping poverty, or at least increasing their real income and what factors are driving this. Also, we need to know who is persistently poor and why.

In 2010/2011, the individuals who were sampled in wave 1 were visited for a second time in order to collect data tracking changes in their well-being two years after they were first visited. Thus, with the release of wave 2 of NIDS, the country has an

opportunity to study changes in the incomes of individuals and households across the country over the period 2008 to 2010.

This paper reports on some of the key findings with regard to income dynamics. It begins with a discussion of the quality of the income data and argues that they are up to the task of tracking these income changes over the two year period. The paper goes on to analyse observed changes in real incomes over this period in Section 3. It then adds some detail to these changes by describing a set of key income transitions; including those into and out of poverty in section 4. Against this backdrop of changes, we investigate one component underlying these transitions by comparing those who changed their residence (movers) over the two year period with those who did not (stayers). We conclude with two short case studies that highlight the ability of our panel data to tell rich stories about the changing fortunes of individuals and households in South Africa.

This is a national profile and the discussion is at a fairly aggregated level. There are many complex dynamics undergirding these income changes. Labour market dynamics, human capital dynamics (education and health) and the role of social grants are given detailed attention in other papers that use the first two waves of NIDS. It is important to remember that income is not the only dimension that is important in assessing well-being. As such, other papers address wealth and subjective well-being explicitly. The role of this paper is to set the context by presenting the broad findings on income mobility.

The global financial crisis that hit the world in 2008 still casts its shadow over economic growth rates both internationally and in South Africa. The fact that the base wave of NIDS gathered data on a representative sample of South Africans in 2008 and then revisited these same individuals in 2010/11 implies that it is uniquely able to tell us the story of the impact of this environment on ordinary people in this country. In addition, it can throw light on what people have done to cope in this economic climate.

In this paper we uncover a number of interesting findings. On average, our sample of panel members experienced positive real income changes in between wave 1 and wave 2. However, although the mean of income change was positive, the distribution of these

changes is very wide. The relationship between income in both waves is fairly strong, as one would expect. 70% of respondents who were poor in wave 1 were poor again in wave 2, according to a poverty line of R515 per capita per month. For those that escaped poverty, the "distance" travelled in terms of income changes tended to be rather small. A similar number of respondents entered and escaped poverty, although the aggregate change was an improvement in the poverty headcount.

1 793 respondents moved between wave 1 and wave 2, and their outcomes differed substantially to those who remained where they were in wave 1. Movers moved to smaller households, found work more easily, and received and gave a higher value of remittances than stayer households. Countering this, however, was the fact that movers generally earned lower wages than stayers – even if finding a job was easier. The final part of the paper tells the stories of two households in the NIDS balanced panel. One household escaped poverty in between waves, while another fell below the poverty line. The value of panel data is that it allows us to analyse the reasons for these transitions. Once we have future waves of data we will be able to ascertain whether the poverty status of a household is temporary, regular of chronic. Before we begin the analysis, however, we turn to a discussion of attrition between waves 1 and 2.

2.   Assessing attrition in the income data in the NIDS panel

The NIDS Wave 2 User Guide (Brown *et* al., 2011) discusses attrition between waves 1 and 2 in detail. The aggregate level of attrition is 21%. This attrition rate reflects sample members that refused to be interviewed, or that we did not find when we conducted the wave 2 fieldwork. It is not a statistic that gives specific attention to non-response on the income questions that we use to construct the wave 2 income variable which forms the basis of our analysis in this report. Given that income is the particular focus of this paper, we need to discern the specific impact of this missing information on our analysis of changes in incomes between wave 1 and wave 2.

This discussion is particularly important as the analysis of attrition in the Wave 2 User Guide shows quite clearly that those with the highest levels of attrition were in the top income deciles of the Wave 1 income distribution.[1] The attrition rate in deciles 9 and 10 was 28% and 42% respectively, compared the aggregate attrition rate of 21%. The attrition rate for better off white South Africans was 53%, compared to 19% for Africans. Thus, there is a danger that our analysis of income changes over the first two waves of NIDS will not provide an accurate picture of changes for those who were at the top of end of the wave 1 income distribution.

We assess this in Figure 1 below.[2] The three kernel density plots in the figure provide a representation of the impact of attrition. The blue line is the distribution of wave 1 income with wave 1 weights. The red line is the distribution of wave 1 income with wave 1 weights for the balanced sample only; that is, attritters are excluded from the distribution. It can be seen that, largely, it is those at the top end of the wave 1 income distribution that are missing from wave 2.
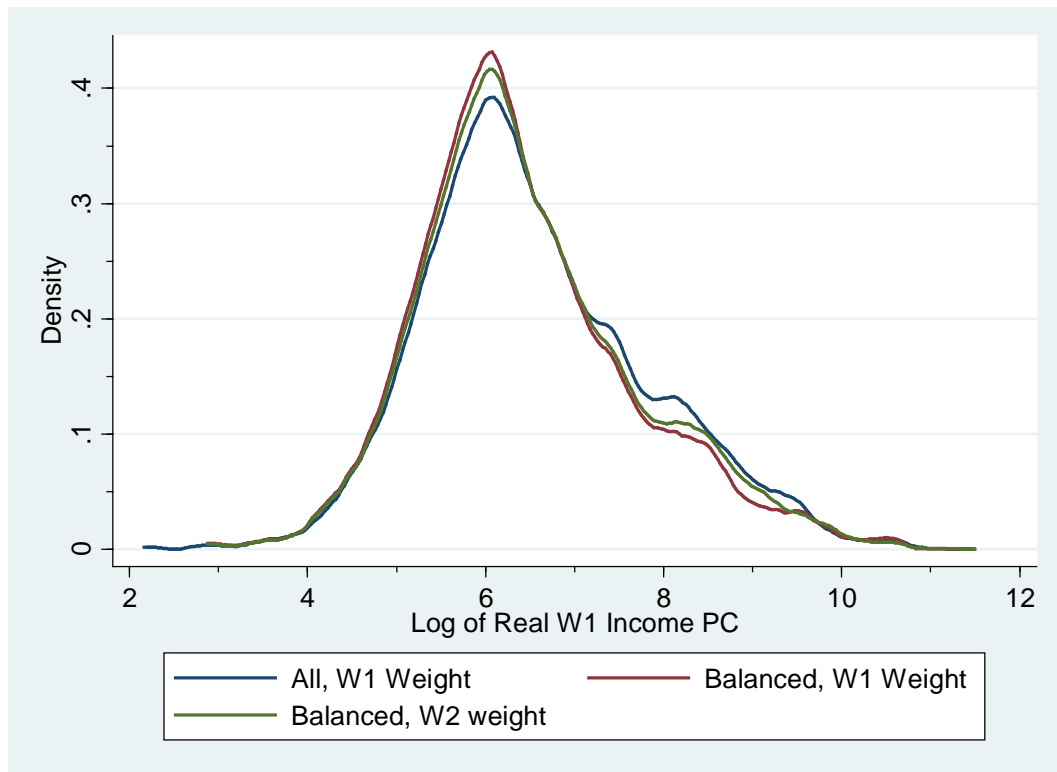
Remembering that the wave 2 panel weights are designed to correct for general, person-level attrition, it is important to see the extent to which these panel weights correct for the impact of this attrition on our analysis of income. The green line presents the distribution of wave 1 income with the wave 2 panel weights for those in the balanced sample only. We expect these weights to close the gap between the blue line and the red line, as the latter does not take the attritters into account at all. Ideally, the green line would closely map the blue line, as this would show that the weights are successful in compensating for the incomes of the wave 1 respondents who were not interviewed in wave 2. The panel weights do make a difference. The green line is closer to the blue line than the red. However, it seems that the wave 2 panel weights do a good job at the bottom end of the distribution but do not completely close the gap at the top end. Thus, we can expect our analysis to adequately represent national income changes

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[1] Brown, M. *et al.* (2011, 28-29).

[2] It is worth noting that there are colour graphics in this paper and it would be better to read the draft electronically or to print on a colour printer.

over the two years for all South Africans except, perhaps, for those who were right at the top of the 2008 income distribution.

Figure 1: Comparing the distributions of wave 1 per capita incomes for the full sample and the balanced sample

Source: Own calculations using NIDS wave 1 and wave 2 data.

The rest of this paper focuses on the panel of individuals that we see in both wave 1 and in wave 2. We make use of the panel weights at all times so that we can use the NIDS sample to provide the best representation possible of national income dynamics. Our focus is on *real* income mobility. If someone's wages or pension increased in a way that enabled them only to buy the same amount of groceries, or "purchase" the same livelihood at they did in 2008, then their real income is unchanged. Given that the NIDS fieldwork ran over a number of months in 2008 and then again in 2010/2011, we use monthly deflators to bring all incomes in 2008 and 2010/2011 to their September 2008

real equivalents.[3]   The final choice that we make is to use incomes rather than expenditures to capture these changes in money-metric well-being. This decision is discussed in some detail in Appendix 1 at the end of this document.

