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Education: Analysis of the NIDS Wave 1 and 2 Datasets

by Nicola Branson, David Lam and Linda Zuze





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Introduction

Education is a major focus of attention in the National Income Dynamics Study (NIDS). With the release of Wave 2 NIDS provides the first longitudinal data ever collected on education in a national household survey in South Africa. This makes it possible to study transitions in and out of school and transitions across grades in ways that have never before been possible. This report analyzes NIDS Wave 1 and 2 data corresponding to the sections of the questionnaires that are most specifically related to education –Module C of the child questionnaire, Module H of the adult questionnaire, and Module E of the proxy questionnaire. While many of the questions in these modules are similar to questions on other national surveys, tracking the same individuals across time allows us to identify changes over time while controlling for individual level characteristics. NIDS collects schooling information at each wave and for intermediate years. As such, by wave 2 there is information on the respondent's grade and enrolment status for each year 2007 (the year before Wave 1) through 2010 (the year of Wave 2). In addition, the outcome for each year 2007 through 2009 is collected.

While NIDS Wave 1 asked retrospective questions on the age the respondent started school and which grades were repeated, a complete schooling transition matrix could not be constructed using wave 1 data alone since it did not provide a complete history of school enrolment by year. With the release of Wave 2 this is now possible. In addition, NIDS is the first nationally representative panel study to contain in-depth questions of transitions from school to work. In section 1 we assess the quality if the NIDS education panel questions. In the second section we use the detail provided by the panel to provide a more complete picture of schooling and school to work transitions between 2007 and 2010. The final section illustrates how the NIDS school data can be augmented with external administrative data from the Department of Basic Education.

Part 1: Assessing the quality of the education variables in the NIDS panel

Nonresponse - attrition and item nonresponse

Given our focus on transitions through school, we focus on attrition within the school going population. Table 1 presents the number of respondents who were in grades 0 through 12 in 2008 and successfully interviewed in Wave 1 and Wave 2, respectively in addition to the attrition rate between Waves 1 and 2. Attrition for this sample is about 14% overall, with higher rates of attrition among respondents in the older grades in 2008. A subsample of respondents was not asked the complete education module in Wave 2 either because their information was collected from a proxy respondent or because they were part of the second phase of fieldwork (NIDS, 2012). Excluding these cases increases the proportion of Wave 1 respondents who are missing Wave 2 date to over 19% overall and to 24% among those who were in grades 8-12 in 2008. This will affect analyses that use education information about 2009 specifically or that require consecutive year information, such as estimating the proportion of respondents enrolled in 2010.

			All	Complet mod	e education ule only
-	Wave 1	Wave 2	Attrition rate	Wave 2	Attrition rate
Grade 0-12 in 2008	8217	7011	14.68%	6598	19.70%
Grade 0-7 in 2008	5160	4449	13.78%	4282	17.02%
Grade 8-12 in 2008	3057	2562	16.19%	2316	24.24%

Table 1: Sample sizes and attrition rates, NIDS Waves 1 and 2

Notes to table 1: Sample in column 1 restricted to wave 1 respondents in grades 0-12 in 2008. Sample in column 2 are those from column 1 who were successfully interviewed in wave 2. Sample in column 4 are those from column 1 who were successfully interviewed in wave 2 and completed the full-length education module.

Next we assessed the completeness of individual questions in the education section. The table in the appendix presents unit non-response rates for each of the education variables in the adult, child and proxy questionnaires. These are responses that are coded as either "don't know" (-9), "refused" (-8) or "not asked" (-2)¹ and does not include cases without information and not coded (e.g. incorrect skip patterns). Response rates are good, especially in the child questionnaire. Questions related to monetary amounts are least well answered. There appears to have been a problem with the coding of the question 'who paid educational expenses'. Respondents were asked to report the person code or relationship of up to four people who contributed to their educational expenses' and it is likely that respondents who had fewer than four people contribute to their expenses were erroneously coded as 77, the code for an absent contributor. As a result, the questions on the relationship of this person to the respondent have large numbers of missing values.

We assessed the accuracy of the skip patterns in the education section for a subsample of questions in the adult and child questionnaires. This is the percentage of respondents who should have been asked a specific question who, for some reason, were not. The questions assessed were enrolment in 2008-2010, level of education and reason did not enroll in 2009 and 2010 and reason withdrew before completing the year in 2008 and

¹ Not asked because the respondent was part of phase 2 of fieldwork where only subsets of the questions were included in the questionnaire.

2009. Skip patterns were accurate for these key variables, with a maximum of 5 incorrect skip patterns found for each variable. One error in the skip patterns was found on the wave 2 child questionnaire. This resulted in 1014 children, who indicated in c2 that they were in primary school (grade 1 or above), not being asked what specific level they were enrolled in in 2010.

Measurement error in the education variables

The benefit of a panel is the ability to track individuals over time and to assess the impact of life events on choices and progress through events. That being said, this is only beneficial if the data are accurately collected at each wave, such that the transitions across time appear plausible. While measurement error in survey data is generally difficult to identify, the structured nature of educational progress enables us to assess whether the enrolment, grade level and result (i.e. whether the respondent passed, failed, or withdrew) variables, taken together, present plausible transitions. We classify school transitions as implausible if 1) respondents progressed more than one grade per year, 2) progressed a grade without successfully completing the previous one, 3) stayed in the same grade if they passed or 4) regressed a grade. While there will be cases where these transitions reflect reality, these should be few in number.

	Adult in	Child in	Child in wave 1, adult in	Wave 1	Wave 2	
	both	both	wave 2	only	only	Overall
Sample size	2931	4699	1280	1496	2123	12602
% transition error	25.0	28.0	30.5	2.7	5.9	20.7
% progress more than 1 grade per year	5.9	10.3	16.1	0.2	2.8	7.6
% progress without successfully completing previous	5.7	2.4	4.4	0.6	1.4	2.9
% remain in same grade even though completed in previous year	19.6	15.9	15.9	2.4	2.4	12.8
% regress a grade	7.2	5.6	5.6	0.3	0.8	4.5

Table 2: Schooling transition errors between NIDS Waves 1 and 2

Notes to Table 2: Sample restricted to respondents who were enrolled in a school grade (0-12) in at least one year between 2007 and 2010.

