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MANCHESTER 1824

Poverty transitions among older households in Brazil and South Africa

Armando Barrientos [1*]

Julia Mase [2]

[1] University of Manchester, UK

* Corresponding author

a.barrientos@manchester.ac.uk

[2] University of Manchester, UK

Julia.Mase@postgrad.manchester.ac.uk

June 2011

BWPI Working Paper 150

Brooks World Poverty Institute
ISBN : 978-1-907247-49-1

Creating and sharing knowledge to help end poverty

Abstract

Using a panel dataset of older people and their households in Brazil and South Africa, this paper provides estimates of changes in poverty among older people in Brazil and South Africa. It examines poverty status transitions of older people and their households over time. It measures the extent to which panel households managed to escape from poverty, whilst others fell into poverty, and others still remained persistently poor or persistently non-poor over time. The analysis in the paper also throws light on changes in the depth and intensity of poverty among older households. A comparative approach provides an additional dimension to the estimates.

Keywords: poverty, poverty transitions, old age, Brazil, South Africa

Armando Barrientos is Research Director of The Brooks World Poverty Institute at the University of Manchester, UK.

Julia Mase is Doctoral Candidate at The Brooks World Poverty Institute at the University of Manchester, UK.

Acknowledgement

The authors gratefully acknowledge financial support from the cross-UK Funding Council Programme on New Dynamics of Ageing.

Introduction

The existing literature on wellbeing and poverty in late age in developing countries has not paid sufficient attention to dynamics. To a large extent, the absence of longitudinal datasets in developing countries is responsible for this state of affairs. Few developing countries have invested in longitudinal studies, and among those countries that have had the foresight to do so, fewer have focused on older people and their households. Fortunately, recent initiatives in a handful of developed and developing countries will bear fruit in this respect (Lee, 2010). The main objective of this paper is to provide estimates of poverty dynamics among a sample of older people and their households in Brazil and South Africa, and contribute to fill in this huge knowledge gap.

The paper takes advantage of data collected under a multi-country collaborative study as part of a project on *Ageing, Wellbeing and Development: a comparative study of Brazil and South Africa*. One of the components of this project collected household survey data for a sample of old people and their households in 2002 and 2008. Following the same households over time, the study produced a panel dataset containing detailed information about various aspects of the lives and wellbeing of the older people and their households. The panel datasets provide a unique opportunity to examine the dynamics of well being and poverty among these older households.

Examining the dynamics of poverty and wellbeing among older households has the potential to make an important contribution to our understanding of the impact of population ageing in developing countries, and the shape of appropriate policy responses. There are conflicting claims in the literature as to whether individual ageing has effects on wellbeing. The weight of the evidence emerging from studies on subjective wellbeing comes to the conclusion that ageing is not associated with worsening measures of life satisfaction (Diener & Suh, 1997; Lucas & Gohm, 2003). This is in contrast with studies focusing on objective indicators of wellbeing, which tend on the whole to suggest that ageing is associated with a decline in wellbeing (Banerjee & Duflo, 2007). Importantly, the majority of available studies for developing countries rely on cross-section data. These studies therefore compare individuals of different ages at a point in time, rather than the same individuals over time. For developing countries, a majority of older people live in extended households, with the implication that older people's wellbeing cannot be studied in isolation from that of their households. An objective of this study is to compare older people's wellbeing over time and to do so taking full account of their households.

The knowledge gap relating to the dynamics of wellbeing and poverty among older households in developing countries has direct implications for policy. To an important extent, the core policy instruments addressing individual ageing in developing countries rely on dedicated income transfers, social pensions of non-contributory pensions. In fact, many other poverty reduction policy instruments effectively bypass, or exclude, older people (Barrientos, 2008). Public works,

employment guarantees or micro-insurance are cases in point. Non-contributory pensions are strongly influenced by the presumption that wellbeing in late age is fairly stable, or gently declining. Most non-contributory pensions provide regular, but fixed, transfers. A handful of non-contributory pension schemes provide higher level transfers for very old people. Examining the dynamics of wellbeing and poverty in old age could help test the effectiveness of this particular approach to poverty reduction in old age.

This paper provides estimates of changes in poverty among older people in Brazil and South Africa. It examines changes in the poverty status of older people and their households over time. It measures the extent to which panel households managed to escape from poverty, whilst others fell into poverty, and others remained persistently poor or persistently non-poor over time. It also provides an exploratory analysis of the factors associated with poverty transitions. In addition to examining changes in poverty status, the analysis in the paper also aims to throw light on changes in the depth and intensity of poverty. A comparative approach provides an additional dimension to the estimates, enabling an informed discussion of the country poverty trends and poverty reduction policy. The paper tackles the following key questions: what are the changes in the poverty status of the observed households over time? Have households with older people in South Africa and Brazil fallen deeper into poverty or have they managed to reduce their poverty gaps? And, what are the observed changes among the poorest households? Has the intensity of poverty among participant households increased or decreased over time?

The paper is organised as follows: Section 1 provides an overview of national poverty trends in Brazil and South Africa as a point of reference. Section 2 discusses the survey data and attrition issues. Section 3 reports on the analysis of poverty status transitions among the older households in the two countries. Section 4 provides a discussion of changes in poverty depth and intensity. A final section discusses the findings, summarises the main conclusions, and draws key policy implications.

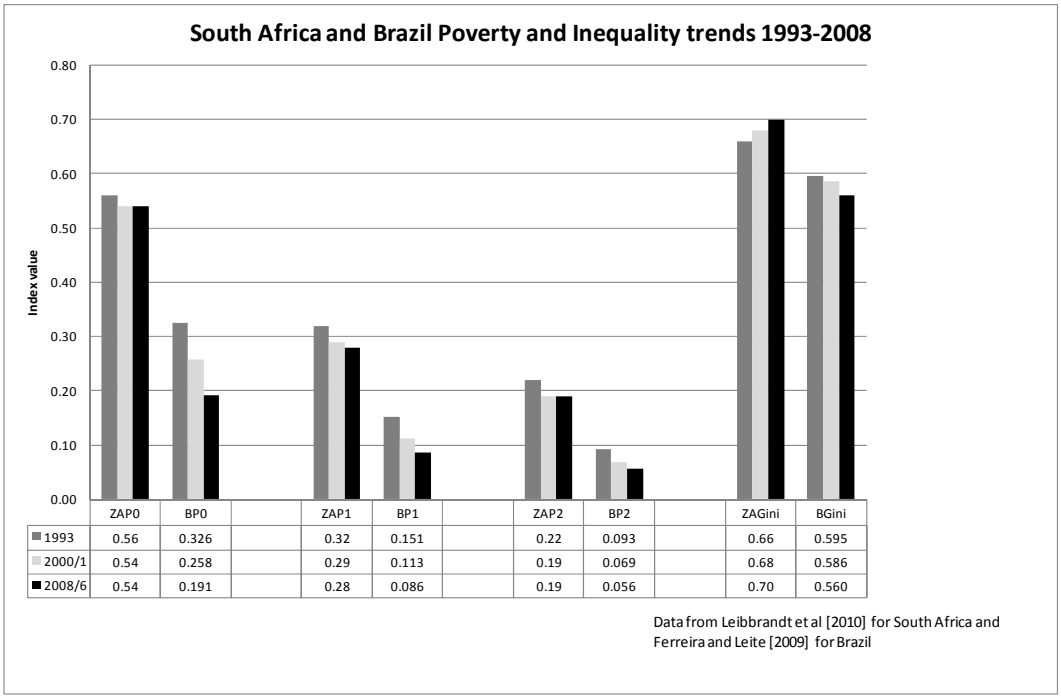
2. Poverty trends in Brazil and South Africa

It will be useful to begin with a brief discussion on poverty and inequality trends in Brazil and South Africa to frame the more detailed analysis to be done below on the dynamics of poverty and wellbeing among older households in Brazil and South Africa.