3.   Changes in Real Incomes between Waves 1 and 2: Did South Africans get ahead or fall behind between 2008 and 2010/11?

With two real income per capita observations for each panel member, we can measure the change in well-being for each person as the change in real per capita income over the two year period. This is a statistic that is unique to panel data. Table 1 illustrates the importance of this by calculating means and medians for real income in wave 1 and wave 2 and then calculating mean and median *changes* in income. Means and medians of levels are effectively cross sectional statistics, whereas income changes and means and medians of these changes require panel data.

Starting with the aggregate figures in the first column, we see that median income is less than mean income in each of the two years. We know that the distribution of real income is skewed in South Africa, so that this is not a surprise. Indeed, we have seen this in every South African data set since 1993. Something of a surprise, given the economic climate in which the two waves of NIDS took place, is the fact that both the means and the medians reflect an increase in real monthly per capita income in 2010/2011 compared to 2008 for our panel of individuals.   The income changes confirm this situation, with the mean and median changes in real income being R15 and R19 per capita per month respectively.

The rest of the table breaks this aggregate picture down by race, by wave 1 income quintile and by rural and urban categories, in order to interrogate how widely diffused

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[3] Further details about converting nominal incomes to their real equivalents can be found in the NIDS Wave 2 User Document. See Brown *et al*. (2011, 49).

into South African society this positive change in real incomes is. The columns of mean and median changes suggest that this improvement in well-being is widely spread. There are positive mean and median income changes across African and coloured respondents, while mean incomes actually decreased for white members of the panel.[4] This decrease may be driven by the fact that attrition was highest amongst whites, and highest amongst those whites at the top of the income distribution. This pattern of attrition, combined with the panel weights not "closing the gap" at the top of the distribution, may explain this decrease in real incomes.

That said, the quintile comparisons show quite clearly that it is not inevitable for there to be positive income changes. Neither is it inevitable for the best off to experience the largest real income changes. The bottom two quintiles experienced the largest average and median changes in real income. The top quintile experienced the worst changes. Indeed, median changes declined consistently from the bottom quintile to the top, *becoming negative for quintiles three to five.* It is worth sounding a note of caution here. Our earlier analysis of attrition showed that the upper sections of the wave 1 income distribution had especially high attrition rates and it is possible that it is those that would have done well over time (had the biggest changes in real income) that are missing. Thus, we should not make too much of this pro-poor bias in real income improvements. However, there is no reason to question the fact that the bottom quintiles experienced positive real income gains.

The rural/urban breakdowns make two useful points. First, they show that even those residing in rural informal and urban informal areas experienced positive average and median changes in real incomes, re-iterating the point that such positive changes are widely spread through the society. However, the fact that the median changes are so much smaller than the mean changes (and even negative for those living in rural commercial farming areas) makes the crucial point that the averages do not tell one about the dispersion of changes in well-being within any of these categories and, if one

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[4] We do not report on Asian/Indians. As noted in the Wave 2 User Guide, even in wave 1 there were too few Asian/Indian individuals to support such within-group calculations and, as this group had significant attrition across waves, there is even less basis for cross-wave comparisons.

is to ascertain whether there are significant pockets of people who did not get ahead, then we need to interrogate the distribution of income changes too. The next two figures address this directly.

Figure 2, below, presents a histogram of the changes in real incomes. The two highest bars are either side of zero and the next two are either side of these. Thus it is clear that smaller positive and negative changes in real incomes are the most commonly-experienced changes. Nearly all of the changes are crowded in the range between – R1000 and R1000. However, as these are real income changes per capita per month, changes of R1000 are already large over a two year period. The red line that is inserted on the graph represents the mean (R19) change in real incomes that we discussed earlier. While it was useful to start our discussion of income changes with these figures, it is clear that they are both missing a lot of the action. In particular, this figure shows that there are groups losing and gaining more than R1000.

We go on in the paper to unpack these movements in more detail. But before we do, Figure 3 presents kernel density estimates of these real income changes both for the full panel and then for Africans, coloureds and whites. Again we include a red line for mean changes. The density for the full sample is blue. This is really another, smoother version of the histogram in the previous figure. The African density is red. It maps very closely onto the national distribution. This makes the important point that, to a large extent, national income changes are being driven by the majority African population. The coloured density (green) shows slightly fewer people with changes narrowly clustered around zero change and, therefore, a wider dispersion than the national and African changes. This point is greatly accentuated by the white density (orange). Here the rand values of real income changes are much more widely dispersed. We showed earlier in Table 1 that white incomes are very much higher than other racial groups. Thus these larger changes may not represent the same impact on livelihoods as smaller changes for other racial groups.
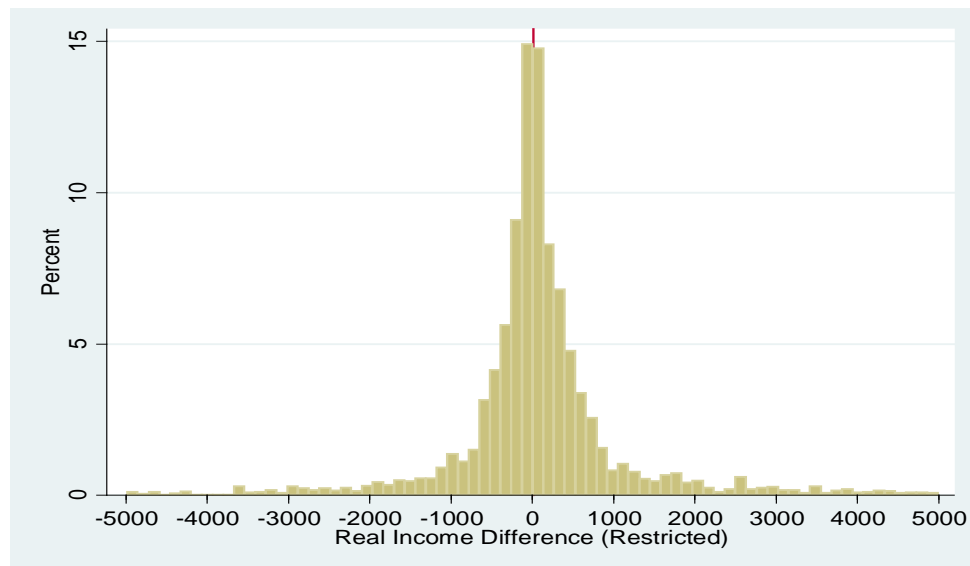
Table 1: Mean and Median Changes in Real Incomes from Wave 1 to Wave 2

		Mean PC Income W1	Mean PC Income W2	Mean Change PC Income W1 to W2	Median PC Income W1	Median PC Income W2	Median Change PC Income W1 to W2
Overall		1631	1646	15	530	585	19
Racial Groups	African	923	1006	83	455	487	17
	Coloured	1562	1819	256	937	951	86
	White	7925	7260	-665	5466	5820	105
Wave 1 Income Quintiles	1	155	452	297	162	268	117
	2	329	615	286	330	362	35
	3	545	679	134	530	489	-45
	4	1098	1268	170	1030	899	-127
	5	6034	5217	-817	3928	3621	-501

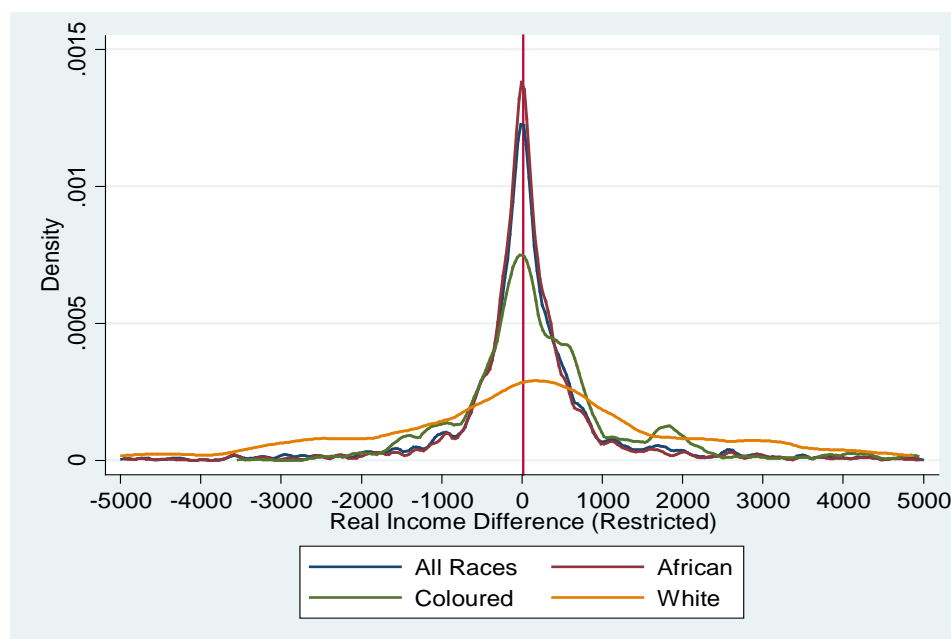|		Mean PC Income W1	Mean PC Income W2	Mean Change PC Income W1 to W2	Median PC Income W1	Median PC Income W2	Median Change PC Income W1 to W2
Urban/ Rural	Rural Formal	1150	1244	95	646	617	-61
	Tribal Authority	532	646	115	322	337	20
	Urban Formal	2811	2725	-86	1037	1113	16
	Urban Informal	694	739	45	464	556	56

Source: Own calculations using NIDS wave 1 and wave 2 data

Figure 2: Changes in real income per capita for balanced panel members

Source: Own calculations using NIDS wave 1 and wave 2 data.