Table 2 presents the percentage of respondents whose school transitions are not plausible, classified by reason. Only those respondents who were enrolled in grade school in at least one year between 2007 and 2010 are included in the sample. 21% of

this sample has transitions that appear implausible, with the majority a result of respondent's reporting the same grade for two or more years although they reported successfully completing this grade in a prior attempt. Nearly 20% of adult transitions have this error. While it is plausible that some of these reports reflect reality, the majority will be errors. The frequency of skipped grades is also high for wave 1 child respondents. This error is not frequent among adult respondents. Column 3 presents estimates for respondents who were classified as children in wave 1 and adults in wave 2. The child's primary caregiver answered the child questionnaire, while the adult respondents answered the adult questionnaire themselves. Given that the schooling information is collected from different people in the two waves, one may expect more errors. This however is not the case for all but the first error category. 16% of respondents who were child respondents in wave 1 and adult respondents in wave 2 have a skipped grade in their schooling transition. One point of interest is the intersection between the first and third category of errors. If a respondent is erroneously captured as being in the same grade in two or more years even though they report having successfully completed this grade at a previous attempt (error category 3), then the subsequent grade may reflect a progression of more than one grade per year (error category 1). 140 respondents have both error 1 and 3. Analyses in section 2 were checked for sensitivity to excluding respondents who have implausible transitions.

Filling in the gaps - Improved response on the age start school variables

NIDS collected information in wave 1 for all respondents on the year they started school. We documented in the Wave 1 education report that this variable was poorly answered, especially by older, poorer, and less educated respondents (Branson & Lam, 2009). Recognising this, in Wave 2 an additional question, *At what age did you first attend Grade 1/ Sub A?* was added. Table 3 shows that compiling information from both waves improves the response rate substantially. Of those who should have responded to this question in wave 1, just over 50% gave a plausible age (4-20) when calculated from birth year and year start school. When we add wave 2 information on age first attended grade 1, the valid responses increased to 77%. In addition, it is noticeable that the majority of respondents who now have information specified an age between 4-9 years.

Including those respondents who were asked this question for the first time in wave 2^2 , the distribution is even better.

		Wave 1	and 2
	Wave 1 only	Wave 1	Incl. new
		sample only	wave 2 ppl
Age 4-7	42.2	59.2	64.3
Age 8, 9	9.7	13.3	13.2
Age 10-20	4.0	5.0	4.7
Invalid	0.7	0.6	0.6
Don't know/refused	43.4	21.9	17.2
Sample	19297	19297	24532

Table 3: Age start school – improvement in the response rate by including wave 2information

Notes to Table 3: The table presents the percentage of individuals by the age group they are calculated to have started school in. Wave 1 only uses the year of birth and year started school to calculate the age the respondent started school. Wave 2 includes responses from respondents who gave the age they started school directly.

Panel data is vulnerable to attrition and measurement error. This is well documented (Deaton, 1997) and we have shown that NIDS is no exception. However, it is clear that the education modules in wave 2 were effectively administered, with high response rates on individual questions and very few incorrect skip patterns. In addition, we showed that the panel aspect of NIDS can be used to update variables which are poorly answered in previous waves. In the next section, we illustrate the benefits of panel data in analysing progress through school and on to work.

 $^{^{\}rm 2}$ Temporary wave 2 sample members who are interviewed because they live in core respondent's households.

Part 2: Progress through school and into work

The introduction of Wave 2 data allows us to describe a complete picture of progress through school and into work. With Wave 2 data we can assess changes in rates of progression, repetition and dropout between 2008 and 2010 and investigate what respondents do after leaving school. Wave 1 information forms a baseline from which changes can be measured.

Progress through school and beyond – passing, repeating, dropping out and the transition into the labour force

NIDS wave 2 collects schooling information at each wave and for intermediate years. As such, by wave 2 there is information on the respondent's grade and enrolment status for each year from 2007 through 2010. In addition, the outcome for each year 2007 through 2009 is collected. From this a complete schooling transition matrix can be constructed between 2008 and 2010.

We classify people who were enrolled in 2008 into one of three categories: 1) passed two grades between 2008 and 2010 (normal academic progress); 2) repeated at least one grade and still enrolled in 2010; 3) dropouts – those who were not enrolled in 2010 and had not completed grade 12. Table 4 shows that the almost all (97%) respondents who were in grade 0-12 in 2008 and successfully interviewed in wave 2 can be classified in this way. However, excluding those who have transition errors (as defined in Table 2) decreases the percentage classified to 78% if errors 1, 2 and 4 are excluded and 63% if all errors are excluded. Similar information is provided for each of the subsamples used in the analyses in this section.

Grade	W2 interview	Tı	Transition between 2008 and 2010 non missing								
2008	complete	А	.11	No errors	1, 2 and 4	No errors 1-4					
0-11	6585	6424	98%	5134	78%	4092	62%				
0-12	7009	6795	97%	5473	78%	4383	63%				
8-11	2136	2072	97%	1723	81%	1369	64%				

Notes to Table 4: The table presents sample sizes and percentages by grade in 2008 of whether the respondent can be classified as passed, repeated or dropout in 2010 including and excluding

errors identified in table 2. Only respondents who were successfully interviewed in wave 2 are included.

Figure 1 presents the proportion who passed, repeated and dropped out by 2010 by their grade in 2008, separately for males and females.