Figure 1 below provides estimates of poverty and inequality for the two countries. The Figure provides estimates at three data points for a variety of poverty measures: the poverty incidence (the proportion of the population estimated to be in poverty); the poverty gap (the aggregate gap in the income/expenditure of poor households from the poverty line divided by the population and reported as a fraction of the poverty line); and the poverty gap squared. The poverty gap measure aims to provide information on the depth of poverty. The poverty gap squared attaches a weight to the poverty gap of each unit observed equal to the poverty gap itself. This measure has greater sensitivity to the poverty gaps of the poorest and provides an insight into the

intensity of poverty. The poverty lines employed are R515 (2008 Rand) for South Africa and R100 (September 2004 Reais or 38.4 percent of the minimum wage) for Brazil. The estimates for Brazil based on analysis of the national household survey PNAD for the relevant years, whilst the South Africa estimates are based on PSLSD 1993, IES 2000 and NIDS 2008 datasets (Ferreira & Leite, 2009; Leibbrandt, Woolard, Finn, & Argent, 2010).[1]

Figure 1.



	ZAP0	BP0		ZAP1	BP1		ZAP2	BP2		ZAGini	BGini
1993	0.56	0.326		0.32	0.151		0.22	0.093		0.66	0.595
2000/1	0.54	0.258		0.29	0.113		0.19	0.069		0.68	0.586
2008/6	0.54	0.191		0.28	0.086		0.19	0.056		0.70	0.560

Taking the poverty incidence measure first, the figures indicate a marginal drop in poverty incidence in South Africa between 1993 and 2000, with stagnation thereafter.[2] Brazil, on the other hand, managed to make significant inroads into poverty incidence between 1993 and 2006, as the poverty headcount fell by over one-third. Focusing next on the poverty gap, the reduction in South Africa was just over 10 percent in that period, but the figures in Figure 1 indicate it was close to 50 percent for Brazil. The same applies in the case of the poverty gap squared.

It is instructive to consider national trends in inequality also. Brazil and South Africa are among the countries with the highest inequality in the world. Estimates of the Gini coefficient for the two countries suggest divergent trends. Whilst inequality increased in South Africa in the 1993-2008

[1] PNAD stands for Pesquisa Nacional por Amostra de Domicílios. PSLD stands for the Project for Statistics on Living Standards and Development collected by SALDRU, the Southern Africa Labour and Development Research Unit at the University of Cape Town; and IES stands for Income and Expenditure Survey; and NIDS stands for National Income Dynamics Study.

[2] A study for South Africa using a different dataset comes to different conclusions (van der Berg, Louw, & du Toit, 2009).

period, it fell in Brazil. The changes in inequality in the two countries are admittedly relatively small and from a very high base; however, they do nonetheless show their unmistakably divergent trajectories.

Overall, the analysis of the dynamics of old age poverty in Brazil and South Africa in the paper is set against a context of marginal poverty reduction in South Africa, but a stronger declining poverty trend in Brazil.

2. Data and attrition

The analysis of poverty transitions in the paper will use a longitudinal dataset of older people and their households in South Africa and Brazil, collected as part of the *Ageing, wellbeing and development* study.[3] The study collected a survey of a sample of older people and their households in selected locations in South Africa and Brazil in 2002, and participant households were then traced and re-visited in 2008. The instrument contains two parts: a household survey and a supplementary survey collected from every household member aged 55 and over. The study samples rural and urban low-income communities in Metropolitan Rio and Ilheus in Brazil, and Cape Town and the Eastern Cape in South Africa. The study samples are not nationally representative and are focused on low-income households.[4]

Longitudinal household surveys are affected by attrition, as households fragment or migrate or disappear over time. The focus of the study on older households in lower-income locations could have made attrition among respondents more likely. The study sampled households with members aged 55 and over in 2002, raising the likelihood that those respondents might have passed away six years later and their households might have fragmented or migrated. The focus on low-income communities, including informal settlements, posed particular challenges in terms of tracing some of the original households. The analysis below will carefully consider the likely impact of attrition. The number of households captured in the study by panel status is listed in Table 1 below.

Table 1. Household sample and attrition

	Brazil	South Africa
2002 households sample, of which:	1,006	1,107
Matched (2002 and 2008) households	615	719
Attrited (2002 only) households	391	388
Replacements (2008 only) households	391	254

[3] The study website is at: http://www.sed.manchester.ac.uk/research/ageingandwellbeing/index.htm .
[4] In South Africa, for example, the samples exclude whites and Indians. The sampling is proportionate to size for the locations selected.

A comparison of the 2002 and 2008 waves of the survey data reveal high rates of attrition among households (39 percent of households in the Brazil sample and 35 percent in the South Africa sample). It is helpful to place the observed attrition in context. The literature suggests that attrition rates are higher in developing countries, and increase with the time elapsed between waves (Alderman, Behrman, Kohler, Maluccio, & Watkins, 2001; Fitzgerald, Gottschalk, & Moffitt, 1998). In South Africa, the KwaZulu-Natal Income Dynamics Study reported attrition rates of 16 percent of households and 22 percent of individuals between the first (1993) and the second (1998) wave (Adato, Lund, & Mhlongo, 2007). The fact that our survey targeted older populations in low-income communities, and that six years elapsed between the first and the second wave, helps to explain the relatively high rates of attrition. Converting the period attrition of our sample into an annual equivalent suggests attrition in our sample is within the range of other longitudinal surveys.[5]

To the extent that attrition is random, that is, uncorrelated with the key variables of interest, a smaller sample will retain the full information provided in the larger sample. If attrition is selective, the main variables of interest in the smaller sample could well differ in systematic ways from the initial sample, and therefore bias estimates of these variables over time. This section reports on tests implemented to determine whether attrition is present in the sample and whether it can be addressed. Annex 1 provides a more technical summary.

As a first approach to test for non-random attrition in the data, a dummy variable was constructed recording a value of 1 for attrited households and 0 for panel households. The attrition indicator was then regressed, a set of variables from the initial wave capturing household characteristics (urban-rural, household demographics, assets, debt, education and gender of head of household) and a set of variables expected to influence attrition (age of head of household, age squared, chronic illness, per capita household expenditure).[6] If attrition is random, the estimated parameters will not differ significantly from zero. For the South Africa sample, few coefficients are significant. They include the age of the head of household (+), household size (-), and rural location (+). A Wald test of whether the independent variables are jointly non-significant generates a Chi-squared statistic of 63.5 with 13 degrees of freedom, confirming that these variables are jointly significant predictors of attrition in this sample. For the Brazil sample, household size, age and rural location variables appear to be significantly different from zero. The Wald test generates a Chi-squared of 53.3 with nine degrees of freedom, confirming that these variables are jointly significant predictors of attrition.

A second approach is needed to test whether attrition is a problem for specific variables of interest, since attrition may affect some variables, but not others. The BGLW (Becketti, Gould, Lilliard, & Welch, 1988) test is implemented for this purpose. The BGLW test involves

[5] Converting period attrition of 0.38 for Brazil and 0.35 for South Africa into annual rates by using the formula $1-(1-q)^{1/T}$, where q is period attrition and T the number of years elapsing in between the waves, yields 0.07 and 0.06 respectively.

[6] The estimation results are listed in Annex 2.

regressing an outcome variable (in our case logged per capita household expenditure) from the initial wave on a set of explanatory variables, an attrition dummy, and the attrition dummy interacted with the other explanatory variables. An F-test of the joint significance of the attrition dummy and the interaction variables can help to determine whether the explanatory variables differ systematically between panel and attrited households. For the South Africa sample, an F statistic of 0.89 does not reject the null hypothesis that attrition is random. For the Brazil sample, an F statistic of 1.34 also fails to reject the null hypothesis that attrition is random for that sample.[7] This suggests that estimates of household expenditure might not be biased by attrition.