Figure 3: Kernel densities of changes in real incomes by race

Source: Own calculations from NIDS wave 1 and wave 2 data

4.   Income Transitions

In the previous section we saw that on average and at the median, South Africans got ahead in terms of a positive move in their real incomes. We also learnt that simple summary statistics like the mean and the median lack the ability to describe some of the more subtle aspects of the distribution of income changes. Panel data can do more to identify specifically vulnerable people or specifically successful people. In this section we look more closely at income transitions, with particular emphasis on movements into and out of poverty.
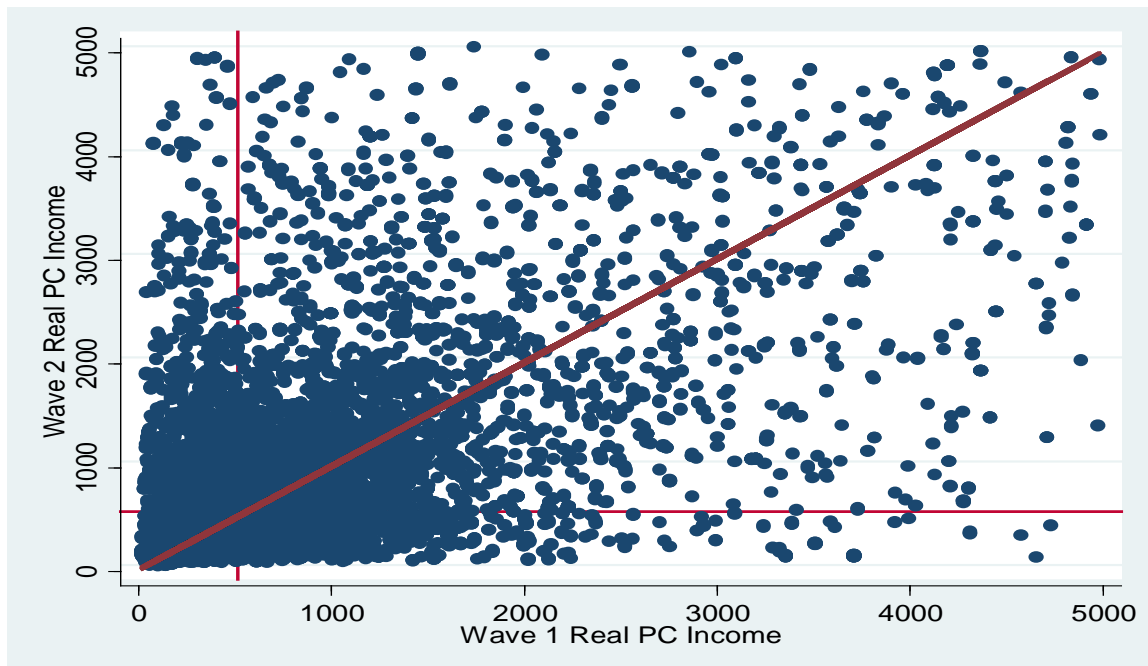
People can move relative to others and/or in absolute income terms. We explore both kinds of movement. We start with a global picture of income mobility across the two waves of NIDS. Figure 4, below, provides a view of the relationship between real household per capita income in waves 1 and 2 for balanced panel members. To ensure that the picture is revealing, we restrict it to households with less than R5 000 income per capita per month. This is not particularly restrictive, as the majority of South African households fall into this category. The lines parallel to the vertical and horizontal axes

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represent poverty lines of R515 per month – a figure that has been widely used as a "cost of basic needs" poverty line on NIDS wave 1 data.[5] Those who escaped poverty between waves 1 and 2 are in the top left quadrant of the figure (to the left of the line parallel to the y-axis, and above the line parallel to the x-axis), while those who entered poverty are in the bottom right quadrant.

The 45 degree line represents constant real incomes in wave 1 and wave 2 – the darker the cloud of points around this line, the lower the income mobility in that area. In general, the figure shows that there was a fair amount of upward and downward mobility in between waves. The heavy concentration around the 45 degree line in the south-west quadrant, suggests relatively little inter-wave change for those with particularly low incomes. There is some evidence of a general improvement in income levels, as the real median for this sub-sample increased from about R470 to R500 between waves. The proportion of this sub-sample of respondents in poverty in wave 1 was 52.8%, and this dropped to 49.7% by wave 2. The average normalised poverty gap remained identical. While the headcount ratio gives attention only to whether a person was above and below the poverty line, the poverty gap gives attention to the depth of poverty too. The fact that this measure remained constant suggests that the gains in headcount poverty reduction were not matched by a decrease in the depth of poverty.

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[5] Further details of the use of this poverty line in a South African context can be found in Leibbrandt et al (2010).

Figure 4: Scatterplot of wave 1 and wave 2 income with poverty lines

Source: Own calculations using NIDS wave 1 and wave 2 data

The above figure is a picture of absolute income transitions. Each dot represents a person's real income in wave 1 and in wave 2. However, while this gives us an overall view, it is too detailed to illuminate specific transitions in which we are interested. An absolute transition matrix allows us to unpack the movement across a set of real income thresholds of interest. Particularly interesting are transitions – or the lack thereof – across a set of poverty lines. In the transition matrix below (Table 2), we split our balanced sample into 4 useful categories – less than the lower poverty line of R515, between the lower poverty line of R515 and the upper poverty line of R949, between the upper poverty line and twice this value (R1898) and those above R1898.

Times were tough between 2008 and 2010/2011, and 70% of those who were the poorest of the poor in 2008 were not able to escape this poverty over two years. Of the 30% who moved out of this category by wave 2, two thirds moved only 1 category higher. That said, there was a great deal of movement for those in category 2 in wave 1 (between the upper and lower poverty lines). By wave 2, 28% of this group climbed out of poverty, while 41% entered "deeper" poverty by falling below the R515 per month

threshold. There was a lot of movement in both directions for respondents in the R949 to R1 898 category in wave 1, with 22% moving into the highest category by wave 2. Notably, the category displaying the least movement is that corresponding to an income of more than R1 898 per capita per month – three quarters of respondents remained in this income group in both waves.

The cells on the diagonal of this matrix represent those who stayed in the same real income category in wave 2 as they were in wave 1. This is equivalent to those on the 45 degree line in Figure 4, although here we are talking about staying in the same income group rather than the exact income level. In general, it was the poorest and the best-off who displayed the least mobility between the waves. Those in the middle groups exhibited more mobility, and this is not surprising, given that these middle categories can move up as well as down. An alternative picture of income transitions across the entire wave 1 and wave 2 distributions is shown by the heat plot in Figure 13 of Appendix 2.

Table 2: Movements into and out of poverty across the two waves

Wave 1	Wave 2				
	<515	515-948	949-1898	>1898	
<515	70%	20	7	3	100%
515-948	41	31%	21	7	100%
949-1898	20	22	35%	22	100%
>1898	5	5	14	76%	100%

Source: Own calculations using NIDS wave 1 and wave 2 data

In order to be clear as to whether this mobility situation represents an increase or a decrease in poverty, the transition matrix can also be presented so that each cell provides the proportion of the overall sample in that cell (rather than conditioning on the wave 1 category as above). Thus, there is no necessity for any row or column to sum to 100%. This situation is presented in Table 3 below. We see that the proportion of our balanced sample in the poorest category dropped from 49% in wave 1 to 46% in wave 2. Only 34% of the sample was below the R515 threshold in both waves. 14% of

respondents moved from the lowest category into a higher category, while 12% fell from a higher category back into poverty. Most of the movement that occurred was over a "short" distance. Although the gainers and the losers were nearly equal, overall measured poverty dropped amongst these respondents.