Notes to figure 1: Sample restricted to respondents who were in grade 0-11 in 2008 and successfully interviewed in wave 2. Sensitivity to the exclusion of respondents with errors identified in table 2 were assessed and found not to be significant. Point estimates weighted using the panel weight and smoothed using a lowess smoother, bandwidth 0.5.

The graph depicts much of what is known about the South African schooling system: There are high rates of grade repetition in all grades, with higher repetition in secondary grades. Females have higher pass rates than males in every grade. There are high retention rates until secondary school, but low rates of grade 12 completion. However, the figure adds an additional dimension - levels of dropout by grade. The figure shows that dropout is negligible in primary school (grades 0-7), but increases year-on-year thereafter. Dropout rates are higher for males than for females beginning in grade 6. For those respondents who were in grade 11 in 2008, about 40% of both males and females had dropped out of the schooling system without completing matric by 2010.

Table 5 provides additional detail on these transitions between 2008 and 2010. The highlighted 'diagonal' elements are the percentage of respondents progressing at the desired rate of two grades over the two years, with percentages below the diagonal presenting the percentage repeating at least one grade over the period. Successful progression rates hover between 65% and 80% until the end of grade 9. In grade 9 there is a large increase in both the proportion repeating and the proportion not enrolled. For those who were in grade 9 in 2008, only 43% had progressed two grades by 2010, around 30% repeated at least one grade and the rest left the grade schooling system. The last four columns indicate that the majority of those exiting were not exiting into alternate types of education or into employment. Less than 1% of grade 9 learners in 2008 were in post-schooling education in 2010, 3% were in employment and the remaining 22% were not enrolled and not working. Observing the last three columns of the table it is clear that the majority of South African youth do not transition from school into either employment or post schooling education. 54% of youths who were in matric in 2008 were not enrolled and not working in 2010, with 25% in post grade schooling education and only 18% in employment.

-							Grad	le in 2	010							Not		
															Post	enrolled/	Employ-	
Grade in															school	not	ed	11
2008		0	1	2	3	4	5	6	7	8	9	10	11	12		working		
Grade 0		0.0	18.9	81.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37
Grade 1	Dhase 1	0.0	3.3	26.5	70.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	411
Grade 2	I hase I	0.0	0.0	0.2	25.7	73.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	474
Grade 3		0.0	0.0	0.0	0.4	28.2	69.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.4	456
Grade 4		- 0.0	0.0	0.0	0.0	2.9	24.9	69.6	$\overline{0.0}$	0.0	0.0	0.0	0.0	$-\overline{0.0}$	0.0	2.5	0.0	458
Grade 5	Phase 2	0.0	0.0	0.0	0.0	0.0	0.5	16.0	78.9	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.4	507
Grade 6		0.0	0.0	0.0	0.0	0.0	0.0	0.4	15.9	76.7	0.0	0.0	0.0	0.0	0.0	5.7	1.2	481
Grade 7		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	15.0	69.5	0.0	0.0	0.0	0.9	13.5	0.4	473
Grade 8	Phase 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	14.4	65.3	0.0	0.0	0.0	17.9	0.4	441
Grade 9		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	27.1	42.6	0.0	0.7	21.8	3.0	402
Grade 10		0.0	- 0.0	0.0	0.0	0.0	0.0	0.0	-0.0-	0.0	0.0	4.8	24.8	40.3	0.8	24.9	4.5	453
Grade 11	Phase 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	17.2	15.1	52.4	10.1	444
Grade 12		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	25.4	53.8	17.6	375

Table 5: Education transition matrix from 2008 to 2010, NIDS Waves 1 and 2

Notes to Table 5: Sample restricted to respondents who were in grade 0-12 in 2008 and successfully interviewed in wave 2. Respondents with errors 1, 2 and 4 identified in table 2 were excluded. Point estimates weighted using the panel weight.

Figure 2 presents the last four rows of Table 5 separately for males and females, with school grades in 2010 grouped into the school category.



Figure 2: Transitions from school into work - males and females separately

Notes to Figure 2: Sample restricted to respondents who were in grade 0-12 in 2008 and successfully interviewed in wave 2. Respondents with errors 1, 2 and 4 dentified in table 2 were excluded. Point estimates weighted using the panel weight.

School: grade 9-12, Studying :any post schooling studying (does not necessarily require matric).

Grade 9 is the end of compulsory schooling in South Africa, but from Figure 2 it is not clear that this is a major exit point from the schooling system. Respondents who were in grade 8 in 2008 and did not repeat a grade should have completed grade 9 in 2009. We might therefore expect an increase in the non-schooling categories in 2010 for this group. This is not the case, however – the proportion not in school increases at a constant rate for grades 7 through 10 in 2008 for both males and females. In addition, of those that are not in school, very few report studying in further education and training non facilities.

Shifting to those who were in grade11 in 2008, those that are still in school in 2010 must have repeated at least one grade, since if respondents progressed without repeating they would have exited the schooling system by 2010 with matric. We see here that 20% of females and over 25% of males remain in school two years after grade 11. It is also clear from the figure that while females progress through the schooling system at a faster rate than males, once they exit school they are less likely to find employment than males. 15% of females who were in grade 12 in 2008 are employed in 2010, compared to over 20% of males. Females are however more likely to be studying, resulting in an equal share classified as not studying not working.

The figures and table present the harsh reality of transitions through school and into work for youth in South Africa. Progress through school is slow with high rates of grade repetition throughout grades and drop out increasing systematically from grade 7 onwards. Very few youth successfully complete matric and even fewer attempt the alternative vocational route. Exit from the schooling system does not offer a better alternative - the majority of respondents who were in grade 12 in 2008 remain without employment and are not studying in 2010.

Part 3: Access and choice of school

Post-apartheid education funding is designed to redress past inequalities in funding and, in doing so, to provide all learners with high quality education (Schools Act, 1996). Two policies designed to promote equitable access are the National Norms and Standards for School Funding (NNSSF) and the no-fee and school-fee exemption policies implemented in 2007.

