Exploring psychological well-being and poverty dynamics in South-Africa: evidence from NIDS waves 1-5

Nik Stoop[123*], Murray Leibbrandt[1], Rocco Zizzamia[1]

[1] Southern Africa Labor and Development Research Unit, University of Cape Town, South-Africa.

[2] Institute of Development Policy, University of Antwerp, Belgium.

[3] Centre for Institutions and Economic Performance, University of Leuven, Belgium.

Abstract

The mechanisms that perpetuate poverty are still not well understood. An emerging literature focuses on the psychology of poverty, investigating psychological and behavioral factors that may affect poverty entry and make it difficult to escape poverty. This paper explores the relationship between psychological well-being and poverty in South-Africa. We rely on Waves 1-5 of the National Income Dynamics Study (NIDS), a nationally representative household panel survey that spans a decade. A descriptive analysis shows a strong negative correlation between psychological well-being and per capita household expenditure, with individuals in lower expenditure deciles displaying significantly higher risks of depression and lower levels of life satisfaction. Preliminary results from a poverty dynamics analysis further suggest that psychological well-being significantly affects both poverty entry and persistence. We discuss a range of avenues for follow-up research.

1. Introduction

Research in development economics traditionally focused on *external constraints* faced by poor people and how to alleviate them. These constraints may relate for example to credit, education, health or infrastructure. Over the past decades, a growing number of economists have also started to recognize the role that *internal constraints* may play in perpetuating poverty. Drawing on findings from psychology and anthropology, they study psychological and behavioral factors that may affect poverty dynamics.

In this paper we start exploring the relationship between psychological well-being and poverty dynamics in South-Africa. Rather uniquely so for a developing country, South-Africa boasts a nationally representative household panel survey that spans a decade. We rely on data from the National Income Dynamics Study (NIDS), which is implemented by the Southern Africa Labor and Development Research Unit at the University of Cape Town. NIDS started in 2008 with a nationally representative sample covering more than 28,000 individuals in 7,300 households. Since then, survey waves were conducted bi-annually. Our analysis exploits all five waves of data that are currently available, covering the period 2008-2017 (SALDRU 2008, 2011, 2012, 2015, 2017). Besides a large range of socio-economic variables, NIDS incorporates measures of psychological well-being and life satisfaction, including the Epidemiologic Studies Depression (CES-D) scale. This is unique for a household panel survey in a developing country.

In a first descriptive analysis we find a strong negative correlation between psychological well-being and per capita household expenditure. Individuals in lower expenditure deciles display significantly lower levels of psychological well-being, are more likely to be at risk of depression, are less satisfied with their life overall and are more likely to be less happy than 10 years ago. We then move to a more rigorous econometric analysis, exploring poverty dynamics with a tri-variate probit model that accounts for potential endogeneity arising from initial conditions affecting poverty status and non-random attrition from the sample. Preliminary results suggest that psychological well-being significantly affects both poverty entry and persistence.

In what follows we first offer a brief overview of related literature. Section 3 presents the data and a descriptive analysis, while poverty dynamics are explored in Section 4. We conclude in Section 5 by discussing the results and highlighting potential avenues of further research.

2. Related literature

A longstanding literature, going back to Easterlin (1974), has investigated how income affects psychological well-being. Recent empirical evidence shows that self-reported happiness, well-being and satisfaction increase with absolute income, both within and across countries (Sacks, Stevenson, and Wolfers 2012). Research further links poverty to poor mental health and mental disorders. A systematic review of the literature found

that out of 115 studies on low and middle income countries, 79% reported a positive relationship between various poverty indicators and mental disorders (Lund et al. 2010).

The psychological literature puts forward two main pathways that link poverty and mental health. The 'social causation' hypothesis posits that circumstances associated with living in poverty – e.g. high levels of stress, malnutrition, social exclusion, lowered social capital, exposure to violence – increase the risk of mental illnesses. The 'social drift' hypothesis reverses the argument, arguing that individuals with a mental illness are more likely to fall into poverty and less likely to escape from it, through e.g. loss of productivity and employment, elevated health expenditures and stigma (Lund et al. 2011).

Growing evidence from natural and field-experiments confirms that increases in poverty are causally associated with lowered psychological well-being and stress, while the opposite is true for reductions in poverty. Moreover, stress and poor psychological well-being have been associated with short-sighted and risk-averse decision-making. These relationships may thus constitute a negative feedback loop, where poverty is perpetuated by inducing psychological states that lead to poor choices, such as lowering long-term investments in education and health (see Haushofer and Fehr (2014) for an overview of the literature). Experimental research by Mani et al. (2013) further indicates that poverty causes a shortfall of cognitive capacity. Being preoccupied with poverty-related concerns limits the amount of mental resources that poor people have available

for other tasks, thereby often leading to choices and behavior that may further perpetuate poverty.

A burgeoning literature investigates the link between economic development, hope and aspirations. Theoretical work submits that poverty stifles aspirations, leading the poor to underinvest in future-oriented behavior because their own experiences and their social environment suggest that it is almost impossible to escape poverty (Dalton, Ghosal, and Mani 2016; Genicot and Ray 2017; Ray 2006). Consolidating previous work in psychology, anthropology and economics, Lybbert and Wydick (forthcoming) develop an economic model of hope that offers a framework to understand how internal constraints may limit upward mobility of the poor. They decompose hope into aspirations, pathways and agency: hope requires that an individual possesses a specific goal or aspiration that is meaningful as a future outcome, that the individual is able to visualize a pathway to reach that goal, and that he or she has the agency to progress along this pathway.

The above studies call for increased attention for the psychological costs associated with poverty, as well as the potential psychological benefits of poverty-alleviating interventions. Theoretical research suggests that interventions only focused on relieving external constraints may have little impact in cases where internal constraints are binding. A complementary approach on relieving both external and internal constraints thus seems warranted. Recent empirical evidence supports the idea that poverty-alleviation programs with such a holistic approach may be highly effective.

Wydick et al. (2017) find that a child sponsorship program, executed in six countries, had a significant impact on sponsored children's school completion, the probability and quality of employment and their income and wealth in adulthood. The authors argue that the program's impact was at least partly achieved through its ability to alleviate internal constraints. In two studies on currently sponsored children, they show that sponsorship significantly increased hope, happiness, self-efficacy and educational aspirations (Glewwe et al., forthcoming; Ross et al., 2017). Other evidence comes from Banerjee et al. (2015) who show that a multifaceted program – combining the transfer of a productive asset with a holistic set of services, including skills training, home visits and coaching – caused a cost-effective improvement in the consumption and psychosocial status of very poor households in six countries.

A handful of recent innovative field experiments have focused on the design and evaluation of interventions that may alleviate internal constraints. Several studies point to the importance of role models in raising aspirations among the poor (Beaman et al. 2012; Macours and Vakis 2014). Interestingly, while these studies analyze actual exposure to and interaction with role models over several years, tentative evidence suggests that a simple and more indirect exposure to role models may also work. In a randomized set-up in Ethiopia, Bernard et al. (2014) organized the screening of documentaries featuring people with a similar background as the study participants, in which they tell the story of how they managed to escape from poverty. The intervention was found to have positively impacted aspirations, as well as future-looking behavior

such as savings and investments in children's education. Lybbert and Wydick (Forthcoming) organized a similar documentary screening in Mexico. Here, the documentary was part of a larger intervention, which further included an aspect of goal-setting and a four-week 'hope curriculum', in which the above-mentioned components of hope were discussed. Preliminary results suggest that the intervention significantly raised hope and aspirations. Riley (2018) experimentally evaluates the impact of role models in a movie on student performance in Uganda. Secondary school students who were randomly selected to watch the movie 'Queen of Katwe', featuring a potential role model, where significantly less likely to fail their math exams and achieved higher overall exam scores. Finally, in a field experiment in Colombia, Aguinaga et al. (2017) estimate how the achievement of business-related objectives is affected by goal-setting, monetary incentives and support groups. While the combination of the three program components resulted in the highest achievements, the mere act of establishing a goal yielded substantial results.

In sum, the existing evidence suggests that psychological well-being and internal constraints matter for economic development, and may partly explain poverty persistence. Early findings from a number of field experiments also suggest that simple and low-cost interventions may be effective in alleviating internal constraints. Programs encompassing such interventions in an integrated approach, that simultaneously addresses external and internal constraints, may especially have substantial potential to facilitate pathways out of poverty. However, in order to provide useful policy

prescriptions, more research from different settings is needed to assess the external validity of such interventions and to find out under which circumstances they are most effective. Moreover, research over a longer time-span is needed to ascertain whether the early impacts persist over time.