Table 3: The proportion of the sample in wave 1 and wave 2 income categories

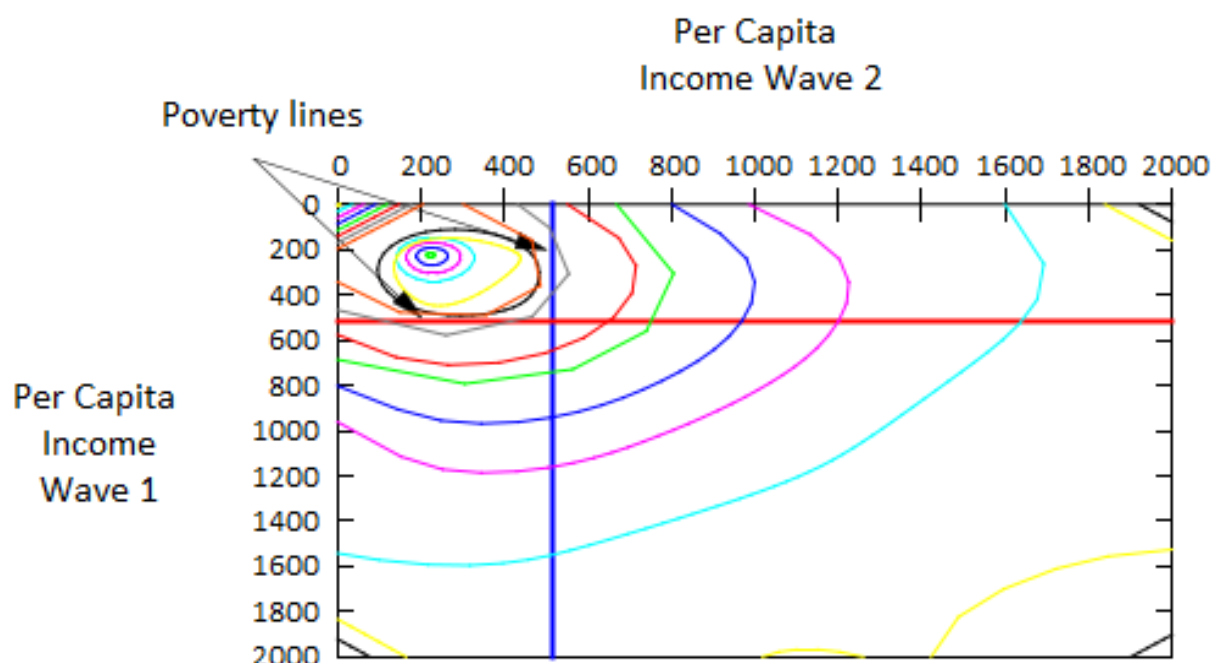|	Wave2				
Wave1	<515	515-948	949-1898	>1898	
<515	34	10	3	1	49%
515-948	8	6	4	1	19%
949-1898	3	3	5	3	14%
>1898	1	1	3	14	19%
	46%	20%	15%	20%	100%

Source: Own calculations using NIDS wave 1 and wave 2 data

An alternative view of the distance moved by low income households between waves is provided in the two figures below. The first figure is a two-dimensional representation of real household per capita income in both waves, and can be regarded as the continuous analogue to the absolute transition matrix presented earlier. The figure is to be interpreted in much the same way that a topographical map is read – except now the contours represent points of equal frequency, rather than points of equal height (Baulch and Schutes, 2008). The contour plot has the lower poverty line (R515) super-imposed, and the four quadrants mirror those of Figure 4 in that they are poor:poor, non-poor:poor, poor:non-poor and non-poor:non-poor. The ranges of the x and y axes have been restricted to R2 000, so that we can focus on those in relatively low income households.

The peak of the contours is well within the top left quadrant – lending further support to our finding that the majority of the poor in wave 1 were still poor by wave 2. The top right quadrant represents the 30% of poor wave 1 respondents who were non-poor in

wave 2, according to the lower poverty line. These are counter-balanced by those who entered poverty in between waves, given by the contours in the bottom left quadrant.
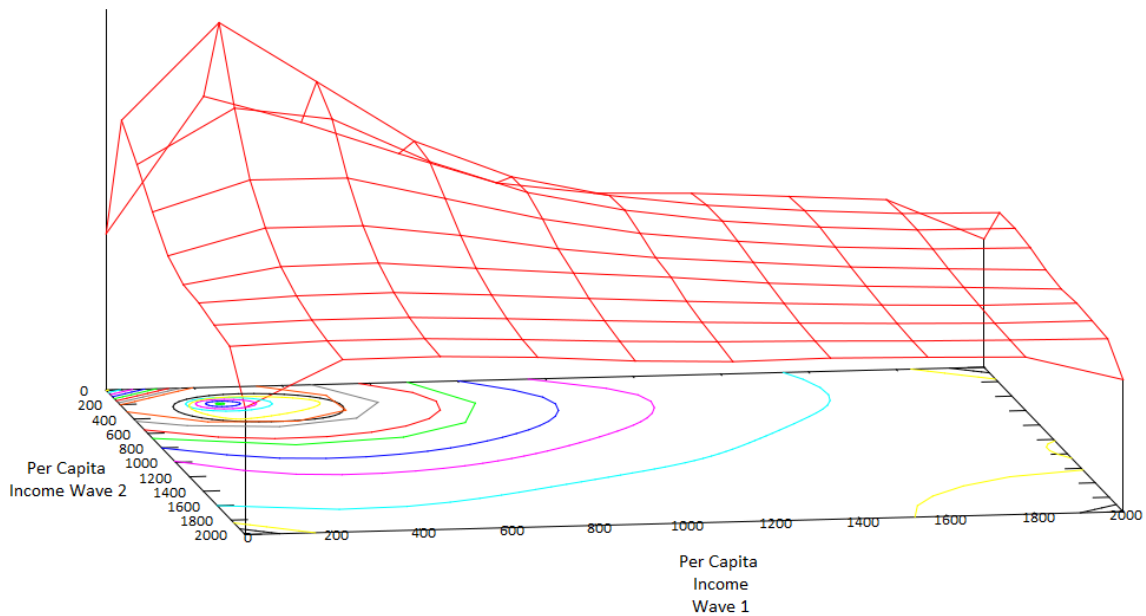
Figure 5: Contour plot of joint income densities with poverty lines

Source: Own calculations from NIDS wave 1 and wave 2 data

The final contour figure, below, plots a three-dimensional surface view above the contour plot. Wave 2 incomes are on the y-axis, wave 1 incomes on the x-axis, and the joint density is on the z-axis. The x-axis label has been brought forward for presentation purposes, and the poverty lines have been removed, but the interpretation remains the same as above. Once again, the balanced sample is restricted to those with less than R2 000 per capita per month. The picture accentuates the peak of the joint density of wave 1 and wave 2 incomes in the top left quadrant, and shows that overall movements were generally rather small.

Figure 6: Contour plots of income with 3-d surface

Source: Own calculations from NIDS wave 1 and wave 2 data

Up to this point in this section we have provided a number of views of absolute income transitions. In contrast to these absolute movements, the relative transition matrix below gives us a sense of how much positional income mobility there was between waves. Each cell of the highlighted leading diagonal of the matrix gives us the percentage of respondents who were in the same income quintile in wave 2 as in wave 1. So, for example, we see that 31% of respondents were in the third quintile in wave 1 and wave 2. The leading diagonal is particularly strong for the richest 20% of the sample, with almost three quarters of those who were in the top quintile in wave 1 still present in that quintile in wave 2. Quintiles 2, 3 and 4 display a slightly weaker association between waves. Much of the movement that took place was restricted to relatively short "distances". This is not surprising, considering the fact that only about 2 years separated the data collection points for most respondents.

Table 4: Relative income mobility - a quintile transition matrix

Wave 1 Income Quintiles	Wave 2 Income Quintiles				
	1	2	3	4	5
1	46	25	18	9	3
2	27	32	25	12	4
3	18	26	31	22	4
4	7	14	22	40	17
5	2	3	5	18	73

Source: Own calculations from NIDS wave 1 and wave 2 data

Table 5, below, summarises the relationship between household per capita income between waves for our balanced sample. The inter-wave correlation of income is 59% (rising to 72% when we correlate the log of income), and this is almost identical to the rank correlation of 58%. The degree of mobility presented in the previous table is summarised by the percentage of respondents on the leading diagonal of the decile transition matrix. A figure here of 100% represents total immobility, while a figure of 0% represents perfect mobility. As it stands, we have a figure of 27, suggesting that there is a fair deal of mobility, although we know this to be concentrated in the middle of the income distribution, rather than at the top of the bottom. The mean absolute change in real income per capita over the two waves was an increase of R15.

In concluding this section we reiterate that our analysis of income mobility here and throughout this paper examines changes in measured poverty and inequality for our balanced sample only. However, we may get a different picture of poverty and inequality levels if we treat our data as two cross-sections, rather than two waves of a panel. This cross-sectional view is not the focus of this paper. Nonetheless, it is important and we discuss it as well as the relationship between cross-sectional income inequality and income mobility in Appendix 3 below.