The NNSSF assigns all schools a quintile ranking based on the school's neighbourhood income, employment rate and literacy levels calculated from the census 2001. Schools are allocated non-personnel expenditure budgets based on their quintile ranking, with lower quintile schools receiving a larger allocation per learner. Schools in quintiles 1 and 2, the poorest 40% of schools, were deemed 'no fee schools' in 2007 (Motala & Sayeed, 2009). These schools may not charge school fees and are compensated by government. In addition, a learner may apply for fee exemption at any school by taking

a means test or if their primary-caregiver receives a poverty-linked social state grant. Schools are not compensated for students that receive fee exemptions, and paying learners subsidize non-paying learners.

While the funding allocations implemented between 2005 and 2008 are redistributive in terms of budget, concerns about how these policies are implemented (Chudgar & Kanjee, 2009; Gustafsson & Patel, 2006) and their impact on the promotion of 'meaningful' education (Pendlebury, 2009) have been raised.

Chudgar and Kanjee (2009) note that while schools in the lowest and highest quintile are distinguishable, many schools in the middle three quintiles are very similar. This results in schools of similar socioeconomic status being assigned to different quintiles (Chutgar & Kanjee, 2009). They also note that school quintile status is based on the school's neighbourhood characteristics and may not accurately reflect the characteristics of the school's learner population. In addition, Gustafsson & Patel (2006) show that quintile status is only used for allocation of non-personnel expenditures. Thus the lion's share of funding – for personnel – is not allocated on a pro-poor basis. Teacher salaries are based on qualification and experience. Teachers from rich schools have, on average, higher qualifications and therefore receive higher salary allocations per teacher (Gustafsson & Patel, 2006). Questions have also been raised about whether the 'no-fee' policies do not unintentionally exacerbate the two-tier education system evident in South Africa. Hall and Giese (2009) note that while the introduction of the policy has increased the revenue of most no-fee schools, the funding provided may not be sufficient to improve the quality of schools and to narrow the gap between poor and rich schools. Schools that have the discretion to charge fees can attract more or better quality teachers and increase school resources. In addition, given that the onus is on the school to raise funds to compensate learners that apply for fee exemption, there is no incentive for schools to adjust the equity distribution of their learners.

We use NIDS data to investigate access to schools, the effectiveness of quintile targeting and the schooling outcomes of learners in different quintile schools. Because NIDS collects information on the geographic location of households and the name and location of the school respondents actually attend, we can examine the respondent's school choice set, the actual school they attend and the outcome of their schooling, given this choice, between 2008 and 2010.

Success in coding schools in NIDS to DoE data

Department of Education (DoE) data was linked to NIDS in two ways. First, using the NIDS household and DoE EMIS (2009) geographic location information, proximity to schools within the respondent's neighbourhood or of a certain type (quintile, pupil-teacher ratio and no fee school) was calculated. Second, NIDS included the question '*Name of school or educational institution*' and '*Location of educational institution*' for the school the respondent attended in 2007 and 2008 and the school where they completed their highest grade. This information was matched to schools on the DoE schools list 2009. Thus for those individuals that could be coded we have household, individual and school level information. This presents a unique opportunity to investigate school choice and the socioeconomic characteristics of learners by school.

Table 6 reports the number of respondents who answered the questions on name of last school, current school (2008) and school in 2007, in addition to the number that were successfully coded to the DoE schools list. Match rates were high for current school, with 90% of responses matched to a school on the list. As would be expected, match rates for 2007 were a bit lower (86%) and, given that all adult respondents who had ever completed some level of schooling were required to provide the name and location of the last school they attended, significantly lower for the last school attended (67%). Older respondents would have completed their schooling some time in the past, thus matching these responses was less successful.

			Last
	School in	School in	School
	2008	2007	attended
Number of valid school responses	8,344	2,796	12,980
Number coded	7,497	2,395	8,706
Coding rate	90%	86%	67%

Table 6: Success rate in coding schools in NIDS wave 1

Notes to Table 6: The table presents the number of NIDS wave 1 responses to school in 2008, school in 2007 and last school variables, in addition to the number and percentage that were coded to the DoE EMIS 2009 data.

Access to schools, targeting of school funding and school outcomes

In this section we describe the availability of schools, assess school quintile targeting and the schooling outcomes of learners attending different quintiles schools. We show that most households have access to a school within one kilometer of their household and that the education funding policies are successfully targeting the poor. We show that respondents who choose not to attend their closest school, pick schools with higher quintiles, that are less likely to be no-fee schools and have lower pupil-teacher ratios. Finally, we compare schooling outcomes between 2008 and 2010 of respondents from different school quintiles and find that although learners that attend quintile 1 and 2 schools are most disadvantaged socioeconomically, their school outcomes between 2008 and 2010 are the same, if not better, than learners attending quintile 3 and 4 schools.

Access to schools and school choice:

Figure 3 plots density functions of the distance to the nearest school by the income quintile of the household. The figure shows that learners from both rich and poor households have equal access to schools in terms of distance. The majority of South African learners have a school within one kilometer from their home and there is no evidence of a relationship between household income quintile and distance to school. Table 7 shows that learners from poorer households do not, however, have equal access in terms of either the number of schools they can choose from within their immediate neighbourhood, or the type of school, as measured by quintile or pupil-teacher ratio, available. Learners in the richest households have on average two additional schools within 2km of their household. Added to this, the schools in their choice set have lower pupil-teacher ratios and are more likely to be higher quintile schools.

Figure 3: Distance to nearest school by household income quintile



Notes to Figure 3: Kernel density functions of distance to closest school by household income quintiles. Sample restricted to respondents who were in grade 0-12 in 2008. Point estimates weighted using the panel weight. Trimmed at the 99th percentile.