This paper aims to offer an exploratory analysis of the relationship between psychological well-being and poverty dynamics in South-Africa using NIDS data. We also discuss avenues for follow-up research.

3. Data & descriptive analysis

NIDS consists of various survey modules and records a wide range of socio-economic variables at the individual and household level. Information relating to individual psychological well-being is drawn from two sections in the survey module implemented among adults: "Emotional Health" and "Well-being and Social Cohesion".

3.1 Measures of psychological well-being

The first measure of psychological well-being we consider is the Epidemiologic Studies Depression (CES-D) scale. The CES-D scale was designed to measure depressive symptomatology (Radloff 1977). Respondents answer a range of questions relating to how often in the past week they felt emotions related to depression or well-being. NIDS includes a 10-item version of CES-D; which probes the frequency of various feelings

including depression, loneliness, fear, hopefulness and happiness. Answer categories include (1) Rarely or none of the time – less than 1 day; (2) Some or little of the time – 1-2 days; (3) Occasionally or a moderate amount of time – 3-4 days; (4) All of the time – 5-7 days. For positive feelings the scores of the answer categories are reversed. Adding up the scores for each item yields the CES-D 10 scale, which ranges from 0 to 30, with higher scores indicating stronger presence of depressive symptoms. The CES-D score has been widely validated (e.g. Zhang et al. 2012; González et al. 2017) and used in analyses (e.g. Dustmann and Fasani 2016; Hamad et al. 2008). It can be considered as measuring a continuum from well-being to depression; the higher one's score, the more likely one is to experience various psychological problems over time (Siddaway, Wood, and Taylor 2017). A recent study tested the reliability and validity of the CES-D 10 in Zulu, Xhosa and Afrikaans populations in South Africa and concluded that it is a "valid, reliable screening tool for depression" (Baron, Davies, and Lund 2017, 1). The study further suggested that, in the South African context, a score of 12 or higher can be used to identify individuals at high risk of depression.

We further consider a subjective measure of well-being. Respondents were asked to assess the overall satisfaction with their life "Using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied", how do you feel about your life as a whole right now?". A large literature shows that measurements of subjective life satisfaction correlate in predictable ways with individual's demographic characteristics, health outcomes, and neurological functioning and characteristics, suggesting they

provide a valid and meaningful indicator of an individual's well-being (e.g. Kahneman and Krueger 2006; Frey and Stutzer 2002; Stutzer and Frey 2010; Posel and Casale 2011; Sacks, Stevenson, and Wolfers 2012).

3.2 Describing psychological well-being in NIDS

In what follows we limit the analysis to the sample of adults (>15 years) that were successfully interviewed with the adult survey in all 5 waves and answered the relevant questions to construct the measures of psychological well-being. For the CES-D score this balanced panel comprises 6,100 adults and 30,500 observations; for the life satisfaction score we count 5,690 adults and 28,450 observations.

As expected, the CES-D and life satisfaction scores are negatively correlated. We find a correlation coefficient of 0.24, significant at the 1%-significance level. While both concepts are thus clearly connected, they are not perfectly correlated, indicating that they capture different elements of an individual's psychological well-being. It is thus worth investigating how both measures relate to poverty.

Panel A of Figure 1 shows the histogram of the CES-D score for the balanced panel of adults. The vertical line indicates the threshold of 12, identifying 16% of the sample as having a high risk of depression. Panel B of Figure 1 graphs the cumulative distribution by NIDS wave. At every step of the distribution, the CES-D score was highest in wave 1, while being quite comparable across following waves. This is also

reflected in Table 1, showing that the average CES-D score was 8 in wave 1, while fluctuating around 7 in the following waves. The percentage of the sample at high risk of depression was highest in wave 1 (22%), dropped to 13% in wave 2 and then remained fairly stable in the following waves (around 15%).
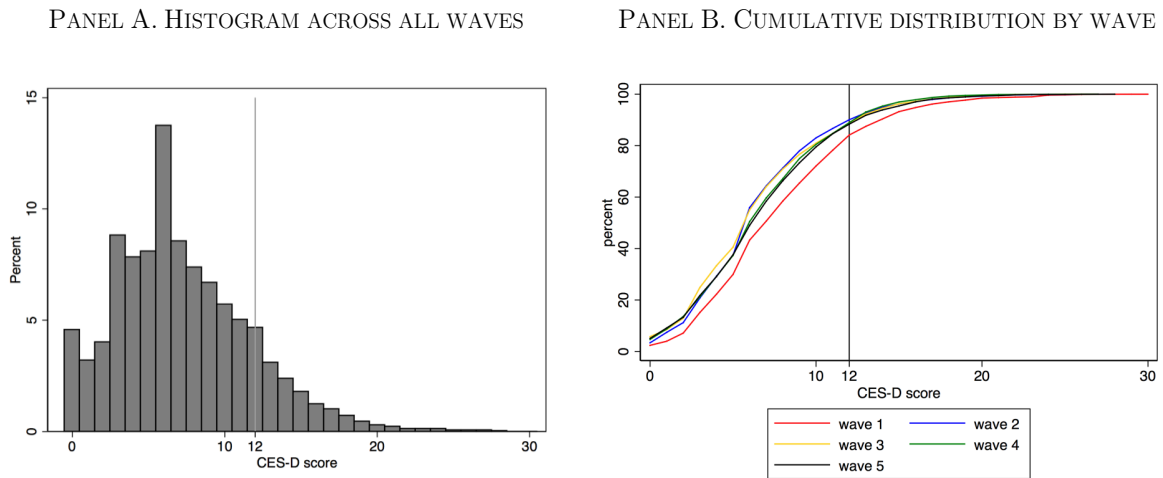
FIGURE 1. CES-D SCORE

PANEL A. HISTOGRAM ACROSS ALL WAVES   PANEL B. CUMULATIVE DISTRIBUTION BY WAVE

TABLE 1. CES-D 10, summary statistics

| | obs. | CES-D 10 score | | | | % |
		mean	st.dev.	min	max.	CES-D ≥ 12
Wave 1	6,100	8.16	4.66	0	30	21.81%
Wave 2	6,100	6.87	4.14	0	27	13.33%
Wave 3	6,100	6.78	4.30	0	27	15.27%
Wave 4	6,100	6.99	4.15	0	27	15.27%
Wave 5	6,100	7.13	4.37	0	28	15.39%
Overall	30,500	7.16	4.35	0	30	16.10%

Notes: Post-stratified weights were applied.

Panel A of Figure 2 shows the histogram of the life satisfaction scores for the balanced panel of adults, while Table 2 shows accompanying summary statistics. The overall life satisfaction averages a value of 5, with about 40% of the sample indicating to be less satisfied than this average. Panel B of Figure 2 graphs the cumulative

distribution by NIDS wave. In wave 1, life satisfaction averaged at 5.4, with 35% scoring

less than 5. Waves 4 and 5 are comparable to wave 1, while life satisfaction was lowest

in waves 2 and 3, averaging at 4.9 with about 45% scoring less than 5.
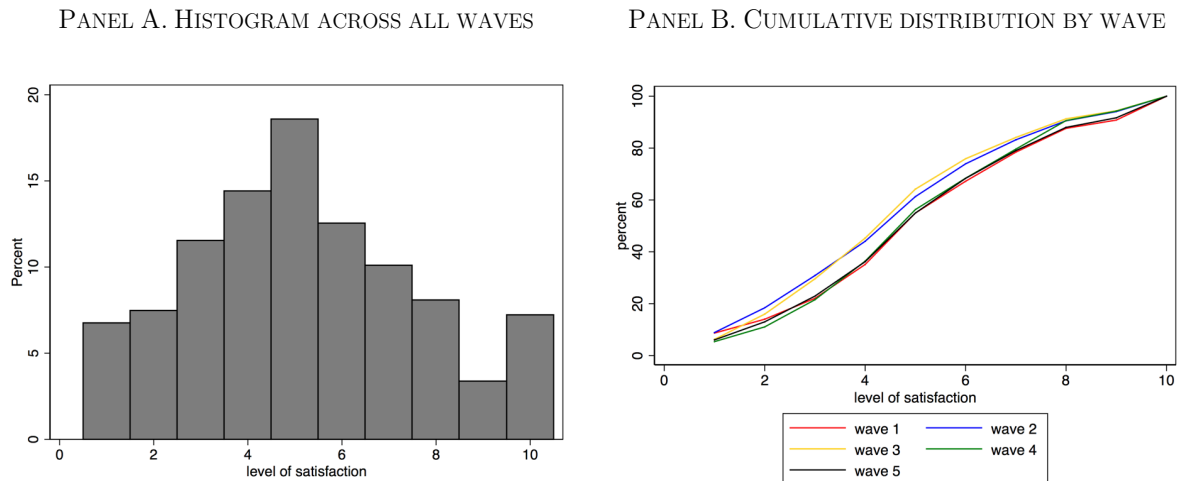
FIGURE 2. LIFE SATISFACTION SCORE

PANEL A. HISTOGRAM ACROSS ALL WAVES   PANEL B. CUMULATIVE DISTRIBUTION BY WAVE

TABLE 2. Life satisfaction, summary statistics

| | obs. | life satisfaction score | | | | % |
		mean	st.dev.	min	max.	satisfaction < 5
Wave 1	5,690	5.41	2.52	1	10	35.13%
Wave 2	5,690	4.95	2.47	1	10	44.06%
Wave 3	5,690	4.93	2.36	1	10	45.30%
Wave 4	5,690	5.36	2.32	1	10	36.40%
Wave 5	5,690	5.40	2.45	1	10	36.20%
Overall	28,450	5.20	2.43	1	10	39.65%

Notes: Post-stratified weights were applied.