Table 5: Summary statistics of income mobility

	Association With W1 Income
Correlation	59
Correlation (log income)	72
Rank correlation	58
% on leading diagonal of decile transition matrix	27
Mean absolute change	15

Source: Own calculations from NIDS wave 1 and wave 2 data

5. Mover-stayer analysis

The previous sections presented a lot of information about the patterns of income mobility in the country across the waves. We now go on to ascertain some of the key characteristics associated with positive or negative economic mobility. It is in examining research questions such as these that NIDS is at its most powerful and useful and there are many examples that will need exploration going forward. These include the impacts of policy.

In this section of the paper we illustrate such analysis with one example; we identify the relative welfare gains and losses associated with changing where you live (moving) in the two years between NIDS waves 1 and 2. We know that South Africans do respond to changing circumstances and opportunities by moving and reconfiguring households. One of the key determinants driving the decision to move is increased access to the labour market and wage income and we give particular attention to this issue. We do this by investigating changes in household per capita income for movers and stayers, by assessing the probability of changing employment status, and by identifying changes in individual-level labour market earnings.

All analysis is performed on a balanced sample of respondents from both waves of the data (that is, respondents who were interviewed successfully in both waves), and all observations are weighted using the wave 2 panel weights, unless otherwise stated. Of the balanced sample of 21 069 individuals, 1 793 reported moving in between waves. Of the movers, 389 moved to a new province, while the rest remained in the same province

that they were in in wave 1. Movers were also about 3.5 years younger, on average, than stayers.[6]

Table 6, below, presents average changes in real household income per capita for movers and stayers in the balanced sample of respondents. Overall changes were positive, on average, but were greater for movers (R111) than for stayers (R3). The spread of changes was far wider for movers than for stayers. When we restrict our analysis to those who experienced positive income changes between waves, we see that movers fared significantly better than stayers. However, when we consider only those who were worse off in wave 2, movers had R600 less than stayers, on average.

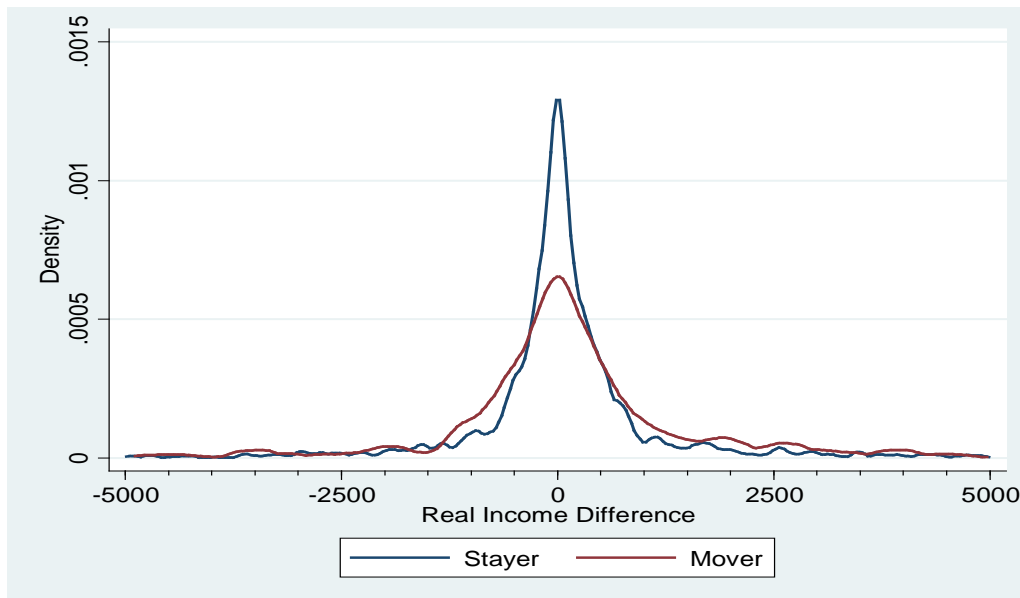**Table 6: Comparing changes in real income per capita for movers and stayers**

	Average Changes in Income Per Capita		
	Overall	Positive	Negative
Mover	111	1644	-1596
Obs.	(1793)	(1015)	(778)
Stayer	3	912	-1003
Obs.	(19274)	(9817)	(9457)

Source: Own calculations from NIDS wave 1 and wave 2 data

Figure 7, below, presents a kernel density plot of real income changes for movers and stayers. As before, changes are restricted to the range [-R5000, +R5000]. We see that a far greater proportion of stayers are clustered around small changes in real per capita income, compared to movers. It seems that moving is associated with large income gains for a few people. Clearly, moving is both a pro-active change to improve livelihoods or a reactive attempt to cope with adverse events with the latter dominating over the period covered by the wave 1 and wave 2.

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[6] The mean age for stayers in the balanced panel is 29.4, while for movers it is 25.8.

Figure 7: The distributions of real income for those who moved versus those who stayed

Source: Own calculations from NIDS wave 1 and wave 2 data

It is important to bear in mind that we are dealing with real household per capita income in this analysis, and changes in this measure are likely being driven by both the numerator (real income) and the denominator (household size). In order to investigate the household composition effect, Table 7 presents changes in household size for movers and stayers.

Table 7: Wave 2 household sizes for movers and stayers

	Mover	Stayer
Wave 2 Household Size		
Overall	3.71	5.84
If Income Change > 0	3.28	5.81
If Income Change < 0	4.18	5.88
Change in Household Size Between Waves		
Overall	-1.02	0.29
If Income Change>0	-2.02	0.18
If Income Change<0	0.09	0.41

Source: Own calculations from NIDS wave 1 and wave 2 data

Household sizes differ considerably between movers and stayers. Movers in wave 2 lived in households that had about 2 fewer people than stayers, on average. Splitting the sample into those who experienced positive and negative real per capita income changes reveals an even greater difference between movers and stayers for respondents whose income increased between waves. For stayers, the size of the household in wave 2 was very similar regardless of income changes. On average, household size increased by 0.29 individuals for stayers, and reduced by 1.02 individuals for movers. This suggests that the overall positive real income change is more robust for stayers than for movers, as changes for the latter group are largely driven by changes in household size.

An analysis of remittance flows to and from mover and stayer households between waves yields some interesting patterns. The table below provides figures for remittances per capita for our balanced sample. In wave 1, the amount of per capita remittance income received was roughly the same for those respondents who would move and those who would stay by wave 2. In wave 2, however, the mean amount of remittance income received by movers had almost doubled, to R637, while the real per capita amount for stayers increased from R351 to R400. It appears that movers rely quite heavily on their originating households for financial support immediately after moving. A detailed analysis of the source of movers' remittance income is certainly worth exploring but beyond the scope of this paper.

While movers experienced a boost in real remittances per capita, they also gave a higher value of remittances to other households, compared to stayers. On average, movers contributed R266 more per capita than in wave 1, while stayers contributed R61 less.

Table 8: Remittances received and sent for movers and stayers

	Wave 2 Stayer	Wave 2 Mover
W1 Remittances Received	351	325
W2 Remittances Received	400	637
W1 Remittances Given	417	296
W2 Remittances Given	356	562

Source: Own calculations from NIDS wave 1 and wave 2 data

Turning our attention to the labour market, it is informative to investigate how successful movers were at finding or retaining employment, compared to stayers. Table 9 provides separate transition matrices of employment status for waves 1 and 2 for movers and stayers aged between 25 and 60 in wave 2. Movers experienced more labour market "churning" than stayers, conditional on not being employed in wave 1. However, of those who were employed in wave 1, three quarters of movers were still employed in wave 2, versus 71.6% of stayers. The key point of the tables is to show how much more successful movers were in finding jobs. Of those who were unemployed (discouraged) in wave 1, 56% of movers had a job by wave 2, versus 24% of stayers. For the strict definition of unemployment, 42% of movers had a job in wave 2, compared to 31% of stayers.

Table 9: Labour market status for movers and stayers

STAYERS					
Wave 2					
Wave 1	N.E.A	Unemp. (Discouraged)	Unemp. (Strict)	Employed	Total
N.E.A	62.1	6.0	10.4	21.5	100
Unemp. (Discouraged)	46.6	10.9	18.0	24.4	100
Unemp. (Strict)	41.6	4.8	23.0	30.5	100
Employed	19.9	3.4	5.1	71.6	100
MOVERS					
Wave 2					
Wave 1	N.E.A	Unemp. (Discouraged)	Unemp. (Strict)	Employed	Total
N.E.A	47.4	2.9	27.6	22.2	100
Unemp. (Discouraged)	26.6	3.1	14.2	56.1	100
Unemp. (Strict)	34.4	11.1	12.3	42.2	100
Employed	12.0	1.7	11.2	75.1	100

Source: Own calculations from NIDS wave 1 and wave 2 data

A final and important part of the mover-stayer analysis investigates changes in formal labour market earnings. If a non-trivial proportion of our respondents moved because they expected to find a higher-paying job, their success or failure should be apparent in the data on earnings from primary and secondary employment. We investigate these dynamics below, and restrict ourselves further from our balanced sample to a sub-sample of respondents that reported labour market income in both waves.