Although the BGLW tests fail to conclude that attrition will influence the estimation of models with expenditure as the dependent variable, it might still be useful to get some sense of the sensitivity of findings to the potential effect of attrition. A procedure put forward in Fitzgerald et al. (1998) for identifying and applying weights of the inverse probability of attrition was implemented as a check.[8] The intuition behind this procedure is that the observations that are more likely to show attrition are weighted relative to the observations that are less likely to show attrition, thus ensuring that the estimates of the variables of interest are unbiased by attrition. The implementation of this procedure found only marginal differences between the weighted and unweighted poverty estimates reported below, suggesting that the findings are not especially sensitive to the application of inverse probability weights. The results below report unweighted estimates.[9]

3. Poverty dynamics in older households

This section explores changes in poverty status and gap among older households in the South Africa and Brazil panels. The study of the dynamics in poverty status provides insights into the extent to which the sample households exited, or fell into, poverty between 2002 and 2008. The observed changes in the poverty gap of households between 2002 and 2008 are also examined. The analysis will focus on the panel of matched households only.

South Africa and Brazil lack official poverty lines. The analysis below uses a poverty line set at R515 (2008 Rand) per person per month in South Africa.[10] For Brazil, the poverty line will be set at R207 (2008 Reais), the equivalent of one-half of the minimum wage per person per month.[11] Two welfare indicators are employed: consumption and income. The consumption measure is constructed from the household survey component, including responses to questions on a list of 27 key items of expenditure. The total household expenditure is then divided by the number of

[7] Using the income measure also fails to reject the null hypothesis that attrition is random.
[8] See Annex 2 for a technical explanation.
[9] See Annex 3 for a comparison of weighted and unweighted estimates.
[10] This is referred to as the lower bound poverty line in the South Africa poverty literature. For a more detailed recent discussion on South Africa poverty lines, see Leibbrandt et al.(2010) and for an earlier discussion see May et al. (2000))
[11] Social assistance benefits are set at the level of the minimum wage; whilst the threshold for entitlement to Bolsa Familia and other social assistance benefits is a per capita household income of one-quarter of the minimum wage. A poverty line of one-half of the minimum wage appears to be a sensible mid-point.

household members. The income measure is constructed by adding reported income from each household member to provide total household income, and then divided by the number of household members.[12] As above, estimates will be made of three poverty measures: poverty incidence; poverty gap; and poverty gap squared (Foster, Greer, & Thorbecke, 1984).

3.1 Poverty status transitions: snakes and ladders

We are now in a position to interrogate our data from South Africa and Brazil, in order to shed light on the poverty dynamics experienced by the participating households.

Focusing first on the South Africa sample, we find significant changes in poverty status among participant households. Table 2 below reports on observed poverty incidence transitions between 2002 and 2008, using the expenditure welfare indicator. The figures in Table 2 show that the incidence of poverty declines from 71.6 percent in 2002 to 39.6 percent in 2008, a significant fall in overall poverty among older households. The aggregate trend nets out household changes in both directions. Some households fell into poverty: 4.8 percent of the sample were not poor in 2002, but became poor by 2008. These households moved against the trend. On the other hand, 36.7 percent of households in the sample could be found in poverty in 2002, but had exited poverty by 2008. A further 34.8 percent of the sample remained in poverty, and can therefore be described as persistently poor. The overall improvement in welfare observed for the panel households is very welcomed. The proportion of households falling into poverty is relatively small, but the incidence of persistent poverty gives cause for concern.

Table 2. Poverty status transitions in the South Africa panel using per capita household expenditure

	2008			
2002		% Not poor	% Poor	
	% Not poor	23.59	4.81	28.40
	% Poor	36.73	34.88	71.60
		60.31	39.69	100

Table 3 repeats the exercise using income instead of expenditure as the welfare indicator. Interestingly, the income measure suggests the opposite general trend in overall poverty, with an increase in poverty incidence (or headcount) from 30.1 percent in 2002 to 44.6 percent in

[12] There are good reasons for using equivalence scales to adjust for household composition and household economies of scale (Barrientos, Gorman, & Heslop, 2003). There are also good reasons for relying on per capita welfare indicators (Streak, Yu, & van der Berg, 2009). Most empirical work on poverty in South Africa and Brazil employs per capita welfare measures. Relying on per capita welfare indicators will facilitate comparability between the estimates in the paper for older households and other work.

2008. The rising poverty incidence trend nets out households transitions in both directions. As the figures in the Table show, 28.5 percent of the sample consists of households that were non-poor in 2002 but that had fallen into poverty by 2008. At the same time, 14 percent of the South Africa sample, nearly half of the households in poverty in 2002, had managed to exit poverty by 2008, while 16 percent remained poor in both years.

Table 3. Poverty status transition in the South Africa panel using per capita household income

	2008			
		% Not poor	% Poor	
2002	% Not poor	41.26	28.58	69.84
	% Poor	14.06	16.10	30.16
		55.32	44.68	100

The divergent trends shown by poverty estimates for South Africa using income or expenditure indicators are hard to explain.[13] It is well known that the collection of income and expenditure data through household surveys is subject to error. In fact, the analysis of both income and expenditure indicators is motivated by the need to minimise the impact of these errors.

An advantage of the analysis using the income measure is that it makes it possible to assess, albeit in a fairly crude way, the impact of pension transfers on household poverty status. Entitlement to old age non-contributory pension benefits in both countries start at a specific age, and are dependent on a means test.[14] Programme guidelines specify a review of the means test at regular intervals, but in practice transfers are continuous until the death of the beneficiary.[15] Subtracting the income from pensions from the income of the household, and re-estimating the poverty status and transitions for the households in the sample, provides some insight into the role of pensions in reducing poverty among older households. Table 4 repeats the exercise using a measure of household income minus the old age grant income reported by households.

[13] Fedderke et al. (2004) find that analysis of inequality trends in South Africa, using household survey data, is sensitive to the choice of welfare measure. Income and expenditure variables show contrasting trends.

[14] Entitlement to the Previdência Social Rural (PSR) in Brazil starts at age 55 for women and 60 for men, while entitlement to the Beneficio de Prestaçao Continuada (BPC) was originally 67 years of age, but was reduced to 65 in 2003. Entitlement to the Old Age Grant in South Africa started at 60 for women and 65 for men in 2002, but subsequently the government decided to equalise the age of entitlement at 60, by reducing the age of entitlement for men in steps, beginning in 2008.

[15] Entitlement to the Beneficio de Prestaçao Continuada (BPC) is meant to be reviewed every two years. The PSR entitlements are not subject to review. The Old Age Grant in South Africa has a review on paper, but implementation depends on administrative capacity at the local level.

Table 4. Poverty status transitions in the South Africa panel using per capita household income minus income from non-contributory pension

	2008			
2002		% Not poor	% Poor	
	% Not poor	29.14	32.84	61.98
	% Poor	14.80	23.22	38.02
		43.94	56.06	100

When non-contributory pension income is subtracted from total household income, poverty incidence rises. Comparison of the relevant figures in Tables 3 and 4 shows, as expected, higher rates of poverty by just over seven percentage points in 2002 (38.02 percent, as opposed to 30.16 percent) and by a larger 12 percentage points (56.06 percent, as opposed to 44.68 percent) in 2008. Without pension income the poverty transitions become more pronounced towards a deteriorating trend in living standards. The proportion of households in the sample falling into poverty between 2002 and 2008 rises to 32.8 percent (from 28.58 percent if pension income is included). The proportion of panel households in poverty in 2002 managing to exit poverty in 2008 rises marginally to 14.8 percent. The persistently poor group rises to close to a quarter of the sample (as opposed to 16.10 if pension income is included). The share of the sample free from poverty in both 2002 and 2008 shrinks from 41.26 percent, if pension income is included, to 29.14 if this is subtracted. Pension income is therefore a very important instrument in reducing poverty, and persistent poverty, among South African older households.