We are interested in exploring the relationship between psychological well-being

and income. Following the general practice of Statistics South Africa (Stats SA), we rely

on per capita household expenditure which is assumed to provide a better approximation

of household income than reported income levels. Table 3 presents summary statistics

for real per capita monthly household expenditure, which has been deflated to March 2017 prices.[1] Figure 3 graphically presents the relationship between psychological well-being and per capita household expenditure. Panels A and B show the average CES-D and life satisfaction score for each decile of per capita household expenditure, which were calculated by wave. In line with the extant literature, we find a clear correlation for both measures, with individuals in lower expenditure deciles attaining on average higher CES-D scores and reporting lower life-satisfaction. We find correlation coefficients of -0.86 and 0.91, both significant at the 1%-significance level. Individuals in the lowest expenditure decile on average have a CES-D score of 8, compared to a score of 6 for individuals in the highest expenditure decile; similarly, their life satisfaction is lower (4.3 compared to 6.3).

TABLE 3. Per capita real monthly household expenditure

|	obs.	mean	st.dev.	min	max.
Wave 1	6,475	1,881	4,354	111	40,632
Wave 2	6,475	2,095	5,119	72	44,630
Wave 3	6,475	2,328	4,455	107	36,909
Wave 4	6,475	2,522	5,019	128	34,783
Wave 5	6,475	2,251	3,639	142	62,025
Overall	32,375	2,219	4,204	72	62,025

Notes: Expenditures are presented in March 2017 values; Post-stratified weights were applied; To deal with outliers, the bottom and top 0.1% of expenditures in each wave were winsorized.
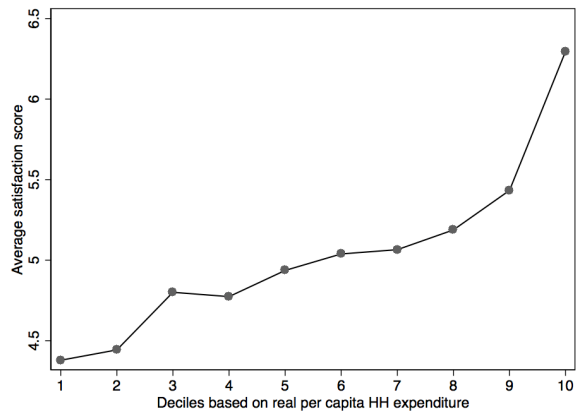
---

[1] The sample in this Table is comprised of all adults who were successfully interviewed during each wave and answered the CES-D and/or life satisfaction questions.
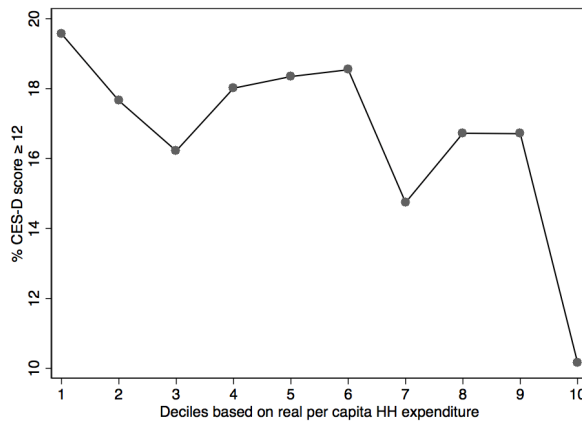
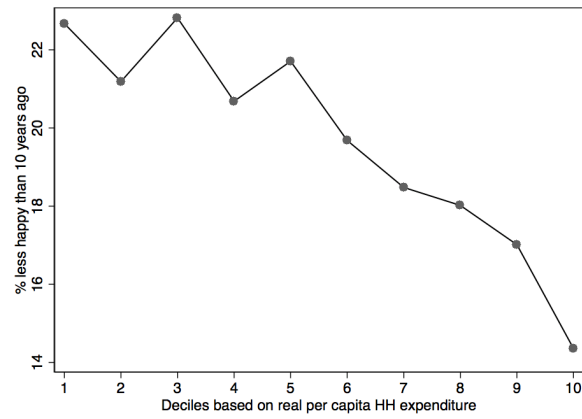FIGURE 3. PSYCHOLOGICAL WELL-BEING AND EXPENDITURE
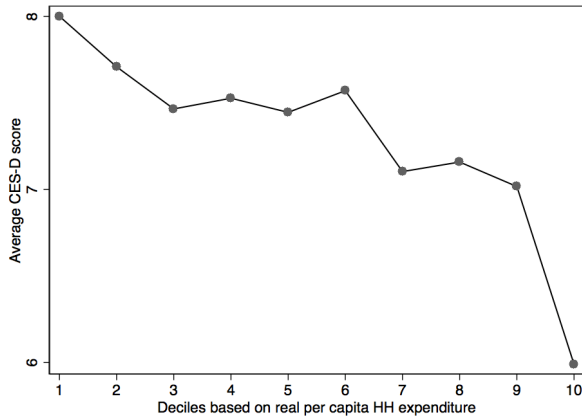
PANEL A. CES-D   PANEL B. LIFE SATISFACTION

PANEL C. CES-D ≥ 12   PANEL D. LESS HAPPY THAN 10 YEARS AGO

The graph in Panel C of Figure 3 shows the share of individuals at high risk of depression for each expenditure decile. We find strong differences, with 20% at high risk of depression in the lowest decile compared to 10% in the highest decile. Overall, we find a negative correlation coefficient of -0,68 significant at the 1%-level. Respondents in NIDS were also asked "Are you happier, the same or less happy with life than you were 10 years ago?". Answer categories include (1) Happier; (2) The same; and (3) Less happy. Panel D graphs the share of individuals who indicate to be less happy than 10 years ago by expenditure decile. Again, there is a large difference between the lowest decile (23%)

and the highest (14%). Here we find a negative correlation coefficient of 0.93 significant at the 1%-level.

It is important to highlight that the above graphs merely provide evidence of significant correlations, not of causation. Moreover, they do not account for the potentially confounding effect of other individual, household or environment characteristics. To illustrate the effect of confounding factors, Figure 4 graphs the relationship between psychological well-being, poverty status and population group. An individual's poverty status was defined according to Stats SA's upper-bound poverty line, which is set at R1,136 per person per month (in March 2017 values).[2] Panels A and B present the average CES-D and life satisfaction score for each of the population groups interviewed by NIDS.[3] On average, the lowest levels of psychological well-being are reported by Africans (CES-D: 7.4 ; life satisfaction: 5), followed by Coloureds (6.2 and 6), Asian/Indians (5.1 and 6.7) and whites (5.4 and 7.2). In Panels C and D of Figure 4 we reconstruct these graphs, while additionally accounting for poverty status. We now get a different picture, with poor individuals in the Asian/Indian and white population groups attaining the lowest mental health and life satisfaction scores.

---

[2] The upper-bound poverty line is calculated by Stats SA following a cost-of-basic-needs approach. Individuals with an expenditure level above the upper-bound poverty line are able to satisfy both their food- and non-food basic needs.

[3] Note that the 'Asian/Indian' population group accounts for less than 1% of this balanced sample. Comparisons with this population group thus suffer from lack of power due to its small sample size.