Table 10 shows that the overall real mean of labour market earnings for the sub-sample decreased marginally by R17, while the median increased by R360. Interestingly,

although labour market outcomes improved significantly more for movers than for stayers, real earnings showed the opposite trend. As the table below shows, movers who earned in wave 1 earned R978 less in wave 2, on average. The corresponding trend for stayers was a R125 increase. For those respondents who experienced an increase in wages, the mover-stayer difference was rather more muted as both groups had mean real increases of between R2 100 and R2 230. For those with falling real labour market earnings, movers saw a mean reduction of about R5 900 while stayers saw a reduction of about R3 300.

Table 10: Changes in real wages for movers and stayers

Changes in Real Wage	Mover	Stayer
Overall	-978	125
Obs.	(219)	(1984)
If Change>0	2099	2229
If Change<0	-5941	-3328

Source: Own calculations using NIDS wave 1 and wave 2 data

In summary, we see that the outcomes for movers are far more spread out than for stayers. Of the 1 793 respondents who moved between waves, some did much better in wave 2 than wave 1, while others were much worse off. Movers tended to move to smaller households, and received and gave remittances that far exceeded the amounts flowing into and out of stayer households. Movers tended to achieve more favourable labour market outcomes than stayers, in terms of employment status, but labour market earnings were lower for movers than for stayers, on average.

6. Case studies

We conclude with two case studies that highlight some of the dynamics driving household income in South Africa. In the first, a household managed to escape poverty in between wave 1 and wave 2. In the second, however, the opposite held true, and the household entered poverty. We tell the stories of these households and discuss some of the factors associated with the rise and fall of their household income.

Escaping poverty

Our first story is about a family living in the rural Eastern Cape that managed to escape poverty between waves. The family faced troubled times in 2008, when NIDS fieldworkers arrived for wave 1 interviews. The head of the household, a 49 year old woman, lived with her 6 children in a small house. Her youngest were twins, aged 4, with the oldest resident being her 23-year-old son. Her husband worked in Gauteng, and she had another older son living in KwaZulu-Natal.

In wave 1, the per capita income in the household was a little over R200 per month, which was made up solely by remittances received from Gauteng. In wave 2, however, the household managed to move above the poverty line to a per capita income of R700. What happened in between waves to improve the household's position? We can identify three drivers of this improvement.

First of all, the woman heading up this household began producing and selling agricultural products. This managed to bring in a few hundred rand extra per month, even if it only occupied about 14 hours of her week – as she reported. This seemingly small change nevertheless represented an improvement from wave 1, where she was unemployed and relied totally on remittances to bring income into the household. Secondly, child support grants were received for 3 children, and this added R750 per month to household coffers. Finally, the remittances received by the household increased on two fronts. The husband of the household head managed to send more back home, and extra remittances (in cash and in kind) were received from another family member living in KwaZulu-Natal.

Although the 23-year-old in the household was unemployed when he was interviewed in wave 2, he stated that he was actively searching for a job, whereas he was not in wave 1. Perhaps the additional income allowed him to travel into urban areas to search for work. The other children in the house are in school and progressed through 2 years of schooling in between waves, except for the twins who began their first year of school in 2010.

Entering poverty

Our second household story comes from the North West province, where a grandfather and grandmother live with their two grandchildren. In contrast to the previous household, this family entered poverty in between waves 1 and 2. In the first wave the grandfather, who was 54 years old at the time, worked as a machine operator in a job that brought in about R4 000 per month. He had worked in this job for a number of years, but stated that he was employed by a verbal agreement, rather than by anything more substantive. This R4 000 a month was divided up by the 4 residents, and was enough to situate them above the poverty line.

By wave 2, the grandfather had lost his job and retained little hope of finding regular employment at the age of 57. At this time, all household income came from government grants, rather than from the labour market. The grandmother had turned 60 by wave 2, and received the monthly state old age pension of R1 080. Additional income came from the R500 received in the form of a child support grant for the children, who were both still in school. Total income dropped from R4 000 to R1 580 per month in nominal terms. The source of household income changed completely in between waves – after initially relying purely on labour market income, the family now relies totally on government support. With the oldest child in the household planning to finish school one year after the interview took place, it will be interesting to track his outcomes in wave 3 later this year.

References

Baulch, B., & Shutes, S. 2008. "Creating and Interpreting Contour Plots Using DASP and Gnuplot." Chronic Poverty Research Centre Toolkit Note. Chronic Poverty Research Centre.

Brown, M., Daniels, R., de Villiers, L., Leibbrandt, M. and Woolard, I. 2012. "NIDS Wave 2 User Guide". University of Cape Town: Southern Africa Labour and Development Research Unit.

Fields, G. 2009. "Does Income Mobility Equalize Longer-term Incomes? New Measures of an Old Concept." *Cornell University Articles and Chapters: Paper 446.* Cornell University: ILR School.

Leibbrandt, M., Woolard, I., Finn, A., & Argent, J. 2010. "Changes in Income and Poverty Over the Post-apartheid Period: An Analysis Based on Data from the 1993 Project for Statistics on Living Standards and Development and the 2008 Base Wave of the National Income Dynamics Study." *Studies in Economics and Econometrics*, 34(3): 25-43.

Appendix

Appendix 1: Comparing Wave 2 Incomes and Expenditures

Although income is the focus of this paper, it is useful to compare income trends to expenditure trends over the two waves. The expenditure data contain some significant problems, and our preference is to use income rather than expenditure/consumption as a stand-alone measure of welfare in any analysis.[7] In this section we analyse the relationship between income and expenditure, and try to unpack some of the consumption dynamics of households in our balanced sample. We plot income and expenditure quintile transition matrices, and then move on to a discussion of how food and non-food shares of consumption vary across the income distribution by way of plotting Engel curves.

Quintile transition matrices for income and expenditure are strikingly similar along the diagonals. The expenditure quintile matrix, below, complements the income transition matrix presented earlier. About half of the members of poorest quintile in wave 1 were in the poorest quintile again in wave 2, according to either measure of welfare. The

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[7] A detailed discussion of the construction of and problems with the expenditure data can be found in the NIDS Wave 2 User Document. See Brown *et al.* (2011, 35-37).

diagonal is slightly weaker for quintiles 2, 3 and 4, before rising to almost three quarters for the richest quintile in both waves. However, the mean real difference in expenditure for balanced panel members was a decrease of R42, compared to a rise in income of R186, as presented earlier.
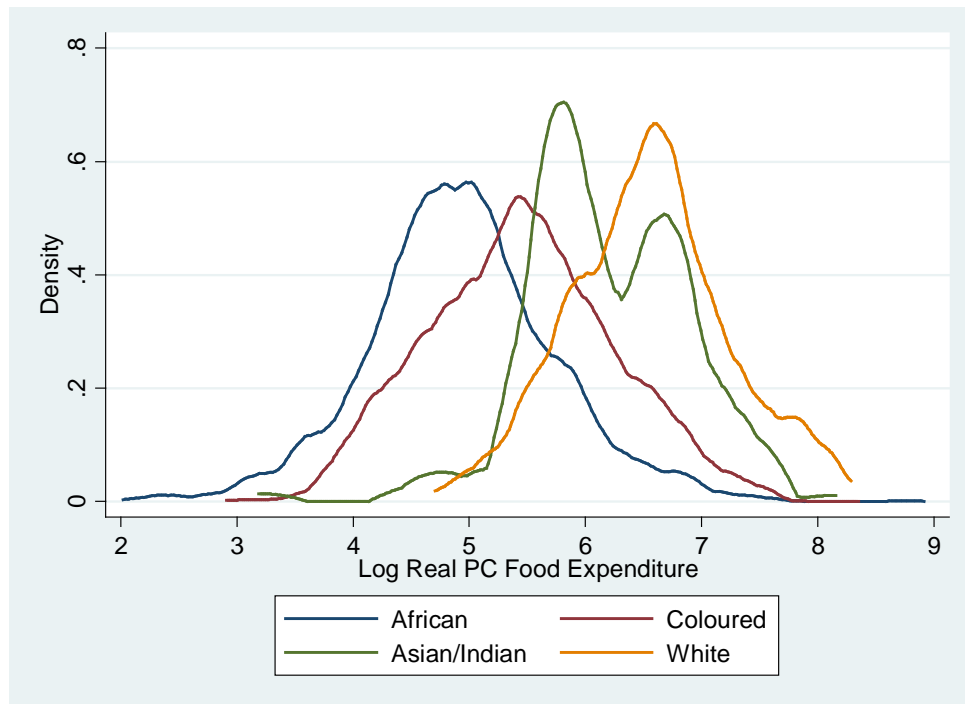
Table 11: Quintile transition matrices using expenditure per capita

	Wave 2 Expenditure Quintiles				
Wave 1 Expenditure Quintiles					
	1	2	3	4	5
1	50	27	15	6	3
2	27	31	26	12	4
3	15	26	29	25	5
4	7	14	24	40	15
5	2	2	5	18	73

Source: Own calculations using NIDS wave 1 and wave 2 data.