Admittedly, this exercise provides only a limited insight into the impact of the Old Age Grant on poverty, because it cannot account for households' behavioural changes in response to the withdrawal of transfers. It provides, at best, an upper bound of the short-term impact on poverty rates from withdrawing grants from recipients.

Turning to the estimates for the Brazil sample, Table 5 focuses on poverty incidence transitions using the expenditure indicator of wellbeing. The figures in the Table report a fall in the aggregate poverty incidence rate from 36.8 percent in 2002 to 23.4 percent in 2008. This trend nets out transitions into poverty by 9.3 percent of the panel households, and transitions out of poverty for 22.7 percent of the panel households. The figures reflect the strong performance of poverty reduction in Brazil. Despite the improvement in poverty incidence, around one in every six households not in poverty in 2002 falls into poverty by 2008. Around 14.1 percent of households remain in persistent poverty. The overall improvement in living standards among older households in the Brazil panel should be taken together with adverse transitions among a significant group of older households.

Table 5. Poverty status transitions in the Brazil panel using per capita household expenditure

	2008			
2002		% Not poor	% Poor	
	% Not poor	53.78	9.34	63.12
	% Poor	22.76	14.12	36.88
		76.54	23.46	100

Table 6 repeats the exercise, using the total household income measure. The figures in the Table confirm a stronger overall poverty reduction trend. The share of households in poverty declines from 25.9 percent in 2002 to 8.6 percent in 2008, a large drop in poverty headcount. A very small proportion of households in the panel are shown to have fallen into poverty, 2.6 percent, and a majority of households in poverty in 2002 managed to exit poverty by 2008, close to 20 percent. The estimates using income are stronger than the indicators in Table 5, which focus on expenditure as the welfare indicator. The share of households in persistent poverty is just 5.96 percent. If the findings from this study were to be extrapolated to the country as a whole, they would suggest Brazil is well on its way to eradicating old age poverty.

Table 6. Poverty status transitions in the Brazil panel using per capita household income

		2008		
2002		% Not poor	% Poor	
	% Not poor	71.37	2.68	74.06
	% Poor	19.98	5.96	25.94
		91.35	8.65	100

Table 7 provides estimates of poverty transitions, excluding from the income measure the contribution to household income from non-contributory pensions. The upshot from a comparison with the estimates in Tables 6 and 7 is confirming evidence that non-contributory pensions play an important role in reducing poverty among older households, with the effect being more pronounced for households classed as persistently poor. The figures in the Table indicate that subtracting non-contributory pensions from household income would almost double the share of households in persistent poverty (10.74 percent, as opposed to 5.96). The share of households untouched by poverty would also be much lower (56.06 percent, as opposed to 73.79 percent). The findings confirm the important role of non-contributory pension income in reducing poverty incidence among households with older persons.

Table 7. Poverty status transitions in the Brazil panel using per capita household income, excluding income from non-contributory pensions

	2008			
2002		% Not poor	% Poor	
	% Not poor	56.06	5.72	61.33
	% Poor	27.93	10.74	38.67
		84.00	16.00	100

Overall, the analysis of poverty transitions among older households in the Brazil and South Africa panels suggests some success in poverty reduction across the two countries, although the estimates based on income for the South Africa panel suggest an increase in poverty incidence between 2002 and 2008. Perhaps the most important finding to emerge from the analysis is the fact that overall trends net out significant transitions into and out of poverty among older households. These transitions suggest that the welfare of an important group of older households is fluid across the poverty line. A third finding is the persistence of poverty for a significant share of older households in the South Africa panel, and for a smaller fraction of older households in the Brazil panel. The fourth finding relates to the importance of non-contributory pension income in reducing poverty among older households. Having said this, it follows from the earlier point about transitions that pension income is insufficient, in itself, to fully prevent households descending into poverty or remaining trapped in poverty.

3.2 Changes in the poverty gap: the depth and intensity of poverty

A limitation of the analysis thus far is that it has focused on the poverty headcount measure of poverty, which fails to take account of the depth and intensity of poverty. Here we supplement the findings on poverty transitions at the household level with reference to changes in the poverty gap for the panels.

Figure 2 below provides estimates of the poverty gap and the poverty gap squared for South Africa panel. Consider first the estimates using the expenditure measure: they show a large drop between 2002 and 2008, from 0.38 to 0.20 of the poverty line, close to one-quarter of the initial value. The squared poverty gap pays greater attention to the gaps of the poorest and, interestingly, the figures indicate that the reduction in this measure is more pronounced than the poverty gap measure, suggesting improved welfare for the poorest households.

The estimates of the poverty gap using the income measure show the opposite trend, a rise in the poverty gap from 0.13 to 0.23 of the poverty line, close to a 40 percent rise. Excluding non-contributory pension income from the calculations substantially increases the estimate of the poverty gap, to close to one-half of the poverty line.