	Quinti	le 1	Quinti	le 2	Quintile 3		Quintile 4		Quintil	e 5		
	Mean	n	Mean	n	Mean	n	Mean	n	Mean	n		
Closest school:												
Median distance (km)	0.6	2352	0.6	2411	0.5	1701	0.5	1104	0.6	647		
School quintile	2.2	2352	2.3	2411	2.5	1701	3.0	1104	4.0	647		
% that are no fee schools	60%	2352	56%	2411	44%	1701	32%	1104	13%	647		
Pupil teacher ratio	35.8	2309	34.6	2390	34.6	1661	34.3	1085	31.4	643		
Schools under 2km from household:												
Number	4.8	2352	5.1	2411	6.5	1701	8.2	1104	6.5	647		
Average quintile	2.4	2352	2.5	2411	2.8	1701	3.0	1104	3.5	647		
Average Pupil Teacher ratio	34.8	2139	34.5	2169	34.4	1509	32.9	1052	29.5	601		
School attended in 2008:												
% going to closest school	36%	2167	36%	2210	31%	1506	24%	954	14%	514		
% going to school within 2 km of closest	75%	2167	74%	2210	73%	1506	66%	954	53%	514		
Distance (km) - mean	21.9	2167	17.0	2210	15.4	1506	16.9	954	13.1	514		
Distance (km) - median	3.3	2167	3.3	2210	4.2	1506	4.4	954	7.4	514		
School quintile	2.4	2165	2.4	2186	2.8	1499	3.2	935	4.2	485		
% in no fee school	55%	2195	52%	2236	37%	1539	27%	978	12%	547		
Pupil teacher ratio	34.8	2137	33.9	2206	33.6	1503	32.4	953	28.6	526		

Table 7: School characteristics by household income quintile – closest, 2km choice set and school chosen

Notes to Table 7: Sample restricted to respondents who were in grade 0-12 in 2008. Point estimates weighted using the panel weight. School characteristics from DoE EMIS 2009 data.

Interestingly, there is not much variation in the average pupil-teacher ratio of schools in the first three, even four, income quintiles but the richest households have significantly lower average pupil-teacher ratios. Figure 4 illustrates this point even more clearly. For learners from income quintiles 1-4, the distributions of the pupil-teacher ratios of their closest school overlap significantly; the median point is at 34 learners per teacher. The median point for learners from the richest households is shifted significantly to the left at around 25 learners per teacher.



Figure 4: Pupil teacher ratio of nearest school by household income quintile

Notes to Figure 4: Kernel density functions of closest school pupil-teacher ratio by household income quintiles. Sample restricted to respondents who were in grade 0-12 in 2008. Point estimates weighted using the panel weight. Trimmed at the 99th percentile. Pupil-teacher ratio calculated from DoE EMIS 2009 data.

In the last panel of Table 7, we describe the school characteristics of the school the respondent actually attends using the name and location of the school the respondent attended in 2008. While we saw that most respondents had a school within 1km from their household, only between 14-36% of respondents attend the closest school to their household. Most respondents do, however, attend a school within 2km of the closest school. The median distance to the school actually attended is between 3 and 7 km and differs significantly across the household income quintile. The median learner in the lowest income quintile travels 3.3km to school, and this increases with each income quintile, with a large increase between the 4th and 5th income quintile. The median learner in the highest income quintile travels 7.4km to school. Those in the poorest income quintile attend lower quintile schools, are most likely to be attending no fee schools and attend schools with the highest pupil-teacher ratios.

The characteristics of schools respondents actually attend are even more distinct by income quintile than when measured on availability. This suggests that in addition to having access to a wider range of schools, richer learners also have the means to travel further to attend schools of their particular choice.

Targeting of education funding:

Chudgar and Kanjee (2009) raise concerns that quintile targeting is not effective for middle quintile schools. While quintile 1 and 5 schools are clearly distinct, schools assigned middle quintile rankings often are schools, and have learner populations with similar socioeconomic status to quintile 1 schools.

Table 8 presents the neighbourhood (assigning respondent's to their closest school) and learner population (using the school the respondent attended in 2008) characteristics to schools classified by quintile. In this way, we assessed both targeting of neighbourhoods and targeting of learners. The sample is restricted to respondent's who were in grade 0-12 in 2008.

Schools are allocated to quintiles based on the income, employment rate and education level of their surrounding neighbourhood. Examining the characteristics of respondents allocated to the school quintile of their closest school, it is clear that school funding is accurately targeted to poor neighbourhoods. School quintile status is positively correlated with education, income and employment levels of their neighbourhood. However, the table confirms Chudgar and Kanjee's (2009) concern that those schools assigned middle quintile status are not very different. The neighbourhood characteristics of quintile 1, 2 and 3 schools are similar in terms of income, employment and education.

The next panel of Table 8 provides details of the learner population of schools by quintile status. Given that the majority of South African learners attend a school within 2 km of their closest school, it is not surprising that the learner population characteristics do not differ much from the neighbourhood characteristics. Here again we see that the quintile targeting appears effective. Schools with the lowest quintile status have learner populations from the poorest households.

The final panel of Table 8 provides mean school's characteristics by school quintile. The no fee school policy appears accurately targeted at quintile 1 and 2 schools, with over 98% of quintile 1 and 2 schools classified as no fee schools. Lower quintile schools tend to have fewer learners and quintile 1 and 2 schools have slightly lower pupil-teacher ratios than quintile 3 and 4 schools. Quintile 5 schools are distinct on all characteristics presented.