Wave 2 kernel density plots of food expenditure by race show very similar patterns to those of wave 1. The distribution for African food expenditure is the widest, and peaks far to the left of the distributions of the other racial groups. Food expenditure per capita for Whites lies furthest to the right. The Asian/Indian distribution is largely uninformative, given the low number of observations of this group in the balanced sub-sample.
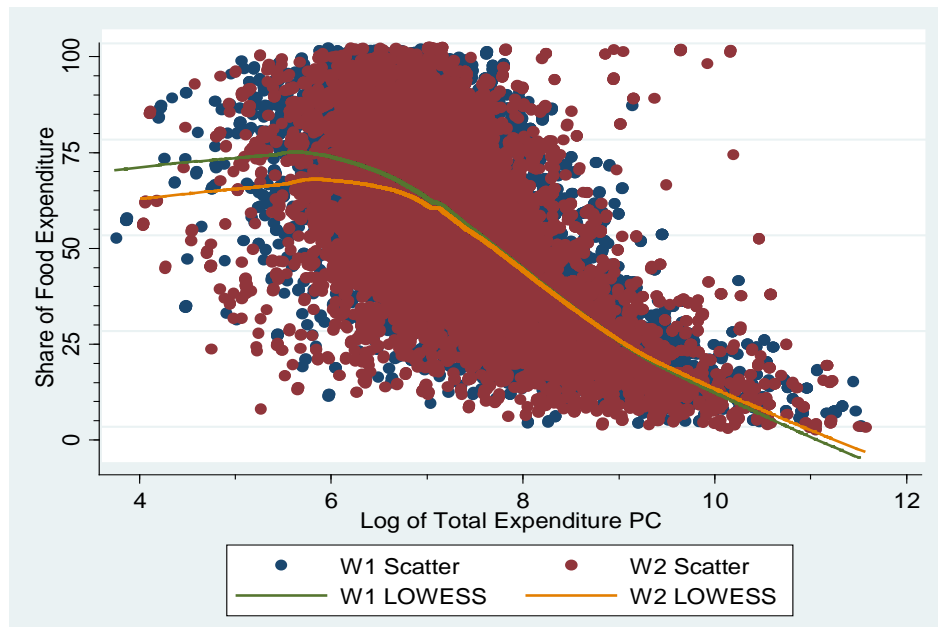
Figure 8: Kernel densities of per capita food expenditure by race

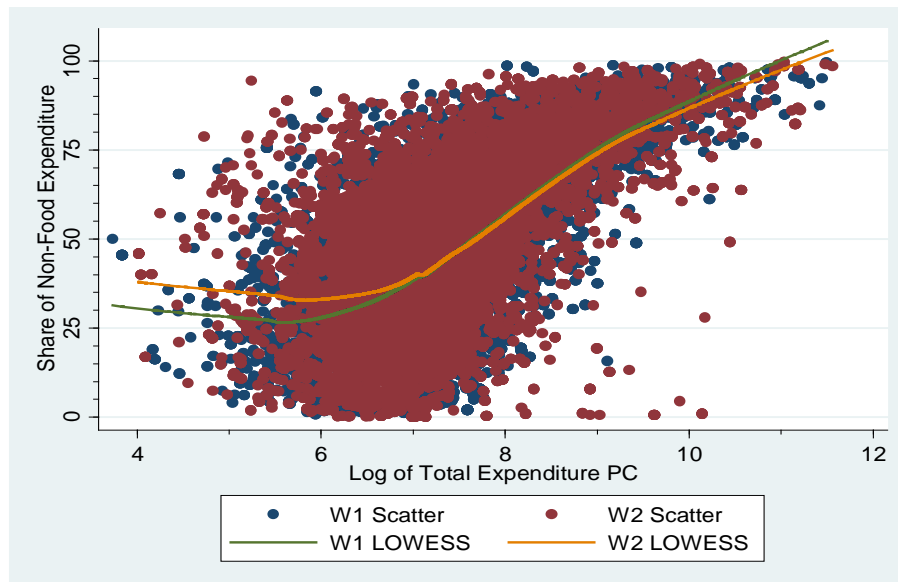Source: Own calculations using NIDS wave 1 and wave 2 data.

The following two figures plot the relationship between the log of total expenditure per capita, and the food and non-food shares of total expenditure respectively. This is done for both waves, in order to assess comparability. As expected, the food share of expenditure decreases as households spend more and more, while the opposite holds for non-food expenditure. The wave 1 and wave 2 data differ significantly for poorer households in our balanced sub-sample of respondents – wave 1 shows a higher share of expenditure on food up to per capita expenditure of R1 100. However, the shares are largely aligned for richer households and approach zero for those with the highest level of expenditure.

Figure 9: Wave 1 and wave 2 food share of expenditure against real expenditure

Source: Own calculations using NIDS wave 1 and wave 2 data.

Figure 10: Wave 1 and wave 2 non-food share of expenditure against real expenditure
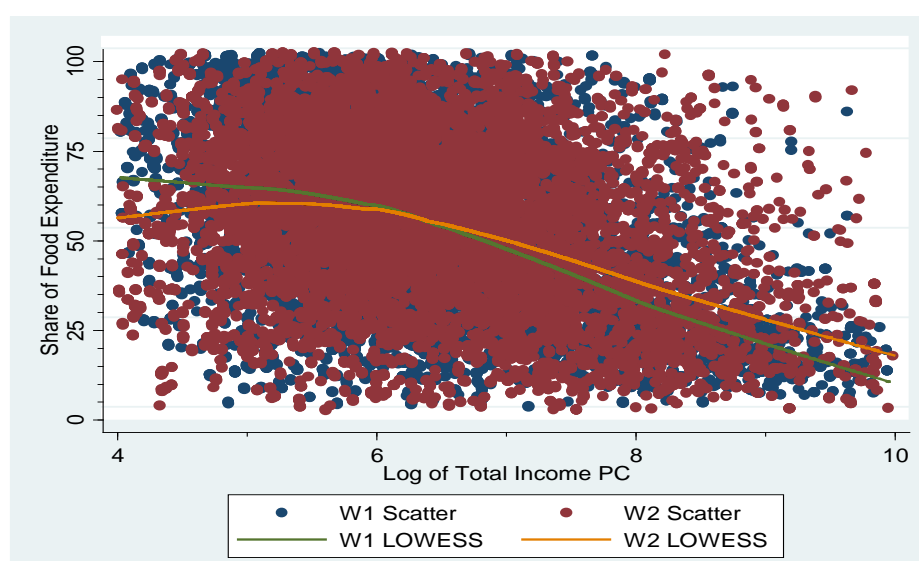

Source : Own calculations using NIDS wave 1 and wave 2 data.

Plotting Engel curves with log of per capita income (rather than expenditure) on the x-axis shows a less clear-cut relationship for our balanced panel respondents. The non-
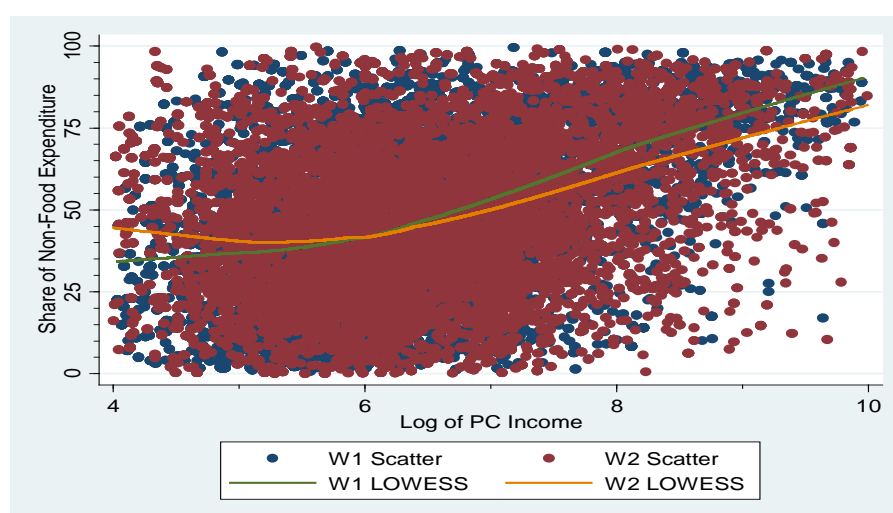
food Engel curve shows a positive relationship between the share of expenditure on non-food items and log income per capita, but the differences between waves are quite large. The share of non-food expenditure is much higher in wave 2 for poorer households – something we do not expect to see, given that the curves are plotted for the same households in both waves. The curves cross at about R400, after which the wave 1 share lies always above the wave 2 share.

Figure 11: Wave 1 and wave 2 food share of expenditure against real income

Source: Own calculations using NIDS wave 1 and wave 2 data.