Figure 2

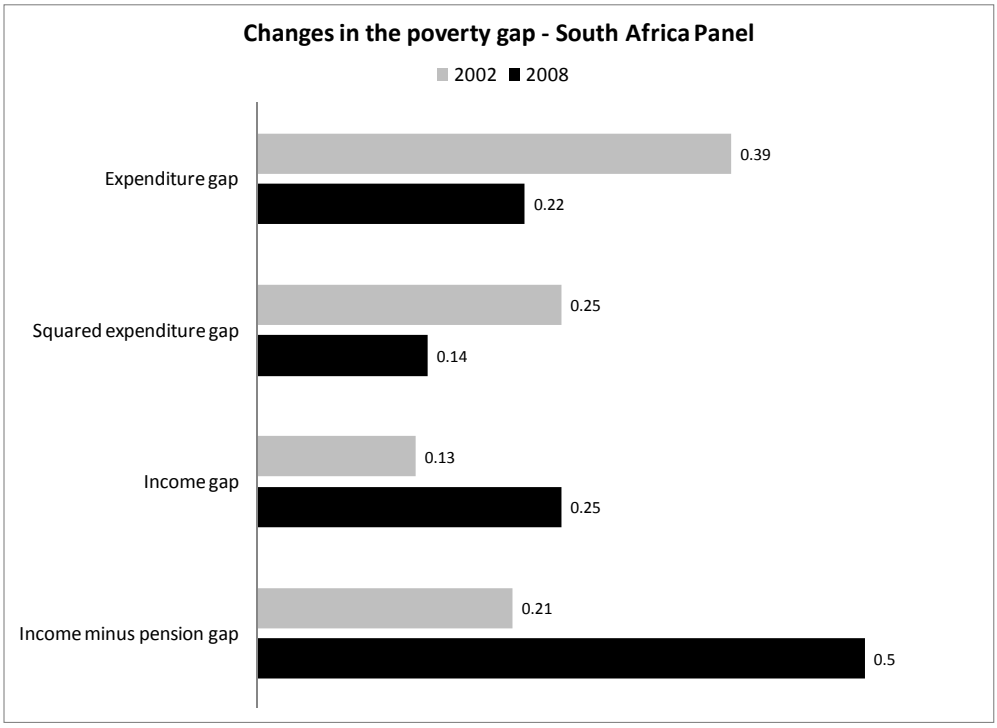


Figure 3

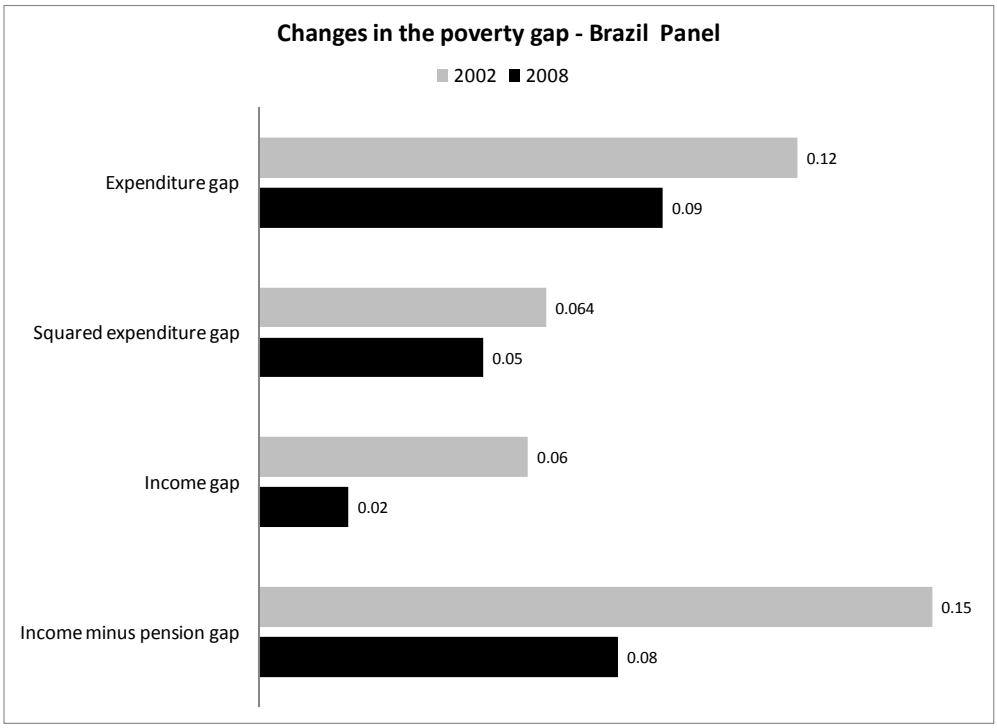


Figure 3 provides estimates of the poverty and the poverty gap squared for the Brazil panel. The figures confirm that poverty estimates using expenditure and income indicators suggest the same downward trend over time. The reduction in the poverty gap and the squared poverty gap are large for both expenditure and income measures, around one-third using the expenditure indicator, and two-thirds when using the income indicator. A comparison of the reductions in the poverty gap using full household income, and that using income minus non-contributory pension income, would suggest that pension income is important to poverty reduction among older households in the panel, but also that other factors are important too. Leaving aside for the moment the potential effects of behavioural responses to the withdrawal of non-contributory pensions, the data reported in Figure 3 suggest that non-contributory pension income is responsible for around three-fifths of the reduction in the poverty gap in 2002 (0.15-0.06 = 0.09), and around three-quarters in 2008 (0.08-0.02 = 0.06).

The estimates of changes in the poverty gap and poverty gap squared confirm the gains in poverty reduction among older people in both panels, with the exception of estimates for the South Africa panel using per capita household income as a welfare indicator.

4. Exploring influences on poverty transitions

The main findings emerging from the previous section provide evidence on the fact that overall poverty trends net out important transitions from and into poverty among older households in South Africa and Brazil. The findings point to the need to explore the main factors associated with transition in poverty status at the household level. It is beyond the scope of this paper to consider this issue in sufficient depth, especially given the comparative nature of the present study. This section has the more limited aim of reporting on some preliminary investigation of this issue in the context of the available panel datasets. The approach adopted was to regress poverty status transition indicator variables on a range of independent variables capturing selected variables of interest.

The objective of the exercise was to get some indication of the kind of variables that can influence the likelihood of households experiencing a particular transition. The independent variables selected aim to capture the potential influence of: (i) more or less time-invariant household characteristics, such as education and sex; (ii) time-variant but predictable household characteristics, mainly household composition and predictable changes over time, such as age, the number of children, financial situation, and the number of workers in the household; and (iii) less predictable shocks, such as changes in the financial situation of the household, death, chronic illness and accidents. A variable captures whether changes in household composition are related to loss of grant income. This is a very rough and ready attempt at classifying these variables.

Table 7 below reports the sign and significance of the estimates from multinomial logit models of the transition categories (see Annex 4 for full estimation results). The sign of the estimated coefficients indicates whether the variables increase or decrease the likelihood of the specific transition, compared to a baseline. In the estimates reported below, the baseline is constituted by households that were never poor (that is, not-poor in both 2002 and 2008). In the Tables below, only the sign of significant variables are reported, where the significance threshold is arbitrarily set at 10 percent. It is best to read the reported results as exploratory.

The first panel of Table 7 reports on the results using per capita expenditure to identify poverty status transitions for the South Africa panel. The probability of a household being in chronic poverty rises with the age of the household head, but at a declining rate. Larger household have a stronger probability of being in chronic poverty, but the death of household members from 2002 is also a factor. Higher number of children in the household is associated with a stronger probability of exiting poverty in 2008, and the same applies to the number of household members leaving the household. Interestingly, higher number of household members in work appears to be associated with a higher probability of falling into poverty. Structural factors, such as education, distinguish poverty transitions as against households that are never poor.

The middle panel reports the results from a similar same exercise, but now using per capita income to identify poverty status transitions. This is justified by the fact that using expenditure and income to identify poverty status transitions at the household level generated distinct trends. Few of the estimated coefficients proved significant. Household size, and whether the household reported a financial crisis in the last three years, increased the likelihood of a transition/persistent poverty, relative to never being in poverty. The ageing of the household head is associated with a higher probability of exiting poverty or falling into it, compared to being always poor or never poor.

The last panel reports on a similar exercise for the Brazil sample, using per capita income expenditure to identify poverty status transitions. In the Brazil panel, income and expenditure indicators show similar trends, so only the results from the income multinomial logit are reported. Time-invariant schooling variables are significant, especially for the always poor and for the group exiting poverty. Interestingly, the ageing of the respondent is uniquely associated with a greater probability of exiting poverty. This suggests a greater effectiveness of old age poverty reduction policies in Brazil. As with the South Africa sample, poultry is associated with a significantly lower probability of never experiencing poverty, as it helps identify rural and perhaps poorest households. Household size and the number of children seem to be associated with a higher probability of experiencing poverty. Self-reported poor financial situation in the households is associated with staying in poverty or falling into poverty.

Table 7. Factors influencing poverty status transitions

Qualitative results from the estimation of a multinomial logit model. Categories are: Never-poor; Always poor; Exit (poverty); Fall (into poverty). Never-poor is the baseline. Cells report sign only for variables significant at 10 percent, and should read as 'relative to households never poor'. Unless stated, variables capture 2008 values.

	South Africa – per capita income			*South Africa – per capita consumption*			*Brazil – per capita income*		
Variable	*Always*	*Exit*	*Fall*	*Always*	*Exit*	*Fall*	*Always*	*Exit*	*Fall*
Whether has no education	+	+	+				+	+	+
Whether has primary education	+	+	+			+	+	+	
Whether has secondary education							+	+	
Whether male	-	-		-					
Age	+								
Age squared	-	-			+	+		+	
Household size	+	+		+		+	+	+	+
Number of poultry	+	+					+	+	+
			+	-					
Number of children (aged 16 or less)							+	+	
Reported poor financial situation	+	+		+	+	+	+		+
Number of workers at household level		+							
Number of 2002 members leaving		+					-		
Number of 2002 members who died	+	+						-	
Number of 2002 members who died and received a grant									
Financial situation worsened last 3 years							+		
Whether reported a financial crisis in last 3 years				+	+	+			
Whether reported chronic illness or accidents				-					
	Model fit: LL(0) -818.87 LL(1) -616.7 ; PseudoR2 = 0.2469			Model fit: LL(0) -880.89 LL(1) -745.86 ; PseudoR2 = 0.1533			Model fit: LL(0) -574.76 LL(1) -426.23 ; PseudoR2 = 0.2584		