					School au	intile				
		1	,)	Senoor qu	3	4	1	4	5
	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Neighbourhood characteristics:							· · · · · · · · · · · · · · · · · · ·			
African	97%	2483	96%	2021	95%	2111	72%	953	44%	520
Mother's education	7.1	2189	7.6	1760	8.7	1868	9.6	861	11.7	477
Father's education	6.4	1670	7.2	1278	8.1	1328	9.5	673	11.0	403
Urban	24%	2483	21%	2021	54%	2111	90%	953	97%	520
Household income quintile	2.1	2483	2.2	2021	2.5	2111	3.1	953	4.1	520
Household size	6.3	2483	6.2	2021	6.6	2111	5.8	953	5.1	520
% of household adults employed	26%	2153	24%	1836	31%	1832	43%	819	58%	454
Learner population characteristics										
African	97%	1585	96%	1345	94%	1361	73%	683	46%	490
Mother's education	7.2	1389	8.0	1180	8.7	1202	9.2	598	11.4	451
Father's education	6.7	1048	7.6	840	8.1	827	8.8	459	11.1	380
Urban	21%	1585	23%	1345	52%	1361	80%	683	96%	490
Household income quintile	2.0	1585	2.2	1345	2.4	1361	2.8	683	3.9	490
Household size	6.7	1585	6.4	1345	6.8	1361	5.9	683	5.3	490
% of household adults employed	28%	1377	26%	1213	29%	1182	39%	569	56%	422
School characteristics:										
No fee school	98%	2483	100%	2021	0.0	2111	0.0	953	0.0	520
Pupil-teacher ratio	34	2483	34	2021	35	2111	38	953	30	520
Number of learners 2008	636	2483	545	2021	795	2111	890	953	767	520

Table 8: Neighbourhood, Learner population and closest school characteristics by schoolquintile status

Notes to Table 8: Sample restricted to respondents who were in grade 0-12 in 2008. Point estimates weighted using the panel weight. School characteristics from DoE EMIS 2009 data. Individual and household characteristics from NIDS wave 1 data.

Relationship between school funding targeting and 'meaningful' education:

In this final section we address questions raised by Pendlebury (2009) on whether school funding targeting is redressing past inequalities in terms of 'meaningful' education – measured here by school outcomes – in addition to redressing funding inequalities.

Table 9 presents schooling outcomes for learners by school quintile. We showed in Table 7 and 8 that quintile 5 schools and learners are significantly more advantaged. Differences between quintile 1 through 4 schools were less distinct. Thus in this section we compare the outcomes of learners in quintile 1 and 2 schools to the outcomes of learners in quintile 3 and 4 schools. Outcomes for learners in quintile 5 are included for completeness. The sample includes only those respondents in grade 0-12 whose response on the current school name and location could be coded to the DoE list.

Table 9 shows that learners from quintiles 1 and 2 schools have similar schooling outcomes to learners in quintile 3 and 4 even though they are significantly more socioeconomically disadvantaged.

			School	quintile	category		
	1	-2	3-	-4	p-value: 1-2 versus 3-	5	
	Mean	Ν	Mean	Ν	4	Mean	Ν
School outcomes:							
Ever repeated (before 2008)	38%	3731	34%	2536	0.029	20%	548
Number of repetitions	1.7	1389	1.6	879	0.124	1.3	119
Outcome between 2008 and 2010:							
Passed	60%	3127	61%	2028	0.395	74%	389
Repeated	29%	3127	28%	2028	0.290	17%	389
Dropped out	11%	3127	11%	2028	0.847	9%	389
Wave 1 individual characteristics:							
African	97%	3824	88%	2595	0.000	50%	574
Male	51%	3824	52%	2595	0.521	44%	574
Age	12.1	3818	12.3	2595	0.033	12.3	573
Grade in 2008	6.0	3824	6.4	2595	0.000	6.5	574
School fees 2007 (Rands)	63.6	2978	300.8	2262	0.000	2388.7	473
Attended grade R	65%	2634	69%	1769	0.005	89%	398
Numeracy score	-0.6	910	-0.6	696	0.508	-0.3	101
Mother's education	7.3	3344	8.5	2292	0.000	11.3	532
Father's education	6.7	2518	8.0	1646	0.000	10.8	446
Wave 1 household characteristics:							
Urban	19%	3824	62%	2595	0.000	96%	574
Household income quintile	2.1	3824	2.5	2595	0.000	3.9	574
Household size	6.4	3824	6.4	2595	0.569	5.2	574
% of household adults employed	25%	3406	31%	2254	0.000	0.5	493

Table 9: School outcomes, individual and household characteristics by schoolquintile category

Notes to Table 9: Sample restricted to respondents who were in grade 0-12 in 2008. Point estimates weighted using the panel weight. School quintile from DoE EMIS 2009 data. All other school, individual and household characteristics from NIDS.

Learners from quintile category 1 come from significantly poorer households that are significantly less likely to be urban, have parents with significantly less education and significantly fewer employed adults. Even given this, the outcomes of learners from the first quintile category schools match those in the second quintile category.

In this section we have shown that most South Africans have access to a school within a kilometer of their household and that the school quintile system accurately targets the poorest neighbourhoods and learners. We also showed that learners from quintile 1 and 2 schools have similar schooling outcomes to learners in quintile 3 and 4 schools even though they come from significantly poorer backgrounds. Whether this signals that quintile funding is effective or, given the poor outcome, is an indication that all lower quintile schools do not receive sufficient funding to function effectively is unclear and warrants further investigation.

Conclusion

NIDS provides the first national longitudinal data on education collected in a South African household survey. This makes it possible to study transitions in and out of school, transitions across grades and between school and work in ways that have not previously been possible. In addition, the collection of household geographic location information and school names in NIDS means that these data can be augmented with external administrative data from the Department of Education. This triangulation of school, household and individual level data is extremely useful for analyses of, and for, policy.

We start with an assessment of the quality of the NIDS panel education data. We show that while, like all panel studies, NIDS is vulnerable to attrition and measure error, the education modules in Wave 2 were effectively administered. Response rates on individual questions are high and there are very few incorrect skip patterns. In addition, we showed how the panel aspect of NIDS can be used to update variables which are poorly answered in previous waves. Next we analyse progress through school and into work. Progress through school is shown to be slow in South Africa with high rates of grade repetition throughout grades and drop out increasing systematically from grade 7 onwards. Very few youth successfully complete matric and even fewer attempt the alternative vocational route. Exit from the schooling system does not offer a better alternative - the majority of respondents who were in grade 12 in 2008 remained without employment and were not studying in 2010.