FIGURE 4. PSYCHOLOGICAL WELL-BEING BY POPULATION GROUP & POVERTY STATUS
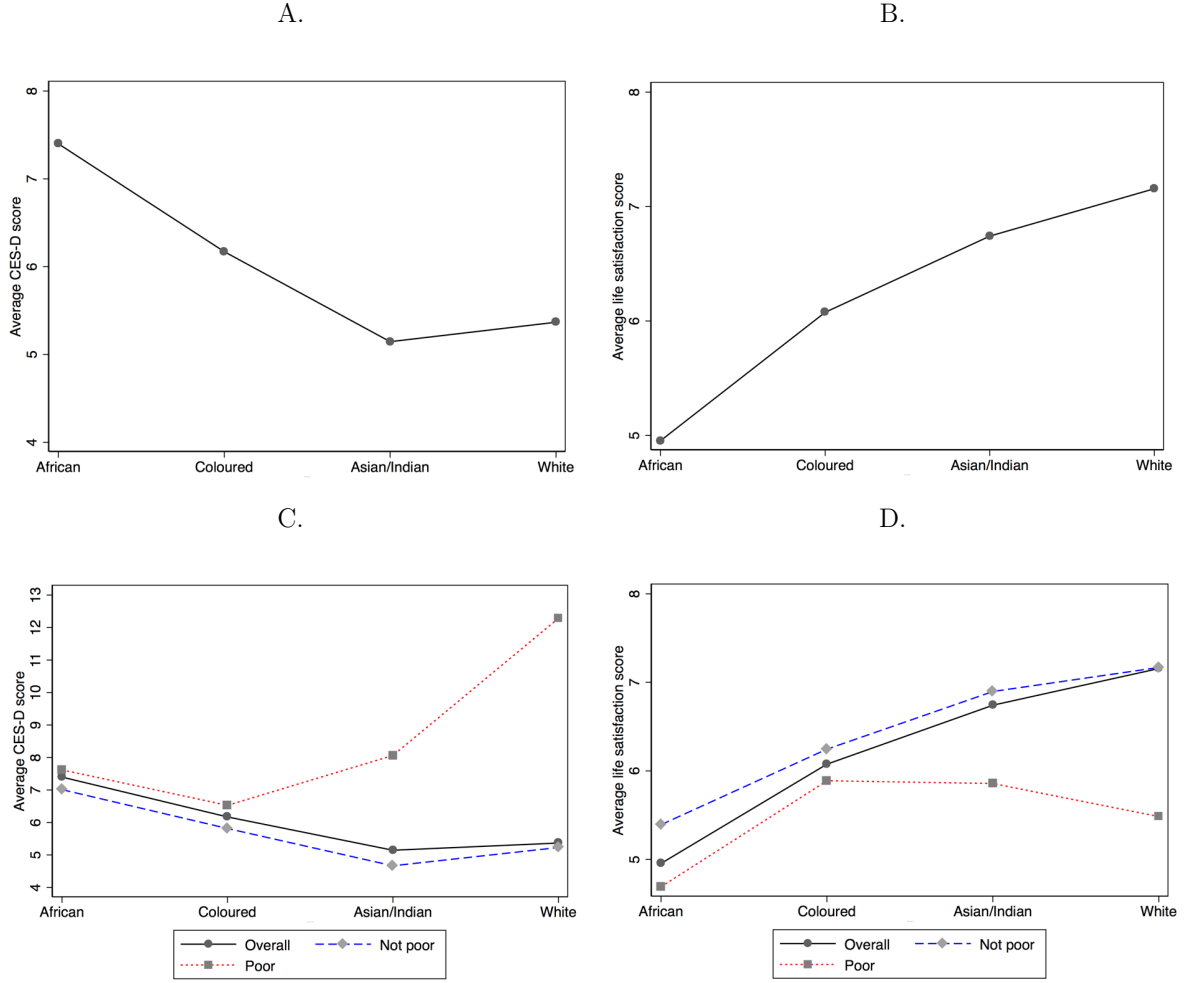
As a first step in controlling for potentially confounding factors we simply look at the correlation between household expenditure and psychological well-being while controlling for a large range of individual- and household-level socio-economic characteristics. Specifically, we run the following linear regression model:

$$(1) \quad \text{Exp}'_{iht} = \alpha_0 + \text{Ind}'_{iht}\ A + \text{HoH}'_{hz}\ B + \text{HH}'_{ht}\ \Gamma\ +\ \beta_1 \text{PW}\ +\gamma_{ht} +\ \mu_t + \varepsilon_{iht}$$

, where i indexes individuals, h households and t survey waves. The outcome variable, denoted by Exp'_{iht} is real per capita household expenditure. Ind'_{iht} and HoH'_{hz} are

vectors containing socio-demographic variables at the level of the individual and the household head; specifically: their age; gender; population group; education level and employment status. HH'_{ht} is a vector containing variables at the level of the household: the number of household members, employed household members, children (<18 years), and elderly (>60 years); a dummy indicating whether the household has access to basic goods and services (shelter, tap water, sanitation and electricity); and the area type (traditional, urban, or farming). Our measures for psychological well-being, the CES-D score and life satisfaction score, are denoted by PW. Finally, we control for fixed effects at the level of the province (γ_{ht}) and survey wave (μ_t). The standard errors, ε_{iht}, are clustered at the level of the individual. Since the measures of psychological well-being are correlated we control for them in separate model specifications.

The results are presented in Table 4. Even when controlling for a large range of potentially confounding socio-economic variables, both measures of psychological well-being remain significantly correlated with per capita household expenditure. A ten-unit decrease on the CES-D scale, indicating an improvement in mental health, is associated with a monthly per capita household expenditure that is higher with about R95 (or about 4% of the average per capita household expenditure). A one-unit increase on the life satisfaction scale is associated with a monthly per capita household expenditure that is higher with about R64 (or about 3% of the average per capita household expenditure). These should not be interpreted as causal effects. As the literature review pointed out, it is likely that a feedback loop exists, with poverty and psychological well-being

mutually affecting each other. We now move to a more rigorous econometric approach

to explore the relationship between psychological well-being and poverty dynamics.

TABLE 4. Correlation between per capita HH expenditure and psychological well-being, controlling for socio-economic variables

	(1)		(2)	
	Estimate	s.e.	Estimate	s.e.
Individual characteristics				
Age	10.96***	(1.56)	11.56***	(1.64)
Female	-116.36**	(48.19)	-163.79***	(49.19)
Population group (base: African)				
Colored	242.61	(261.83)	237.90	(277.87)
Asian / Indian	-4419.98	(3804.42)	-5081.07	(4100.07)
White	-5964.00	(5059.62)	-7542.08	(5501.61)
Level of education (base: no schooling)				
Primary school not completed	61.32	(46.66)	38.86	(49.73)
Primary school completed	163.41**	(64.74)	143.06**	(66.42)
Secondary school not completed	269.03***	(62.38)	284.24***	(65.68)
Secondary school completed	660.75***	(92.38)	609.09***	(88.12)
Tertiary education	1033.61***	(112.52)	1069.29***	(114.53)
Employment status (base: not economically active)				
Unemployed (discouraged)	-58.46	(87.35)	59.35	(52.61)
Unemployed (strict)	-62.05	(43.80)	-59.62	(45.60)
Employed	182.56***	(46.66)	186.90***	(48.23)
Characteristics of household head				
Age	9.24***	(1.60)	9.11***	(1.73)
HoH is female	-229.53***	(40.28)	-214.91***	(41.38)
Population group (base: African)				
Colored	-126.02	(265.84)	-204.23	(282.00)
Asian / Indian	6585.70*	(3787.18)	7239.55*	(4086.53)
White	12709.83**	(5041.80)	14225.41***	(5483.43)
Level of education (base: no schooling)				
Primary school not completed	-7.33	(34.39)	-17.41	(36.90)
Primary school completed	-48.40	(49.62)	-45.51	(52.43)
Secondary school not completed	110.74**	(47.76)	72.37	(50.86)
Secondary school completed	591.61***	(100.38)	577.32***	(100.63)
Tertiary education	1253.39***	(106.75)	1237.13***	(107.39)
Employment status (base: not economically active)				
Unemployed (discouraged)	54.43	(163.75)	-121.29**	(55.47)
Unemployed (strict)	-82.08	(60.99)	-91.34	(64.75)
Employed	273.94***	(45.27)	248.37***	(47.47)
Household characteristics				
Nr. HH members	-159.76***	(11.13)	-160.17***	(11.89)
Nr. of employed HH members	28.96	(22.42)	19.82	(22.98)
Nr. of children (<18 years)	41.25***	(14.22)	36.96**	(15.15)
Nr. of elderly members (>60 years)	-110.47***	(37.70)	-136.40***	(37.72)
HH has access to basic goods and services	343.98***	(55.38)	275.54***	(53.70)
Geographic location (base: traditional)				
Urban	105.14	(64.47)	160.17***	(61.17)
Farms	-365.32***	(71.89)	-321.14***	(76.93)
Psychological well-being				
CES-D scale	-9.48**	(3.95)		
Satisfaction with life scale			63.74***	(7.81)
Province FE	Yes		Yes	
Wave FE	Yes		Yes	
Observations	28,851		26,890	

Notes: * p<0.1, ** p<0.05, *** p<0.01; Robust standard errors are clustered at the individual-level and reported in parentheses; the dependent variable is per capita real household expenditure; the sample is comprised of individuals that were successfully interviewed with the adult survey in all 5 waves and answered the relevant questions to construct the measures of psychological well-being.