Some interesting points arise from this exercise. The variables capturing less predictable events likely to affect poverty or 'shocks', appear to have very little explanatory power. Perhaps observations over a shorter time interval might do better at capturing the effects of shocks. Changes in household composition could have been expected to be important in determining poverty status transitions, but in fact their significance is not confirmed by the logit estimates. Where they prove statistically significant, explaining the sign of the effects would require further study. The passing away of household members appears to have improved exit from poverty in the expenditure model of the South Africa panel, but reduced it in the Brazil panel. The financial impact of HIV/Aids on households could explain the result for the South Africa panel, whereas the loss of work capacity is more likely to explain the result for the Brazil panel. But these potential explanations are very speculative and would need further work to find out whether they have any import. Overall, it appears that structural factors, captured by time-invariant variables above, have some explanatory power. Improving these models, and further comparative work, may be a fertile way forward in identifying the factors behind poverty transitions in older households.[16]

5. Conclusions

Using a longitudinal dataset sampling older households in selected locations in South Africa and Brazil, and after considering carefully the implications of sample attrition for welfare estimates, the paper provided estimates of the dynamics of poverty among these households. The analysis reached the following conclusions:

Between 2002 and 2008, estimates of poverty incidence and depth among older households show a strong declining trend in the Brazil panel, but the picture is more complex in the South Africa panel. When using expenditure indicators of welfare, estimate of poverty incidence and depth show a declining trend, but when income indicators of welfare are employed, the trend is reversed. Several explanations for the divergence in the estimates are possible. The collection of data on household expenditure and income is subject to errors. It is also possible that households were surveyed in late 2008, at a time when they were struggling to protect their consumption from the initial impact of the global financial crisis. The country-level estimates of poverty incidence and gap for Brazil and South Africa show a declining trend in the former and a stagnant trend in the latter.

Poverty trends net out significant transitions in poverty status among older households. A significant share of these households experienced movements into and out of poverty. Whether the analysis focuses on consumption or income measures of welfare, the findings indicate that over 40 percent of households in the South Africa sample experienced some change in poverty status between 2002 and 2008. Starting from a lower poverty incidence base, among the Brazilian panel between one-fifth and one-third of households experienced a transition (income and consumption, respectively).

Of course, the poverty line is to an extent an external threshold, one which would generate different findings if set at different levels. However, it is apparent from the estimates constructed that an important fraction of older households in the panel experience changes in welfare over time. The analysis draws attention to the importance of the study of dynamics of welfare in older households.

[16] Experimentation with grouped categories (never-exit) provided additional information, but this is not reported here. Estimation using race-rural clusters in South Africa and rural-urban groups in Brazil did not produce significant changes to the coefficients and are not reported here.

At the same time, an important share of older households in our sample show persistent poverty over time. Between one-quarter and one-third of households in the South Africa sample, depending on whether income or expenditure welfare indicators are used, experience persistent poverty. Between one in 20 and one in seven households are in persistent poverty in Brazil, depending on whether income or expenditure welfare indicators are relied upon.

Some key policy implications emerge from the findings in the paper.

Firstly, they confirm the large contribution of non-contributory pensions to poverty reduction among older households in the two countries. Subtracting non-contributory pension income in South Africa raises both the share of households falling into poverty, and the share of households in persistent poverty. The impact on persistent poverty is significantly greater. The share of households exiting poverty is almost unaffected. For the Brazil panel, withdrawing non-contributory pensions raises both the share of households falling into poverty and the share in persistent poverty by about the same proportion.

Secondly, the findings on poverty status transitions demonstrate that, for a significant group of older households, old age income support is insufficient to prevent them from staying in poverty, or falling further behind.

Thirdly, a very preliminary exploration of the factors associated with poverty status transitions suggested that short-term ‘shocks’ might be less important than longer-term, and perhaps cumulative, deficits in households’ productive capacity in helping generate adverse welfare dynamics.

The key conclusion from the paper underlines the need to pay attention to the dynamics of welfare among older/pensioner households.

Annex 1. A brief note on attrition

Let a household panel survey contain information on households indexed i (i=i...N), at time t (t=1,2,..T). The variable of interest for a household is denoted by yit, and the independent variables are gathered in xit. In a subsequent wave of the survey, some units previously observed are missing. A dummy variable A to identify attrition takes the value of 0 for units remaining in the panel and 1 for attriting units. Following Fitzgerald et al (1998), the object of interest is a conditional population density f(y|x), but with attrition we only observe g(y|x, A=0) in the later wave. The issue is how to infer f(.) from g(.). The focus is on a function capturing the probability of attrition Pr(A=0|y,x,z), where z denotes auxiliary variable(s) which are observed for all units. The auxiliary variable(s) z are distinct from x. It is then possible to classify attrition as follows:

Chart A1. Types of attrition by restrictions on the attrition probability function

Attrition			Restriction
Random			If Pr(A=0|y,x,z)= Pr(A=0)
Selective	Unobservables		If Pr(A=0|y,x,z)≠ Pr(A=0|x,z)
	Observables	Ignorable	If Pr(A=0|y,x,z)= Pr(A=0|x)
		Non-ignorable	If Pr(A=0|y,x,z)= Pr(A=0|x,z)

Attrition is random if the probability of attrition is independent from y and x. Attrition on observables requires the restriction that, conditional on z and t, the attrition probability is independent of y. If this condition is not given, then attrition is on unobservables. If the probability of attrition on observables is independent of z, attrition is assumed to be ignorable (Alderman, et al., 2001).

Fitzgerald et al (1998) show that in the case that attrition is on observables and is non-ignorable, the complete population density f(y|x) can be computed from the joint density of y and z, as in

$$f(y \mid x) = \int_z g(y, z \mid x, A = 0)(w(z, x)dz \qquad (1)$$

$$w(z, x) = \left[\frac{\Pr(A = 0 \mid z, x)}{\Pr(A = 0 \mid x)} \right]^{-1} \qquad (2)$$

where w(.) are normalised weights and the numerator gives the probability of remaining in the sample, while the denominator gives the probability of remaining in the sample conditional on z.
In the context of a linear parametric function as in

$$y_t = a_t + b_t x_{it} + e_{it} \qquad y_t \, is \, observed \, if \; A_t = 0 \qquad (3)$$

Also linearising the attrition probability as a latent index

$$A_t^* = \delta_t + \delta_1 x_{it} + \delta_2 z_{it} + v_{it} \qquad (4)$$

$$A_t = \begin{matrix} 1 if \; A_t^* \geq 0 \\ 0 if \; A_t^* < 0 \end{matrix}$$

Chart A1 above suggests a sequence of tests for attrition bias (Baulch & Quisumbing, 2010). Firstly, estimating a probit of A with y,x,z, variables on the RHS could provide a test of whether attrition is random. Secondly, the BGLW test of whether attrition on observables is ignorable. These are implemented in the paper.

If attrition is on observables and is non-ignorable, it is straightforward to adjust for attrition bias by estimating inverse probability weights as the ratio of the predicted values from the restricted attrition probability in equation (6) to the unrestricted attrition probability in equation (5) below

$$A_t^* = \delta_t + \delta_1 x_{it} + \delta_2 z_{it} + v_{it} \quad (5)$$

$$A_t^* = \delta_t + \delta_1 x_{it} + \varphi_{it} \quad (6)$$

$$W_i = \frac{p_r}{p_u} \quad (7)$$

Applying Wi gives more weight to households who have similar initial characteristics to households that subsequently attrit than to households with characteristics which imply they are more likely to remain in the panel.[17]

[17] (Paredes, Prieto, & Zubizarreta, 2007)