Finally, we used data from the Department of Basic Education EMIS to look at school access and school quintile targeting. Most South African learners are shown to have a school within one kilometer of their household, but richer households have a broader range of schools to choose from and travel further to attend schools of their choice. We show that the school quintile funding targeting reaches the poorest learners although it is not clear that those in quintiles 2, and maybe even 3, schools are significantly less disadvantaged than those in quintile 1 schools. Finally, we show that the outcomes of learners in quintiles 3 and 4 are no better than the outcomes of learners in quintile 1 and 2, even given their significantly better background characteristics.

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South African Schools Act (84 of 1996)

Appendix

NIDS Wave 2 Section H: Unit response rates in the adult questionnaire

Variable					
	On			Total # who	
Name In data	question-	Description	Total # who responded	should have	Response rate
W2 a adachard	hi	Lishast school grade completed	17595	17692	
w2_a_euscligitu	111 h2 1	Highest school grade completed	1/383	17082	99.5
w2_a_edschyr	n2_1	Year in which respondent completed highest grade	12230	12230	100.0
w2_a_edschage	nz_z	Age at which respondent completed nightst grade	9496	12229	1/./
w2_a_edscnstrt	n5_1	Year in which respondent first attended Grade 1/Sub A	10545	10545	100.0
w2_a_edsrtage	h5_2	How old were you when you first attended Grade 1/Sub A?	6816	9834	69.3
w2_a_edschmth	h6	Highest school grade in mathematics completed	9085	10033	90.6
w2_a_edter	h7	Respondent has successfully completed some form of tertiary studies?	15112	15232	99.2
w2_a_edterlev	h8	Highest level of tertiary education completed	1627	1754	92.8
w2_a_ed08att	h10	Respondent pursued some form of education in 2008?	7641	7705	99.2
w2_a_ed08res	h11	Result of schooling in 2008	3616	3628	99.7
w2_a_ed08wdex	h12	Main reason respondent withdrew before completing educational year	94	109	86.2
w2_a_ed09att	h13	Respondent pursued some form of education in 2009?	7644	7705	99.2
w2_a_ed09ex	h14	Main reason respondent did not enrol in 2009	4107	4364	94.1
w2_a_ed09lev	h15	Education level respondent was enrolled in 2009	3274	3288	99.6
w2_a_ed09sub	h16	Subject or programme respondent was studying in 2009	199	220	90.5
w2_a_ed09spnfee	h19_1	Amount spent on school fees	2968	3289	90.2
w2_a_ed09spnuni	h19_2	Amount spent on uniform	2842	3289	86.4
w2_a_ed09spnbks	h19_3	Amount spent on books and stationery	2760	3289	83.9
w2_a_ed09spntrn	h19_4	Amount spent on transport to school	2857	3289	86.9
w2 a ed09spno	h19 5	Amount spent on allowances and other school related expenses	2645	3289	80.4
w2 a ed09payyn	h20	Did someone pay for your educational expenses in 2009?	3261	3335	97.8
w2 a ed09paypid1	h20 p1	PID of person who paid for education expenses in 2009	2562	3270	78.3
w2 a ed09paypr1	h20 r1	Relationship code of Person who paid educational expenses in 2009 ñ 1	2500	3271	76.4
w2 a ed09paypid2	h20 p2	PID of person who paid for education expenses in 2009	2564	2567	99.9
w2 a ed09paypr2	h20 r2	Relationship code of Person who paid educational expenses in 2009 ñ 2	667	2555	26.1
w2 a ed09paypid3	h20 p3	PID of person who paid for education expenses in 2009	2565	2567	99.9
w2 a ed09paypr3	h20 r3	Relationship code of Person who paid educational expenses in 2009 ñ 3	61	2549	2.4
w2 a ed09pavpid4	h20 p4	PID of person who paid for education expenses in 2009	2565	2567	99.9
w2 a ed09paypr4	h20 r4	Relationship code of Person who paid educational expenses in 2009 ñ 4	37	2548	1.5
$w^2_a ed09navngo$	h20_5	Did NGO pay for your educational expenses in 2009?	2533	3320	76.3
w2_a_ed09payburs	h20_6	Did vou get hursary/scholarship for your educational expenses in 2009?	2549	3320	76.8
$w^2_a = ed09 res$	h21	Result of education in 2009	3279	3288	99.7
w2_a_ed09wdex	h22	Main reason respondent withdrew before completing educational year	69	70	98.6
$w^2_a = ed10cur$	h23	Respondent is currently enrolled?	7945	8014	90.0
$w_2_a_ed10curey$	h24	Main reason respondent did not enrol in 2010	4592	4814	95.1
$w_2_a_ed10curlev$	h27	Level respondent is currently enrolled in	2932	3004	97.6
$w_2_a_{\text{ed10cursub}}$	h28	Subject or programme respondent is currently studying	2932	346	85.0
$w_2 a_{\text{ed10cursub}}$	h20	Matric is a prerequisite for current educational institution?	294	240	85.2
w2_a_editoculliat	1129 h20	Remandant interda to continue at calcal until completion of matric?	290	347	07.5
w2_a_edintinat	h21	Respondent intends to continue at school until completion of matric?	2323	2589	97.5
$w_2 a_e dilitier$	151	Respondent intends to continue studying after completion of matric?	2339	2389	91.1
w2_a_editcomp	n32	Respondent is computer interate?	14429	14523	99.4
w2_a_editidriv	n55	Respondent has drivers needse?	14433	16928	85.3
w_2 _a_edsaid	n54	Respondent has a South African National ID Book (green book)?	14441	16928	85.3
w2_a_edlitrdhm	n35	Respondent's reading level in home language	14440	16928	85.3
w2_a_edlitwrthm	h36	Respondent's writing level in home language	16849	16928	99.5
w2_a_edlitrden	h37	Respondent's reading level in English	16845	16927	99.5
w2_a_edlitwrten	h38	Respondent's writing level in English	16838	16928	99.5