4. Psychological well-being and poverty dynamics

To investigate what role psychological well-being plays in poverty dynamics, we build on a methodology developed by Cappellari and Jenkins (2002, 2004, 2008). Their econometric approach allows us to estimate a multivariate model of poverty transitions from one wave to the next, investigating which variables are associated with poverty entry and exit. The method is particularly useful because it simultaneously controls for the determinants of initial poverty status, unobserved heterogeneity and potential non-random attrition from the sample. We illustrate the importance of these issues by examining the descriptive poverty transitions presented in Table 5. These have been calculated by pooling the NIDS data such that we can examine transitions from one survey wave to the next. In total, we have information on 67,336 adults with non-missing expenditure data who have been interviewed with the adult survey over at least two consecutive waves, labeled year t-1 and year t.

TABLE 5: Descriptive poverty transitions

Poverty status, year t-1	Poverty status, year t		
	Non-poor	Poor	Missing
A: Sample with non-missing expenditure in year t			
Non-poor	76.88	23.12	
Poor	20.45	79.55	
All	43.48	56.52	
B: All individuals			
Non-poor	57.69	17.35	24.97
Poor	17.13	66.60	16.27
All	34.76	45.19	20.05

Notes: Calculations are based on the pooled sample of waves 1 to 5, considering transitions from one wave to the next; Poverty status was calculated based on the Stats SA upper-bound poverty line (as in Section 3); Post stratified survey weights were applied.

Panel A shows evidence of substantial poverty persistence: the large majority of individuals who were poor in year t-1 remained poor in year t (80%), while most non-poor individuals remained non-poor (77%). Overall, individuals who were poor in year t-1 are 56.5 percentage points more likely to be poor in year t than individuals who were non-poor in year t-1. The econometric model we employ explicitly takes into account that the probability of being poor in the current period may depend on poverty status in the previous period, and allows for individual heterogeneity in this relationship. In particular, it allows to estimate how the experience of poverty, in combination with given attributes, may lower an individual's chances to escape poverty in the future.

Panel B of Table 5 also considers individuals with missing information on expenditure in year t. It shows evidence of selective sample attrition: individuals who were non-poor in year t-1 are about 9 percentage points more likely to be missing in year t. The chosen econometric approach aims to limit potential biases arising from selective sample attrition by jointly controlling for the observable and unobservable determinants of panel retention and poverty dynamics.

4.1 Model specification and test statistics

We model poverty dynamics from one period to the next by estimating a tri-variate probit estimation. Specifically, we jointly estimate three equations: 1) the determinants of poverty status in the previous period – allowing us to control for the potential

endogeneity of initial conditions; 2) the determinants of retention in the sample from one period to the next – allowing us to control for potential selective panel attrition; and 3) the determinants of current poverty status. The impact of explanatory variables on current poverty status is allowed to differ according to poverty status in the previous period. Hence, the model allows to estimate how the explanatory variables impact both poverty persistence and poverty entry.

The explanatory variables included in the three equations are the same as those presented in Section 3. All explanatory variables are measured in year t-1, prior to a potential poverty transition between year t-1 and year t, and are thus considered predetermined. The choice of these variables follows the literature, in particular Finn and Leibbrandt (2017) and Schotte, Zizzamia, and Leibbrandt (2018) who have previously applied this methodology to the NIDS data.[4] We complement their analyses by explicitly considering the role of psychological well-being.

Identification in the model relies on instrumental variables that need to satisfy specific exclusion restrictions. In choosing the instruments, we follow Schotte, Zizzamia, and Leibbrandt (2018) who in turn base their approach on Cappellari and Jenkins (2002, 2004, 2008). As an instrument for the equation estimating the determinants of initial poverty status, we consider a variable describing the mother's highest level of education. Conditional on the other explanatory variables, it is assumed to affect an individual's

---

[4] We refer to these papers for further technical details regarding the econometric framework and its theoretical underpinnings.

initial poverty status, but have no direct impact on his or her wave-to-wave poverty transitions. As an instrument for the equation estimating the determinants of panel retention, we include a dummy variable for original sample members – indicating individuals who were included in the NIDS panel from the first wave onwards. It is assumed that sample retention is more likely for these individuals, while their membership status should not directly impact wave-to-wave poverty transitions.

Panel A of Table 6 presents test results regarding the validity of these instruments. The contribution of mother's education level is statistically significant in the initial poverty status equation, while it can be safely excluded from the poverty transition equation. Likewise, membership status is statistically significant in the retention equation, while it can be safely excluded from the poverty transition equation. These findings suggest that the exclusion restrictions hold for both instruments and provide confidence in the identification of the model.

We further tested the exogeneity of the initial poverty status and retention equations. Panel B of Table 6 presents estimates for the cross-equation correlations of unobservables. We find a negative and significant correlation between the unobservables affecting initial poverty status in year t-1 and conditional poverty status in year t. Thus, unobservable factors increasing the likelihood of being poor initially, reduce the likelihood of conditional poverty. This is in line with previous findings in the literature (Stewart and Swaffield 1999; Cappellari and Jenkins 2002; Schotte, Zizzamia, and Leibbrandt 2018), and indicate that ignoring the endogeneity of initial poverty status

would lead one to underestimate poverty persistence. We further find that the unobservables affecting the retention and transition equations are negatively and significantly correlated, while there is no significant correlation between the unobservables affecting the retention and initial poverty equations. In Panel C of Table 6, we test the exogeneity of both selection equations. The null hypothesis for exogeneity of the initial poverty status is strongly rejected at the 1%-significance level, while that of the transition equation is rejected at the 10%-level. The null hypothesis for joint exogeneity is rejected at the 1%-level. Both selection mechanisms thus appear endogenous to poverty transitions, justifying our approach.

TABLE 6: Test statistics and cross-equation correlations

A: Instrument validity	Chi2	p-value
Inclusion of mother's education level in initial poverty status equation (df:5)	115.98***	0.000
Inclusion of original sample membership in retention equation (df:1)	20.91***	0.000
Exclusion of mother's education level from transition equation (df:10)	9.77	0.461
Exclusion of sample membership from transition equation (df:2)	1.67	0.434
Exclusion of mother's education level and sample membership from transition equation (df:12)	11.70	0.470
B: Cross-equation correlations between unobserved effects	Corr.	s.e.
Initial poverty status and transition equations (ρ_{21})	-0.331***	0.046
Retention and transition equations (ρ_{31})	-0.055*	0.029
Retention and initial poverty equations (ρ_{32})	0.049	0.033
C: Exogeneity of selection equations (Wald test)	Chi2	p-value
Initial poverty status equation ($\rho_{21}=\rho_{32}=0$)	53.55***	0.000
Retention equation ($\rho_{31}=\rho_{32}=0$)	4.68*	0.088
Joint exogeneity ($\rho_{21}=\rho_{31}=\rho_{32}=0$)	55.34***	0.000
D: State dependence	Chi2	p-value
Test whether poverty transition estimates are identical for initially poor and non-poor (df:44)	385.11***	0.000

Notes: * p<0.1, ** p<0.05, *** p<0.01; Calculations are based on the pooled sample of waves 1 to 5, considering transitions from one wave to the next; Poverty status was calculated based on the Stats SA upper-bound poverty line (as in Section 3); Post stratified survey weights were applied; Simulated maximum likelihood estimation with 250 draws.

Finally, in Panel D of Table 6, we test whether the coefficient estimates in the poverty transition equation are identical for the initially poor and the initially non-poor.

This test is strongly rejected, at the 1%level, indicating that past poverty status has a significant effect on future poverty transitions.

4.2 Results

Table 7 presents the results for the poverty transition equation. As previously indicated, the impact of explanatory variables on poverty status in year t is allowed to differ according to poverty status in year t-1. Hence, two sets of estimates are reported, indicating how the explanatory variables impact both poverty persistence and poverty entry. Besides coefficient estimates from the tri-variate probit model, we also calculated average marginal effects – indicating how a marginal change in an explanatory variable affects one's probability to remain in poverty (for individuals who were poor in year t-1) or to enter poverty (for those who were not poor in year t-1).