Annex 2. Probit regressions

Table A2.1. Probit estimates for Brazil, Dependent variable is the Attrition dummy (1 if attrited in second wave, 0 otherwise)

```
Probit regression                                 Number of obs   =       1006
                                                  LR chi2(13)     =      67.67
                                                  Prob > chi2     =     0.0000
Log likelihood = -638.32263                       Pseudo R2       =     0.0503

------------------------------------------------------------------------------
           A |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        age2 |   .0094467    .004665     2.03   0.043     .0003035      .01859
       age22 |   .0003756   .0001825     2.06   0.040     .0000179    .0007332
        sex2 |   .1162223   .0851125     1.37   0.172    -.0505951    .2830397
      xprim2 |  -.1065024    .099198    -1.07   0.283    -.3009269    .0879221
       xsec2 |  -.0164736   .1458973    -0.11   0.910    -.3024271    .2694799
      xpost2 |    .191573   .2114613     0.91   0.365    -.2228835    .6060294
     numper2 |  -.1590588   .0335522    -4.74   0.000    -.2248198   -.0932978
     nchild2 |   .1465933   .0629076     2.33   0.020     .0232967    .2698899
    poultry2 |   .0136304   .0085588     1.59   0.111    -.0031444    .0304053
       debt2 |  -.0973816    .091898    -1.06   0.289    -.2774985    .0827352
       lpcx2 |  -.0386362   .0664238    -0.58   0.561    -.1688246    .0915521
  _Igroup2_2 |   .0475871   .1050191     0.45   0.650    -.1582465    .2534207
  _Igroup2_3 |   .3914813   .1165207     3.36   0.001     .1631049    .6198577
       _cons |   -.499614   .4968183    -1.01   0.315     -1.47336    .4741319
------------------------------------------------------------------------------
```

Table A2.2. Probit estimates for South Africa, Dependent variable is the Attrition dummy (1 if attrited in second wave, 0 otherwise)

```
Probit regression                                 Number of obs   =       1081
                                                  LR chi2(13)     =      67.04
                                                  Prob > chi2     =     0.0000
Log likelihood = -667.99733                       Pseudo R2       =     0.0478

------------------------------------------------------------------------------
           A |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        age2 |   .0029934   .0044182     0.68   0.498    -.0056662     .011653
       age22 |   .0005862   .0002085     2.81   0.005     .0001777    .0009948
        sex2 |  -.0277807   .0821037    -0.34   0.735    -.1887011    .1331396
      xprim2 |  -.1324111   .1137332    -1.16   0.244     -.355324    .0905018
       xsec2 |    .081001   .1251016     0.65   0.517    -.1641936    .3261955
      xpost2 |   .1818904   .1964428     0.93   0.354    -.2031303    .5669112
     numper2 |  -.0764262   .0256783    -2.98   0.003    -.1267547   -.0260977
     nchild2 |   .0410139   .0414212     0.99   0.322    -.0401701     .122198
    poultry2 |   .0072406   .0105532     0.69   0.493    -.0134432    .0279244
       debt2 |   -.030762   .0825421    -0.37   0.709    -.1925415    .1310175
       lpcx2 |  -.0361615   .0405922    -0.89   0.373    -.1157208    .0433978
  _Igroup2_2 |  -.1767606   .1067708    -1.66   0.098    -.3860274    .0325062
  _Igroup2_3 |  -.6378879   .1282683    -4.97   0.000    -.8892891   -.3864867
       _cons |   .1805141   .3918171     0.46   0.645    -.5874333    .9484616
------------------------------------------------------------------------------
```

Annex 3. Comparison of weighted and unweighted poverty status transitions

Table A3.1. Poverty status transitions in the South Africa panel with inverse probability weights (unweighted in brackets) using per capita household expenditure

	2008			
2002		% Not poor	% Poor	
	% Not poor	21.58 (23.59)	4.62 (4.81)	26.2 (28.40)
	% Poor	35.53 (36.73)	38.26 (34.88)	73.8 (71.60)
		57.12 (60.31)	42.88 (39.69)	100

Table A3.1. Poverty status transitions in the Brazil panel with inverse probability weights (unweighted in brackets) using per capita household expenditure

	2008			
2002		% Not poor	% Poor	
	% Not poor	56.39 (53.78)	9.73 (9.34)	66.11 (63.12)
	% Poor	20.26 (22.76)	13.62 (14.12)	33.89 (36.88)
		76.26 (76.54)	13.62 (14.12)	100

Annex 4. Multinomial Logistic Models – Full estimation results

Table A4.1. Multinomial logistic models – variable description

age2	Age
age22	Age squared
sex2	Sex
numper2	Number of persons in household
nchild2	Number if children (aged 16 or less) in household
bfinsit8	1 if self-reported financial situations poor or very poor
bfinsitc8	1 if financial situation changed for the worse in last 3 years
hwork8	number of persons in work in households
hleft8	number of persons leaving the household since 2002
hdied8	number of person who died since 2002
hddgrant8	number of persons who died while in receipt of a grant
xnosch2	1 if has no schooling
xprim2	1 if has primary school
xsec2	1 if has secondary school
fincris8	1 if household experienced a financial crisis in last 3 years
sick8	1 if household reported cases of sickness or chronic illness
poultry2	number of poultry

Table A4.2. South Africa Panel: Multinomial logistic regression results (Poverty transition category is dependent variable; Never poor is the baseline)

Multinomial logistic regression — Number of obs = 708; LR chi2(51) = 404.35; Prob > chi2 = 0.0000; Log likelihood = -616.703; Pseudo R2 = 0.2469

xpov	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
always						
age2	.0373371	.0159664	2.34	0.019	.0060437	.0686306
age22	-.0018526	.0009121	-2.03	0.042	-.0036404	-.0000649
sex2	-.8451001	.2966413	-2.85	0.004	-1.426506	-.2636938
numper2	.5975729	.1128435	5.30	0.000	.3764037	.8187421
nchild2	.1909444	.186559	1.02	0.306	-.1747044	.5565933
bfinsit8	1.115284	.3633544	3.07	0.002	.4031226	1.827446
bfinsitc8	-.2001352	.3183761	-0.63	0.530	-.8241409	.4238704
hwork8	-.2926685	.1852056	-1.58	0.114	-.6556648	.0703277
hleft8	.4656523	.301556	1.54	0.123	-.1253866	1.056691
hdied8	1.107427	.5421103	2.04	0.041	.0449103	2.169944
hddgrant8	-.5673222	.702115	-0.81	0.419	-1.943442	.8087978
xnosch2	3.012145	.6823695	4.41	0.000	1.674725	4.349565
xprim2	2.279314	.5937202	3.84	0.000	1.115644	3.442984
xsec2	.534521	.5950785	0.90	0.369	-.6318115	1.700853
fincris8	.374016	.3068324	1.22	0.223	-.2273646	.9753965
sick8	.0951792	.2801509	0.34	0.734	-.4539064	.6442648
poultry2	.1541245	.0549303	2.81	0.005	.0464631	.2617859
_cons	-5.867436	1.306555	-4.49	0.000	-8.428238	-3.306635
exit						
age2	.017191	.0166627	1.03	0.302	-.0154672	.0498493
age22	-.0021357	.00093	-2.30	0.022	-.0039584	-.0003129
sex2	-.6589725	.3054144	-2.16	0.031	-1.257574	-.0603714
numper2	.3017973	.1166434	2.59	0.010	.0731804	.5304142
nchild2	.3597287	.1924855	1.87	0.062	-.0175359	.7369933
bfinsit8	.6297208	.3798594	1.66	0.097	-.1147899	1.374231
bfinsitc8	-.5435179	.3344298	-1.63	0.104	-1.198988	.1119524
hwork8	-.0934211	.1861091	-0.50	0.616	-.4581881	.271346
hleft8	.6441245	.3045527	2.11	0.034	.0472121	1.241037
hdied8	1.092581	.5475505	2.00	0.046	.019402	2.165761
hddgrant8	.0125619	.7033359	0.02	0.986	-1.365951	1.391075

```
     xnosch2 |   2.259307   .6904049     3.27   0.001     .9061386    3.612476
      xprim2 |   1.448037   .5999938     2.41   0.016     .2720706    2.624003
       xsec2 |   .4978163   .5934488     0.84   0.402     -.665322    1.660955
    fincris8 |   .3818272   .3166804     1.21   0.228     -.238855     1.00251
       sick8 |   .2179508   .2890396     0.75   0.451    -.3485565    .7844581
    poultry2 |   .1140728    .056157     2.03   0.042     .0040071    .2241385
       _cons |  -3.558434   1.339915    -2.66   0.008     -6.18462   -.9322491
-------------+----------------------------------------------------------------
fall         |
        age2 |   .0320066   .0199972     1.60   0.109    -.0071872    .0712004
       age22 |   -.000684   .0011619    -0.59   0.556    -.0029612    .0015933
        sex2 |  -.6023726   .3787024    -1.59   0.112    -1.344616    .1398704
     numper2 |   .1906475   .1471181     1.30   0.195    -.0976987    .4789937
     nchild2 |  -.3077563   .2701627    -1.14   0.255    -.8372655     .221753
    bfinsit8 |   .6754999   .4597982     1.47   0.142    -.2256881    1.576688
   bfinsitc8 |   .6264748   .3992287     1.57   0.117    -.1559991    1.408949
      hwork8 |   .4972102    .208071     2.39   0.017     .0893986    .9050219
      hleft8 |   .5578913   .3657065     1.53   0.127    -.1588802    1.274663
      hdied8 |   .7516648   .6246957     1.20   0.229    -.4727163    1.976046
   hddgrant8 |  -.0965144   .8260369    -0.12   0.907    -1.715517    1.522488
     xnosch2 |   1.743186   1.041134     1.67   0.094    -.2973982     3.78377
      xprim2 |   2.283739   .8650828     2.64   0.008     .5882081     3.97927
       xsec2 |   1.376992   .8534708     1.61   0.107    -.2957798    3.049764
    fincris8 |  -.0201053   .4021246    -0.05   0.960     -.808255    .7680444
       sick8 |   .2969648   .3630559     0.82   0.413    -.4146116    1.008541
    poultry2 |  -.0039434   .1046054    -0.04   0.970    -.2089662    .2010794
       _cons |  -5.776058   1.733075    -3.33   0.001    -9.172824   -2.379293
------------------------------------------------------------------------------
(xpov==never is the base outcome)
```