Figure 12: Wave 1 and wave 2 non-food share of expenditure against real income
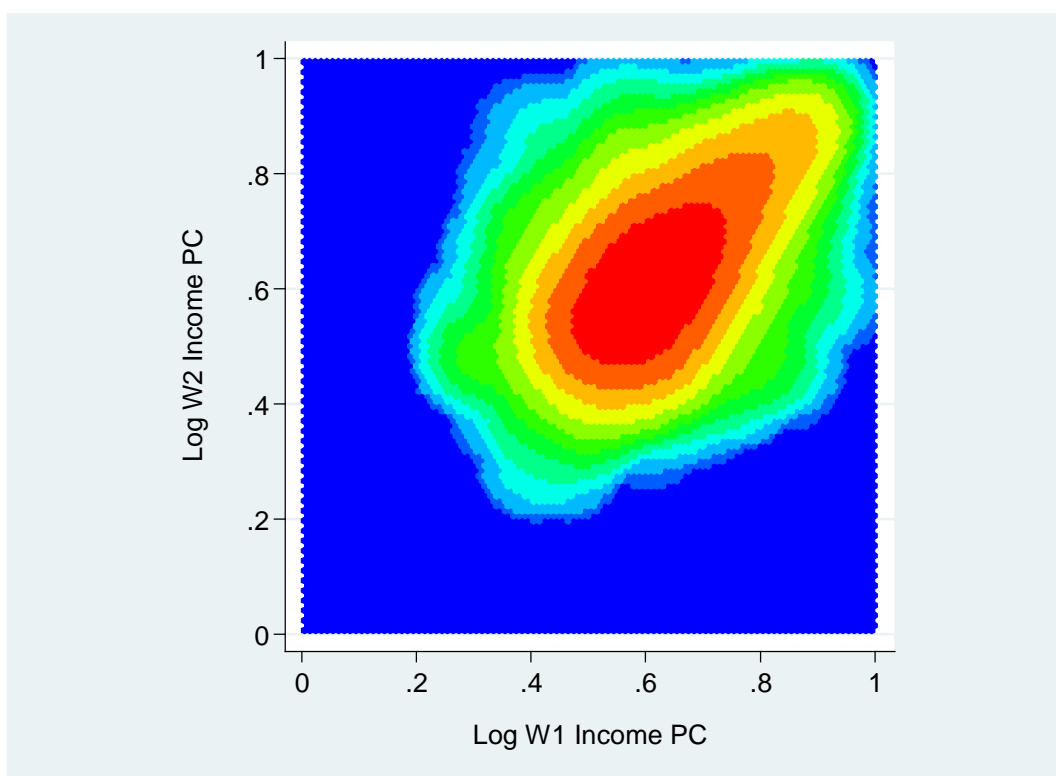

Source: Own calculations using NIDS wave 1 and wave 2 data.

Appendix 2: A Heat Plot of Income Mobility

Figure 13, below, shows the joint (bivariate) density of wave 1 and wave 2 income by way of a heat plot. Warmer colours (orange, red) represent a higher density than cooler colours (blue). The axes have been normalised to [0, 1]. This provides an alternative view to the income transition matrix presented earlier, and we see that the concentration of observations occurs around the 45 degree line. However, there is also a fair deal of upward and downward mobility for our balanced panel members.

Figure 13: Normalised heat plot of income transitions

Source: Own calculations using NIDS wave 1 and wave 2 data.

Appendix 3: Cross-sectional measures of poverty and inequality and the relationship between cross-sectional income inequality and income mobility

Our analysis in the body of the paper outlines changes in measured poverty and inequality for our balanced sample only. However, we may get a different picture if we treat our data as two cross-sections, rather than two waves of a panel. This means weighting by the relevant cross-sectional weight in each wave, rather than by the panel weight in wave 2. Treating the data in this way allows us to draw conclusions that are representative of the population at large, which is not the case when adopting a "balanced panel" approach to the analysis.[8]

Table 12 reflects these cross-sectional poverty results. The headcount poverty rate dropped from 0.46 to 0.44 between waves, while the P(1) measure remained exactly the same.

Table 122: Aggregate Poverty Measures

	P(0)	P(1)
Wave 1	0.46	0.21
Wave2	0.44	0.21

Source: Own calculations using NIDS wave 1 and wave 2 data.

As shown in Table 13, the reduction in headcount poverty was mainly driven by a 2% reduction in the proportion of Africans falling under the poverty line of R515 per capita per month. The percentage of coloureds in poverty dropped from 26% to 25%. For each racial group, as at the aggregate, the P(1) measure of poverty (the so-called "depth of poverty" measure) was identical in both ways.

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[8] For the purposes of this section we drop a single outlier who was having a very large effect on aggregate results.

Table 13: Poverty Measures by Race

	Wave 1		Wave 2	
	P(0)	P(1)	P(0)	P(1)
African	0.55	0.25	0.53	0.25
Coloured	0.26	0.09	0.23	0.09
Indian	0.09	0.02	0.08	0.02
White	0.01	0.01	0.02	0.01

Source: Own calculations using NIDS wave 1 and wave 2 data.

Table 14 reflects the cross-sectional inequality picture. We can see that inequality remained very high from a cross-sectional perspective, with the Gini coefficient standing at 0.68 in both waves. The GE(0) measure of inequality was also constant, while the GE(1) measure showed a slight decrease from 0.98 to 0.95. As levels of inequality change very slowly over time, we would be very suspicious of our Wave 2 cross-sectional picture if it showed dramatic changes in inequality over a two year period.

Table 14: Inequality Measures

	Gini	GE(0)	GE(1)
Wave 1	0.68	0.92	0.98
Wave 2	0.68	0.92	0.95

Source: Own calculations using NIDS wave 1 and wave 2 data.

Mobility as an Equaliser of Longer-Term Incomes

Table 5 earlier in the mobility document provided some basic measures of the overall amount of income mobility between wave 1 and wave 2. However, these and other measures of mobility remain agnostic as to whether the mobility served to equalise or disequalise income distributions. So far we know that the cross-sectional measures of inequality over the first two waves of NIDS were very similar. There was, however, a great deal of mobility, particularly in the first 4 income quintiles. In this section of the report we assess the extent to which income mobility served to equalise (or disequalise) longer-term incomes. To this end, we apply a new measure of mobility of income as an equaliser of longer-term incomes, proposed by Fields (2009).

In order to provide some motivation for a measure that identifies how much mobility contributed to (dis)equalisation, consider two hypothetical societies from which we derive two snapshots of inequality at different points in time. One society has a rigid distribution of income, the other has a fluid distribution. Suppose that the observed inequality is the same at both times – a situation that is not far off what is observed in the NIDS data. It is clear that a society with a rigid distribution of income will have higher long-run inequality that the society with a more fluid distribution.

What we want, then, is a measure that is able to capture how much mobility has (dis)equalised the distribution of income, relative to a base year. In our case we use mobility over the two waves of NIDS relative to the distribution in wave 1. Fields (2009) proposes the following measure:

$$E = 1 - \left(\frac{I(l)}{I(s)}\right)$$

where E, our measure of mobility as an equaliser of longer-term incomes, is increasing in longer-term inequality $I(l)$,[9] and is decreasing in the level of inequality in the base year $I(s)$. $I(l)$ and $I(s)$ must be Lorenz-consistent measures of inequality, and in our case we choose the Gini coefficient.

A positive value of E represents the case in which longer-term incomes are distributed more equally than shorter-term incomes, while a negative value implies the opposite. A value of zero reflects equally-distributed longer and shorter-term incomes. For further details of this measure including a comparison to existing income mobility measures, see Fields (2009).

When we restrict our analysis to balanced panel members only, we see that the overall Gini coefficient dropped from 0.69 to 0.67 between the two waves. This suggests that inter-wave mobility has led to an equalisation of the distribution of income – something that is reflected in Table 15 below. Overall, the mobility that took place between waves

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[9] Measured by inequality of average income over all waves of data.

served to equalise the distribution of income, as represented by the positive value of the Fields measure. Given the high proportion of Africans in the balanced sample, it is not surprising that the measure for this group is the same as the measure overall. Mobility amongst coloured respondents equalised longer-term incomes to a much smaller extent. Turning to the labour market, we restrict ourselves to respondents who were interviewed in both waves and who received labour market income in both waves. The Fields measure here shows that earnings mobility reduced inequality by a fair amount, and that the reduction in inequality for men was more than for women.

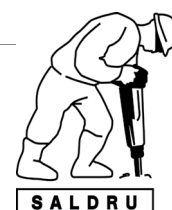**Table 15: Mobility as an Equaliser of Longer-term Incomes**

Category	Fields's E Measure
Overall	0.05
African	0.05
Coloured	0.01
White	0.10
Labour Market	0.10
Labour Market (Men)	0.11
Labour Market (Women)	0.08

Source: Own calculations using NIDS wave 1 and wave 2 data.

southern africa labour and development research unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy.   In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.