Demographic characteristics of the individual matter. For those who were initially poor, the probability of poverty persistence is lower for individuals who are younger, male, white and highly educated. It is interesting to note, however, that these characteristics barely affect the probability of falling into poverty for those who were initially not poor. Formal self-employment and having a permanent contract as an employee further significantly reduce the risk of poverty. Demographic characteristics of the household head also matter significantly, with individuals living in households where the head is female, African and poorly educated facing higher poverty risks. The risk of

poverty reduced, on the other hand, when the household head has a permanent employment contract or is engaged in formal self-employment. Individuals living in larger households also face a higher risk of poverty, but this risk reduces with the number of employed household members.

Moving to our measures of psychological well-being, the results in Table 7 indicate that an individual's CES-D score in year t-1 is significantly related his or her poverty transitions between year t-1 and year t. Specifically, a 10-unit increase in the CES-D score increases the risk of poverty persistence with 2% and the risk of poverty entry with 4%. Table 8 presents the results from the initial poverty status and panel retention equations. It is interesting to note that a higher CES-D score increases the probability of being poor initially, but has no significant effect on the likelihood of panel retention. We further present the coefficient estimates of the instruments which are in line with the validity tests presented in Table 6.

TABLE 7: Determinants of being poor in year t, conditional on poverty status in year t-1

	Poverty persistence			Poverty entry		
	average marg. eff.	coeff. estimate	s.e.	average marg. eff.	coeff. estimate	s.e.
Individual characteristics in t-1						
Age	0.001	0.004***	(0.001)	-0.000	-0.001	(0.002)
Female	0.024	0.088***	(0.024)	0.014	0.050	(0.040)
Population group (base: African)						
Colored	0.108	0.436***	(0.140)	0.0716	0.254	(0.216)
Asian / Indian	0.228	1.300***	(0.471)	0.027	0.097	(0.436)
White	-0.454	-1.418**	(0.637)	0.003	0.011	(0.413)
Level of education (base: no schooling)						
Primary school not completed	0.019	0.072	(0.050)	0.060	0.206*	(0.119)
Primary school completed	0.024	0.090	(0.060)	0.047	0.164	(0.138)
Secondary school not completed	-0.006	-0.020	(0.049)	0.022	0.077	(0.110)
Secondary school completed	-0.044	-0.156***	(0.059)	-0.030	-0.108	(0.117)
Tertiary education	-0.086	-0.296***	(0.065)	-0.063	-0.235*	(0.122)
Employment status (base: inactive)						
Unemployed (discouraged)	0.035	0.133*	(0.072)	0.128	0.448***	(0.139)
Unemployed (strict)	-0.016	-0.058	(0.039)	0.092	0.325***	(0.081)
Subsistence farmer	0.046	0.174	(0.108)	0.068	0.243	(0.217)
Casual worker / helping others	0.023	0.085	(0.067)	0.120	0.418***	(0.127)
Self-employed	-0.019	-0.069	(0.076)	0.072	0.256**	(0.115)
Formal self-employment	0.024	0.088	(0.274)	-0.130	-0.552***	(0.206)
Employee	-0.001	-0.002	(0.046)	0.020	0.075	(0.076)
Employee with a permanent contract	-0.029	-0.104*	(0.059)	-0.007	-0.028	(0.079)
Characteristics of household head in t-1						
Age	0.001	0.002**	(0.001)	-0.003	-0.010***	(0.002)
HoH is female	0.020	0.073***	(0.026)	0.064	0.228***	(0.041)
Population group (base: African)						
Colored	-0.072	-0.259*	(0.141)	-0.107	-0.382*	(0.217)
Asian / Indian	-0.655	-2.695***	(0.500)	-0.276	-1.295***	(0.437)
White	0.074	0.310	(0.613)	-0.246	-1.068***	(0.409)
Level of education (base: no schooling)						
Primary school not completed	0.022	0.079**	(0.039)	-0.060	-0.191*	(0.106)
Primary school completed	0.031	0.112**	(0.052)	-0.071	-0.228*	(0.131)
Secondary school not completed	0.014	0.052	(0.042)	-0.138	-0.456***	(0.105)
Secondary school completed	-0.007	-0.026	(0.061)	-0.158	-0.527***	(0.116)
Tertiary education	-0.058	-0.196***	(0.067)	-0.212	-0.738***	(0.116)
Employment status (base: inactive)						
Unemployed (discouraged)	0.005	0.017	(0.080)	-0.068	-0.265*	(0.142)
Unemployed (strict)	0.011	0.039	(0.046)	0.017	0.061	(0.089)
Subsistence farmer	0.003	0.012	(0.089)	-0.016	-0.060	(0.198)
Casual worker / helping others	0.046	0.171***	(0.066)	0.092	0.324**	(0.143)
Self-employed	0.021	0.076	(0.062)	0.044	0.157	(0.104)
Formal self-employment	-0.133	-0.442**	(0.200)	-0.042	-0.159	(0.152)
Employee	0.023	0.085*	(0.046)	0.052	0.187**	(0.080)
Employee with a permanent contract	-0.031	-0.108**	(0.054)	-0.054	-0.208***	(0.080)
Household characteristics in t-1						
Nr. HH members	0.022	0.078***	(0.009)	0.043	0.149***	(0.022)
Nr. of employed HH members	-0.024	-0.080***	(0.017)	-0.026	-0.117***	(0.032)
Nr. of children (<18 years)	0.009	0.033***	(0.013)	-0.013	-0.053*	(0.028)
Nr. of elderly members (>60 years)	-0.025	-0.083***	(0.022)	0.030	0.103***	(0.039)
HH has access to basic goods and services	-0.053	-0.187***	(0.035)	-0.025	-0.089**	(0.045)
Geographic location (base: traditional)						
Urban	0.012	0.042	(0.035)	-0.056	-0.199***	(0.052)
Farms	0.049	0.184***	(0.055)	0.054	0.181*	(0.100)
Psychological well-being in t-1						
CES-D scale	0.002	0.006**	(0.003)	0.004	0.015***	(0.004)

Province FE		Yes
Wave FE		Yes
Observations		55,088

Notes: * p<0.1, ** p<0.05, *** p<0.01; Robust standard errors are clustered at the individual-level and reported in parentheses; Calculations are based on the pooled sample of waves 1 to 5, considering transitions from one wave to the next; Poverty status was calculated based on the Stats SA upper-bound poverty line (as in Section 3); Post stratified survey weights were applied; Simulated maximum likelihood estimation with 250 draws.

TABLE 8: Determinants of initial poverty status and panel retention

	Initial poverty status		Panel retention	
	coeff. estimate	s.e.	coeff. estimate	s.e.
Psychological well-being in t-1				
CES-D scale	0.007***	(0.003)	-0.000	(0.005)
Instruments				
Level of education Mother (base: no schooling)				
Primary school not completed	-0.179***	(0.041)		
Primary school completed	-0.342***	(0.045)		
Secondary school not completed	-0.566***	(0.061)		
Secondary school completed	-0.106***	(0.039)		
Tertiary education	-0.164***	(0.038)		
Original sample member			0.271***	(0.059)
Individual characteristics in t-1		Yes		
Characteristics of household head in t-1		Yes		
Household characteristics in t-1		Yes		
Province FE		Yes		
Wave FE		Yes		
Observations		55,088		

Notes: * p<0.1, ** p<0.05, *** p<0.01; Robust standard errors are clustered at the individual-level and reported in parentheses; Calculations are based on the pooled sample of waves 1 to 5, considering transitions from one wave to the next; Poverty status was calculated based on the Stats SA upper-bound poverty line (as in Section 3); Post stratified survey weights were applied; Simulated maximum likelihood estimation with 250 draws.

We ran the model several times, including different measures of psychological well-being. Table 9 presents an overview of the results for these measures in the poverty transition equation. Recall that all explanatory variables are measured at year t-1, while we estimate their effect on poverty transitions between year t-1 and year t. The results are slightly ambiguous concerning the risk of poverty persistence for those who were initially poor. On the one hand we find that a 1-unit increase in the CES-D score increases the risk of poverty persistence with 0.2%; and that individuals who were less happy with their life than 10 years before are 1.6% more likely to remain in poverty. On the other hand, we don't find any significant effect for individuals with an elevated risk

of depression, and the results suggest that poor individuals who were more satisfied with their life have a slightly higher risk of remaining in poverty.

However, the results all point in the same direction when it comes to the risk of falling into poverty for those who were initially not poor. A 1-unit increase in the CES-D score increases the risk of poverty entry with 0.4%; a 1-unit increase on the life satisfaction scale decreases an individual's risk of falling into poverty with 0.7%; individuals with an elevated risk of depression are 3% more likely to fall into poverty; and individuals who are less happy with their life than 10 years before are 2.9% more likely to enter into poverty.