Table A4.3. Brazil: Multinomial logistic regression results (Poverty transition category is dependent variable; Never poor is the baseline)

```
Multinomial logistic regression                 Number of obs   =        615
                                                LR chi2(51)     =     336.26
                                                Prob > chi2     =     0.0000
Log likelihood = -605.42994                     Pseudo R2       =     0.2173

------------------------------------------------------------------------------
        xpov |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
always       |
        age2 |  -.0049812   .0163448    -0.30   0.761    -.0370164     .027054
       age22 |    .000725   .0007387     0.98   0.326    -.0007228    .0021729
        sex2 |   .0878939    .277552     0.32   0.751     -.456098    .6318857
     numper2 |   .9166614   .1520651     6.03   0.000     .6186193    1.214703
     nchild2 |   .6545012    .204155     3.21   0.001     .2543647    1.054638
    bfinsit8 |    .965762   .3502693     2.76   0.006     .2792467    1.652277
   bfinsitc8 |   .3288484   .1845515     1.78   0.075     -.032866    .6905627
      hwork8 |  -.0882826    .165163    -0.53   0.593    -.4119961    .2354309
      hleft8 |  -.3880333   .1717373    -2.26   0.024    -.7246322   -.0514343
   hddgrant8 |   .3166576   .5422269     0.58   0.559    -.7460875    1.379403
      hdied8 |  -.4708408   .4574847    -1.03   0.303    -1.367494    .4258128
     xnosch2 |   5.590517   1.593737     3.51   0.000     2.466849    8.714185
      xprim2 |   4.889615   1.574964     3.10   0.002     1.802742    7.976487
       xsec2 |   4.200567   1.578732     2.66   0.008     1.106309    7.294825
    fincris8 |  -.1604545   .2868295    -0.56   0.576      -.72263    .4017209
       sick8 |  -.0399831   .2984935    -0.13   0.893    -.6250195    .5450533
    poultry2 |   .0679297   .0366423     1.85   0.064    -.0038879    .1397473
       _cons |  -9.477912   2.004051    -4.73   0.000    -13.40578   -5.550043
-------------+----------------------------------------------------------------
exit         |
        age2 |   .0212729    .015352     1.39   0.166    -.0088164    .0513622
       age22 |   .0011526   .0006724     1.71   0.086    -.0001653    .0024705
        sex2 |   .1707523   .2771587     0.62   0.538    -.3724688    .7139734
     numper2 |   .2756456   .1548371     1.78   0.075    -.0278296    .5791208
```

```
     nchild2 |   .4983706    .216497     2.30   0.021     .0740443    .9226969
    bfinsit8 |   .1451767    .383795     0.38   0.705    -.6070477    .8974012
   bfinsitc8 |   .0189865    .175415     0.11   0.914    -.3248206    .3627936
      hwork8 |   .1618181   .1606392     1.01   0.314     -.153029    .4766651
      hleft8 |   .2787806   .1747648     1.60   0.111    -.0637521    .6213133
   hddgrant8 |   1.160273   .7225278     1.61   0.108    -.2558551    2.576402
      hdied8 |  -1.314029   .6570266    -2.00   0.046    -2.601778   -.0262808
     xnosch2 |   3.530041   1.212639     2.91   0.004     1.153313     5.90677
      xprim2 |   2.932574   1.208727     2.43   0.015     .5635132    5.301634
       xsec2 |   2.454758   1.248846     1.97   0.049     .0070647    4.902452
    fincris8 |   .4169375   .2806545     1.49   0.137    -.1331353    .9670102
       sick8 |   -.152148     .29604    -0.51   0.607    -.7323758    .4280797
    poultry2 |   .0720813   .0363539     1.98   0.047     .0008289    .1433336
       _cons |   -7.40504   1.684457    -4.40   0.000    -10.70651   -4.103566
-------------+----------------------------------------------------------------
fall         |
        age2 |   .0118868   .0146947     0.81   0.419    -.0169143    .0406879
       age22 |   .0006545   .0005829     1.12   0.262     -.000488    .0017969
        sex2 |   .2174136   .2545572     0.85   0.393    -.2815094    .7163366
     numper2 |   .4204545   .1567816     2.68   0.007     .1131683    .7277408
     nchild2 |  -.0428981   .2539925    -0.17   0.866    -.5407143    .4549182
    bfinsit8 |   .2754427   .3696039     0.75   0.456    -.4489677     .999853
   bfinsitc8 |   .4368911   .1916562     2.28   0.023     .0612518    .8125303
      hwork8 |   -.016645   .1704031    -0.10   0.922    -.3506289    .3173389
      hleft8 |  -.2426049   .1984016    -1.22   0.221    -.6314649     .146255
   hddgrant8 |   .6269636   .6318183     0.99   0.321    -.6113776    1.865305
      hdied8 |  -.8712911   .5668341    -1.54   0.124    -1.982265    .2396834
     xnosch2 |    1.22443   .6475513     1.89   0.059    -.0447473    2.493607
      xprim2 |    .584861   .6474233     0.90   0.366    -.6840654    1.853787
       xsec2 |   .5569532   .6903325     0.81   0.420    -.7960736     1.90998
    fincris8 |  -.3295089   .2748596    -1.20   0.231    -.8682238    .2092059
       sick8 |   .0561323   .2791634     0.20   0.841     -.491018    .6032826
    poultry2 |    .066962   .0347344     1.93   0.054    -.0011162    .1350403
       _cons |  -4.566915   1.271285    -3.59   0.000    -7.058587   -2.075242
------------------------------------------------------------------------------
(xpov==never is the base outcome)
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The University of Manchester
Brooks World Poverty Institute

MANCHESTER 1824

Executive Director
Professor David Hulme

Research Directors
Professor Armando Barrientos
Professor Rorden Wilkinson

Contact:

Brooks World Poverty Institute
The University of Manchester
Humanities Bridgeford Street Building
Oxford Road
Manchester
M13 9PL
United Kingdom

Email: bwpi@manchester.ac.uk

www.manchester.ac.uk/bwpi

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