NIDS Wave 2 Section C: Unit response rates in the child questionnaire

Variable

	On question-		Total # who	Total # who should have	
Name In data	naire	Description	responded	responded	Response rate
w2 c ed10curgrd	c2	Which of the following does this child currently attend?	5294	5332	99.3
w2 c edatt	c3	Has the child ever attended school?	4515	4519	99.9
w2 c edcmpgrd	c 6	Highest school grade completed	5778	5794	99.7
w2 c edgrd1yr	c 7	Year child first attended Sub A. /Grade One	3594	3594	100.0
w2 c edpre	c8	Attendance of pre-primary before Sub A. /Grade One?	3449	4433	77.8
w2 c ed08att	c9	Did child attend school in 2008??	5786	5794	99.9
w2 c ed08res	c10	Result of child's schooling in 2008	4514	4532	99.6
w2_c_ede08wdexp	c11	Main reason child withdrew before completing 2008	14	17	82.4
w2 c ed09att	c12	Child attended school in 2009?	5790	5792	100.0
w2 c ed09exp	c13	Main reason child was not enrolled in 2009	530	542	97.8
w2_c_ed09spnfee	c14_1	Amount spent on school fees in 2009	4718	5004	94.3
w2_c_ed09spnuni	c14_2	Amount spent uniform in 2009	4729	5254	90.0
w2_c_ed09spnbks	c14_3	Amount spent on books and stationery in 2009	4467	5254	85.0
w2_c_ed09spntrn	c14_4	Amount spent on transport to school in 2009	4483	5253	85.3
w2_c_ed09spno	c14_5	Amount spent on other school related expenses n 2009	4346	5254	82.7
w2_c_ed09pay	c15	Did someone pay for child's educational expenses in 2009?	5043	5251	96.0
w2_c_ed09paypid1	c15_p1	PID of person who paid for education expenses in 2009	5190	5258	98.7
w2_c_ed09paypr1	c15_r1	Relationship code of person who paid educational expenses in 2009 -1	4993	5278	94.6
w2 c ed09paypid2	c15 p2	PID of person who paid for education expenses in 2009	5194	5194	100.0
w2_c_ed09paypr2	c15_r2	Relationship code of person who paid educational expenses in 2009 -2	1528	5217	29.3
w2_c_ed09paypid3	c15_p3	PID of person who paid for education expenses in 2009	5199	5199	100.0
w2_c_ed09paypr3	c15_r3	Relationship code of person who paid educational expenses in 2009 -3	153	5217	2.9
w2_c_ed09paypid4	c15_p4	PID of person who paid for education expenses in 2009	5199	5199	100.0
w2_c_ed09paypr4	c15_r4	Relationship code of person who paid educational expenses in 2009 -4	85	5217	1.6
w2_c_ed09payngo	c15_5	NGO contributed towards educational expenses for 2009?	5176	5254	98.5
w2_c_ed09payburs	c15_6	Bursary contributed towards educational expenses for 2009?	5150	5254	98.0
w2_c_edenrol09	c 16	Level child is currently enrolled in	5245	5254	99.8
w2_c_edres09	c 17	Result of child's schooling in 2009	5231	5254	99.6
w2_c_ede09wdexp	c18	Reason for withdrawal before end of educational year	5	18	27.8
w2_c_ed10cur	c19	The child is currently enrolled in school?	4456	4789	93.0
w2_c_ed10curex	c20	Reason for not enrolling in 2010	20	353	5.7
w2_c_ed10curlev	c21	L evel child is currently enrolled in	4422	4426	99.9
w2_c_edtrn1	c22_1	What is the usual mode of transport to school? 1st Answer	4919	4919	100.0
w2_c_edtrn2	c22_2	What is the usual mode of transport to school? 2nd Answer	131	131	100.0
w2_c_edtrn3	c22_3	What is the usual mode of transport to school? 3rd Answer	41	41	100.0
w2_c_edtm4	c22_4	What is the usual mode of transport to school? 4th Answer	15	15	100.0
w2_c_edtm5	c22_5	What is the usual mode of transport to school? 5th Answer	8	8	100.0
w2_c_edtrn6	c22_6	What is the usual mode of transport to school? 6th Answer	1	1	100.0
w2_c_edtrntime_hrs	c23a	Time taken to reach school - hrs	4986	5173	96.4
w2_c_edtrntime_mins	c23b	Time taken to reach school -mins	5126	5177	99.0
w2_c_edsizecls	c24	Number of learners in childís classroom	5108	5177	98.7
w2_c_edmssds	c25	Number of days child was absent from school in last month	5156	5177	99.6

Variable					
Name In data	On question- naire	Description	Total # who responded	Total # who should have responded	Response rate
w2p_edschgrd	e1	Respondent's highest completed grade school grade	1069	1119	95.5
w2_c_edatt	c3	Has the child ever attended school?	813	813	100.0
w2_c_edcmpgrd	c 6	Highest school grade completed	452	813	55.6
w2_c_edgrd1yr	c 7	Year child first attended Sub A. /Grade One	934	975	95.8
w2_c_edpre	c8	Attendance of pre-primary before Sub A. /Grade One?	94	101	93.1
w2_c_ed08att	c 9	Did child attend school in 2008??	603	610	98.9
w2_c_ed08res	c10	Result of child's schooling in 2008	210	220	95.5
w2_c_ede08wdexp	c11	Main reason child withdrew before completing 2008	71	80	88.8

NIDS Wave 2 Section E: Unit response rates in the Proxy questionnaire

southern africa labour and development research unit

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

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