Overall, these preliminary findings suggest that the risk of poverty increases as psychological well-being deteriorates. We discuss several avenues for follow-up research below.

TABLE 9: Psychological well-being and conditional poverty status in year t

	obs.	Poverty persistence			Poverty entry		
		average marg. eff.	coeff. estimate	s.e.	average marg. eff.	coeff. estimate	s.e.
Psychological well-being in t-1							
CES-D scale	55,088	0.002	0.006**	(0.003)	0.004	0.015***	(0.004)
Life satisfaction scale	54,585	0.003	0.010**	(0.005)	-0.007	-0.026***	(0.008)
CES-D 12	55,088	0.004	0.015	(0.033)	0.030	0.106**	(0.051)
Less happy than 10 years ago	55,197	0.016	0.060**	(0.030)	0.029	0.100**	(0.049)

Notes: * p<0.1, ** p<0.05, *** p<0.01; Robust standard errors are clustered at the individual-level and reported in parentheses; Calculations are based on the pooled sample of waves 1 to 5, considering transitions from one wave to the next; Poverty status was calculated based on the Stats SA upper-bound poverty line (as in Section 3); Post stratified survey weights were applied; Simulated maximum likelihood estimation with 250 draws.

5. Discussion

We set out to investigate the relationship between psychological well-being and poverty in South-Africa. Using data from Waves 1-5 of the National Income Dynamics Study, we document a strong negative correlation between psychological well-being and per capita household expenditure. On average, individuals in lower expenditure deciles display lower levels of psychological well-being, a higher risk of depression and lower life satisfaction. They are also more likely to be less happy compared to 10 years ago. Using a tri-variate probit model that accounts for endogeneity stemming from initial poverty conditions and non-random panel attrition, we then explored poverty transitions from one survey wave to the next. Preliminary results suggest that the risk of both poverty entry and poverty persistence increase as an individual's psychological well-being deteriorates.

Our analysis resonates with findings from the recent economic literature on the psychology of poverty. The existing evidence suggests that psychological well-being and internal constraints matter for economic development, and may partly explain poverty persistence. Overall, this literature calls for an increased attention for the psychological costs associated with poverty, as well as the potential psychological benefits of poverty-alleviating interventions.

While other disciplines, notably psychology, have a longer history researching internal constraints, Lybbert and Wydick (forthcoming) argue that economists have

several contributions to make. First, the majority of research in psychology has focused on the developed world. Drawing on insights from these studies, development economists are trying to build a more complete understanding of poverty and economic mobility by applying these insights in the context of developing countries. Second, since internal constraints appear to be important in explaining movements in-and-out of poverty, an area of comparative advantage lies in economist's use of sophisticated tools to analyze heterogeneous poverty dynamics. Third, from a policy perspective it is important to get a better understanding of the extent to which development interventions may alleviate internal constraints. Here, economists may contribute by developing and implementing identification frameworks that enable the estimation of causal effects. Finally, as economic analysis often displays a strong link with state actors and policy makers, economists may be better placed at influencing policy.

We discuss several avenues for further research within this agenda, most of which can be explored with the existing NIDS data. First, previous research on poverty dynamics in South-Africa has pointed to the importance of the Child Support Grant (CSG) in lifting individuals out of poverty (Finn and Leibbrandt 2017). In terms of outreach, the CSG is the largest social protection program in South-Africa, reaching about 10.8 million individuals. It consists of an unconditional cash transfer to eligible recipients that meet two requirements: having children of a certain age, and having an income below a certain threshold. Several studies have evaluated the grant's impact on various outcomes, including child health, school enrolment and labor supply (Coetzee

2013; DSD, SASSA and UNICEF 2012; Eyal and Woolard 2013; Tondini 2017). However, none of these studies have addressed the grant's impact on alleviating internal constraints. While the CSG does not explicitly aim to improve psychological well-being, recent evidence suggests that unconditional cash transfers may also have a significant impact in this area (Haushofer and Shapiro 2016).

Second, existing research suggests that the experience of local violence and crime has a negative effect on individual's mental health (e.g. Dustmann and Fasani 2016). The NIDS dataset also records information on the perception of local community violence and crime. Tomita, Labys, and Burns (2015) rely on this information, from NIDS wave 2, to demonstrate that the perception of such violence is associated with an increased risk of depression. Other studies suggests that exposure to violent crime may limit one's economic mobility (e.g. Sharkey and Torrats-Espinosa 2017). By combining information from NIDS waves 1-5 one could dig deeper in the relationship between the experience of violence, psychological well-being and economic mobility.

Third, Schotte, Zizzamia, and Leibbrandt (2018) use the NIDS data to define five social classes in South-Africa based on their risk of remaining in or falling into poverty: the chronic poor, the transient poor, the vulnerable, the middle class and the elite. Their analysis could be expanded by exploring the extent to which psychological well-being plays a role in inter-class transitions.

Fourth, existing evidence suggests the existence of a feedback loop between psychological well-being and poverty. The econometric approach taken by Alloush

(2018) – a panel GMM (Generalized Method of Moments) – offers opportunities to further explore this bi-directional relationship.

Finally, despite economists' increasing interest in hope and aspirations as causal mechanisms for poverty reduction, very little research has tested and validated measurement instruments of these concepts in the context of developing countries. A recent paper evaluates how standard measures developed by psychologists perform in rural Myanmar (Bloem et al., 2017). While the measures performed relatively well, the authors highlight the importance of contextualizing them to local circumstances. To date, no such exercise has been conducted in South-Africa. Doing so would be interesting in and of itself, but could also serve two other purposes.

First, developing and validating such measurement instruments would be a prerequisite to evaluate the impact of an integrated development intervention on its ability to alleviate internal constraints. Early evidence from a number of studies and field experiments suggests that integrated development interventions, simultaneously addressing both external and internal constraints, may have substantial potential to facilitate pathways out of poverty. However, more research from different contexts is necessary to assess their external validity and to get a better insight into the conditions under which they are most effective. Several poverty-alleviation interventions in South-Africa provide economic support, while also trying to alleviate internal constraints. To date, no such intervention has been the subject of a rigorous evaluation in an experimental set-up.

Second, it would be a necessary step towards potentially incorporating refined instruments to measure internal constraints within a nationally representative panel survey such as NIDS. This, in turn, would allow for a more nuanced analysis of the role that internal constraints play in poverty dynamics.

References

Aguinaga, Paulina, Alessandra Cassar, Jennifer Graham, Lauren Skora, and Bruce Wydick. 2017. "Raising Achievement Among Microentrepreneurs: An Experimental Test of Goals, Incentives, and Support Groups in Medellin, Columbia." Working Paper. University of San Francisco.

Alloush, Mohamad. 2018. "Income, Psychological Well-Being and the Dynamics of Poverty: Evidence from South-Africa." Working Paper.

Banerjee, Abhijit, Esther Duflo, Nathanael Goldberg, Dean Karlan, Robert Osei, William Parienté, Jeremy Shapiro, Bram Thuysbaert, and Christopher Udry. 2015. "A Multifaceted Program Causes Lasting Progress for the Very Poor: Evidence from Six Countries." *Science* 348 (6236): 1260799.

Baron, Emily Claire, Thandi Davies, and Crick Lund. 2017. "Validation of the 10-Item Centre for Epidemiological Studies Depression Scale (CES-D-10) in Zulu, Xhosa and Afrikaans Populations in South Africa." *BMC Psychiatry* 17 (1): 6.

Beaman, Lori, Esther Duflo, Rohini Pande, and Petia Topalova. 2012. "Female Leadership Raises Aspirations and Educational Attainment for Girls: A Policy Experiment in India." *Science* 335 (6068): 582–86.

Bernard, Tanguy, Stefan Dercon, Kate Orkin, and Alemayehu Taffesse. 2014. "The Future in Mind: Aspirations and Forward-Looking Behaviour in Rural Ethiopia." CSAE Working Paper Series. University of Oxford.

Bloem, Jeffrey R., Duncan Boughton, Kyan Htoo, Aung Hein, and Ellen Payongayong. 2017. "Measuring Hope: A Quantitative Approach with Validation in Rural Myanmar." *The Journal of Development Studies*, October.

Cappellari, Lorenzo, and Stephen P. Jenkins. 2002. "Who Stays Poor? Who Becomes Poor? Evidence From The British Household Panel Survey." *The Economic Journal* 112 (478): C60–67.

———. 2004. "Modelling Low Income Transitions." *Journal of Applied Econometrics* 19 (5): 593–610.

———. 2008. "Estimating Low Pay Transition Probabilities Accounting for Endogenous Selection Mechanisms." *Journal of the Royal Statistical Society: Series C (Applied Statistics)* 57 (2): 165–86.

Coetzee, Marisa. 2013. "Finding the Benefits: Estimating the Impact of The South African Child Support Grant." *South African Journal of Economics* 81 (3): 427–50.

Dalton, Patricio S., Sayantan Ghosal, and Anandi Mani. 2016. "Poverty and Aspirations Failure." *The Economic Journal* 126 (590): 165–88.

DSD, SASSA and UNICEF. 2012. "The South African Child Support Grant Impact Assessment." Pretoria: Department of Social Development, South Africa Social Security Agency and UNICEF.

Dustmann, Christian, and Francesco Fasani. 2016. "The Effect of Local Area Crime on Mental Health." *The Economic Journal* 126 (593): 978–1017.

Easterlin, Richard A. 1974. "Does Economic Growth Improve the Human Lot? Some Empirical Evidence." In *Nations and Households in Economic Growth*, edited by Paul A. David and Melvin W. Reder, 89–125. Academic Press.

Eyal, Katherine, and Ingrid Woolard. 2013. "School Enrolment and the Child Support Grant: Evidence from South Africa." 125. SALDRU Working Paper Series.

Finn, Arden, and Murray Leibbrandt. 2017. "The Dynamics of Poverty in South Africa." 174. SALDRU Working Paper Series.

Frey, Bruno S., and Alois Stutzer. 2002. "What Can Economists Learn from Happiness Research?" *Journal of Economic Literature* 40 (2): 402–35.

Genicot, Garance, and Debraj Ray. 2017. "Aspirations and Inequality." *Econometrica* 85 (2): 489–519.

Glewwe, Paul, Phillip H. Ross, and Bruce Wydick. forthcoming. "Developing Hope Among Impoverished Children: Using Child Self-Portraits to Measure Poverty Program Impacts." *Journal of Human Resources.*

González, Patricia, Alicia Nuñez, Erin Merz, Carrie Brintz, Orit Weitzman, Elena L. Navas, Alvaro Camacho, et al. 2017. "Measurement Properties of the Center for Epidemiologic Studies Depression Scale (CES-D 10): Findings from HCHS/SOL." *Psychological Assessment* 29 (4): 372–81.

Hamad, R., L. C. H. Fernald, D. S. Karlan, and J. Zinman. 2008. "Social and Economic Correlates of Depressive Symptoms and Perceived Stress in South African Adults." *Journal of Epidemiology & Community Health* 62 (6): 538–44.

Haushofer, Johannes, and Ernst Fehr. 2014. "On the Psychology of Poverty." *Science* 344 (6186): 862–67.

Haushofer, Johannes, and Jeremy Shapiro. 2016. "The Short-Term Impact of Unconditional Cash Transfers to the Poor: Experimental Evidence from Kenya." *The Quarterly Journal of Economics* 131 (4): 1973–2042.

Kahneman, Daniel, and Alan B. Krueger. 2006. "Developments in the Measurement of Subjective Well-Being." *Journal of Economic Perspectives* 20 (1): 3–24.

Lund, Crick, Alison Breen, Alan J. Flisher, Ritsuko Kakuma, Joanne Corrigall, John A. Joska, Leslie Swartz, and Vikram Patel. 2010. "Poverty and Common Mental Disorders in Low and Middle Income Countries: A Systematic Review." *Social Science & Medicine* 71 (3): 517–28.

Lund, Crick, Mary De Silva, Sophie Plagerson, Sara Cooper, Dan Chisholm, Jishnu Das, Martin Knapp, and Vikram Patel. 2011. "Poverty and Mental Disorders: Breaking the Cycle in Low-Income and Middle-Income Countries." *The Lancet* 378 (9801): 1502–14.

Lybbert, Travis J., and Bruce Wydick. Forthcoming. "Hope as Aspirations, Agency, and Pathways: Poverty Dynamics and Microfinance in Oaxaca, Mexico." In *The*

Economics of Asset Accumulation and Poverty Traps, edited by Christopher B. Barrett, Michael R. Carter, and Jean-Paul Chavas. University of Chicago Press.

———. forthcoming. "Poverty, Aspirations, and the Economics of Hope." *Economic Development and Cultural Change.*

Macours, Karen, and Renos Vakis. 2014. "Changing Households' Investment Behaviour through Social Interactions with Local Leaders: Evidence from a Randomised Transfer Programme." *The Economic Journal* 124 (576): 607–33.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. "Poverty Impedes Cognitive Function." *Science* 341 (6149): 976–80.

Posel, Dorrit Ruth, and Daniela Maria Casale. 2011. "Relative Standing and Subjective Well-Being in South Africa: The Role of Perceptions, Expectations and Income Mobility." *Social Indicators Research* 104 (2): 195–223.

Radloff, Lenore Sawyer. 1977. "The CES-D Scale: A Self-Report Depression Scale for Research in the General Population." *Applied Psychological Measurement* 1 (3): 385–401.

Ray, Debraj. 2006. "Aspirations, Poverty, and Economic Change." In *Understanding Poverty*, edited by Abhijit V. Banerjee, Roland Bénabou, and Dilip Mookherjee, 409421:409–21. Oxford: Oxford University Press.

Riley, Emma. 2018. "Role Models in Movies: The Impact of Queen of Katwe on Students' Educational Attainment." 13. CSAE Working Paper. Oxford.

Ross, Phillip H., Paul Glewwe, Daniel Prudencio, and Bruce Wydick. 2017. "Developing Educational and Vocational Aspirations through International Child Sponsorship: Evidence from Kenya, Indonesia, and Mexico." Working Paper. University of San Francisco.

Sacks, Daniel W., Betsey Stevenson, and Justin Wolfers. 2012. "The New Stylized Facts about Income and Subjective Well-Being." *Emotion* 12 (6): 1181–87.

SALDRU. 2008. "National Income Dynamics Study 2008 (Wave 1)." DataFirst. https://doi.org/10.25828/e7w9-m033.

———. 2011. "National Income Dynamics Study 2010-2011 (Wave 2)." DataFirst. https://doi.org/10.25828/j1h1-5m16.

———. 2012. "National Income Dynamics Study 2012 (Wave 3)." DataFirst. https://doi.org/10.25828/7pgq-q106.

———. 2015. "National Income Dynamics Study 2014-2015 (Wave 4)." DataFirst. https://doi.org/10.25828/f4ws-8a78.

———. 2017. "National Income Dynamics Study 2017, Wave 5." DataFirst. https://doi.org/10.25828/fw3h-v708.

Schotte, Simone, Rocco Zizzamia, and Murray Leibbrandt. 2018. "A Poverty Dynamics Approach to Social Stratification: The South African Case." *World Development* 110 (October): 88–103.

Sharkey, Patrick, and Gerard Torrats-Espinosa. 2017. "The Effect of Violent Crime on Economic Mobility." *Journal of Urban Economics* 102 (November): 22–33.

Siddaway, Andy P., Alex M. Wood, and Peter J. Taylor. 2017. "The Center for Epidemiologic Studies-Depression (CES-D) Scale Measures a Continuum from Well-Being to Depression: Testing Two Key Predictions of Positive Clinical Psychology." *Journal of Affective Disorders* 213 (April): 180–86.

Stewart, Mark B., and Joanna K. Swaffield. 1999. "Low Pay Dynamics and Transition Probabilities." *Economica* 66 (261): 23–42.

Stutzer, Alois, and Bruno S. Frey. 2010. "Recent Advances in the Economics of Individual Subjective Well-Being." *Social Research* 77 (2): 679–714.

Tomita, Andrew, Charlotte A. Labys, and Jonathan K Burns. 2015. "A Multilevel Analysis of the Relationship between Neighborhood Social Disorder and Depressive Symptoms: Evidence from the South African National Income Dynamics Study." *The American Journal of Orthopsychiatry* 85 (1): 56–62.

Tondini, Alessandro. 2017. "The Impact of Unconditional Cash Transfers on Informality: Evidence from South Africa's Child Support Grant." Working Paper. Paris School of Economics.

Wydick, Bruce, Paul Glewwe, and Laine Rutledge. 2017. "Does Child Sponsorship Pay off in Adulthood? An International Study of Impacts on Income and Wealth." *The World Bank Economic Review* 31 (2): 434–58.

Zhang, Wendy, Nadia O'Brien, Jamie I. Forrest, Kate A. Salters, Thomas L. Patterson, Julio S. G. Montaner, Robert S. Hogg, and Viviane D. Lima. 2012. "Validating a Shortened Depression Scale (10 Item CES-D) among HIV-Positive People in British Columbia, Canada." *PLOS ONE* 7 (7): e40793.