N.i.D.S.

NATIONAL INCOME DYNAMICS STUDY

Intergenerational Mobility: Analysis of the NIDS Wave 1 Dataset

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1. Introduction

Intergenerational mobility measures the degree to which an individual's socio-economic status depends on his or her parents' status. Mobility matters in countries, such as South Africa, with high inequality and poverty as the consequences of remaining stuck at the bottom are serious.

This report provides a very brief overview of the 2008 data from the National Income Dynamics Study (NIDS) for conducting intergenerational mobility research on education, occupation and income. It then goes on to undertake a preliminary analysis of intergenerational educational and occupational mobility as well as a cursory look at income mobility for co-residing parents and children.

Mobility analysis is technically the domain of panel data. However, intergenerational mobility is one of the chief themes in NIDS and special attention was given to this theme in the Wave 1 questionnaire. Even in the cross-section of NIDS Wave 1, it is possible to compare parents and their children in terms of their education and occupation status. Indeed, NIDS provides rich data for these topics. There are other dimensions to intergenerational mobility that are in NIDS but that we do not explore in this report. Examples include residential, consumption and health mobility.

This report is structured as follows. Section 2 focuses on intergenerational education mobility, first examining item non-response of parental education and then proceeding to a description of educational mobility results. Section 3 proceeds, in a similar manner, with intergenerational occupation mobility. These two sections are revisited in Section 4 where correlations are used to measure the degree of intergenerational mobility. Section 5 provides a cursory inspection of intergenerational income mobility of co-resident parents and children before Section 6 concludes.

2. Educational Mobility

2.1 Item Non-Response on the Education of Children and their Parents

In Section D of the NIDS adult questionnaire, respondents are asked questions regarding their parents. There were 16 885 adults interviewed, however, of those 16 885, 1246 were refusals. Thus, the following non-response analysis focuses only on those 15 639 adults who responded.

A variable was created to capture the highest education successfully achieved by a parent of an adult from the adult questionnaire. This variable includes information from two sources:

1. For non-resident or deceased parents – the child's[1] recall in Section D of the NIDS adult[2] questionnaire

2. For resident parents – self-reported[3]

Table 2.1: Item non-response for parental education

Variable	missing/refused/don't know		% 'don't know' of total non-response
	Freq.	Percent	
Mother's education	2500	16%	88%
Father's education	4262	27.3%	90.6%

Table 2.1 shows that item non-response rates are primarily driven by the problems associated with recall: approximately 90% of the total non-response in both mothers' and fathers' education are attributable to the 'don't know' category. The frequency of non-response on these education variables is not too surprising as it requires the recall of distant specific information.

Overall, mothers' education has the lower number of missing, refused, not applicable and don't know values. This could be attributed to the fact that there is generally higher father absenteeism during a child's upbringing in South Africa. Unfortunately, there is no formal way to test this assumption.

Technically, there should be data points for every one of the 15639 adults' parental education. However, of the total respondents, there are 2.9% and 2.6% missing for mother and father education respectively. These are attributable to a forced skip pattern following an incorrect

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[1] The word 'child' here is used loosely: anyone who reports information about their parents. However, 'child' in this analysis is restricted to individuals from the adult questionnaire.
[2] Adults here are technically classified as 15 years and older. However, there are a 41 fourteen years olds captured in this first wave.
[3] The 'best' education variable from the individual derived data is used here. For more information regarding the 'best' variables consult the documentation that accompanies the data.

answer. Question D6 of the adult questionnaire asks whether the parent resides in the same household as the respondent. If the answer was yes, the respondent skipped the questions on parental education and occupation. However, 458 and 396 of those who answered yes to this question for mother and father respectively, did so incorrectly (their parents do not in fact reside in the same household). In this sense some information on parents education and occupation are system missing. Another reason for the system missing values is that a few permanent sample members (PSM's) were not interviewed even though they were household members. Therefore their adult files were included (as imputed refusals) for reasons of completeness.

2.2 Analysis of Educational Mobility

For the analysis that follows, post-stratification weights are used where appropriate. Table 2.2 below provides a broad breakdown of mean years of education by race and gender.[4] Table 2.2a restricts the sample to those children aged between 20 and 35. Their parents would be in their fifties and sixties. Table 2.2b considers 'children' who are older than 50 years of age. Their respective parents would be from the generation born prior to World War II. Thus, in effect this table displays a picture of three generations' educational achievement. Table 2.2c examines gender differences across race.

Table 2.2: A Description of Average Years of Education of Children and Parents

a) Children Aged between 20 and 35

	All		African		White		Coloured	
	average	*obs*	*average*	*obs*	*average*	*obs*	*average*	*obs*
child's years of education	10.37	4553	10.16	3741	12.37	153	10.55	605
mother's years of education	5.4	3708	4.79	3105	11.35	135	7.4	428
father's years of education	5.37	3032	4.43	2538	11.65	134	8.02	327

b) Children Older than 50

	All		African		White		Coloured	
	Average	*obs*	*Average*	*obs*	*Average*	*obs*	*Average*	*obs*
child's years of education	6.02	3847	4.04	2792	12.14	402	5.87	575
mother's years of education	3.00	3092	0.87	2422	10.45	300	2.83	323
father's years of education	3.14	2987	0.86	2329	10.57	305	2.81	304

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[4] Table A1 in the appendix outlines the way in which education level was recoded to reflect years of education.

c)	Children Aged between 20 & 35		Children Older than 50	
	average	obs	average	obs
Male	10.26	1865	6.63	1374
Female	10.45	2688	5.63	2473
African male	9.998	1535	4.55	946
African female	10.29	2206	3.73	1846
White male	12.53	67	12.68	174
White female	12.23	86	11.75	228
Coloured male	10.85	240	6.04	224
Coloured female	10.33	365	5.78	351

It is apparent from an examination of Table 2.2a and 2.2b that the number of years of education obtained is increasing across generations: an average of 10 years for the current generation, 5 to 6 years for their parents and a meagre 3 years for their grandparents.

White parents are, on average, more educated than their African and Coloured counterparts in both generations, but the education gap is shrinking: in this generation, White parents have approximately three and 1.5 times more years of education than African and Coloured parents respectively; whereas a generation back, White parents had approximately twelve times more and 3.7 times more years of education than African and Coloured parents respectively. A simple t-test shows that whilst African mothers have significantly more years of education than African fathers, the reverse was true a generation back. There is no significant difference in years of education between White parents in the current or past generation.[5]

Whilst White educational attainment has not increased dramatically, African educational attainment, and to a lesser extent Coloured education, have improved considerably. Therefore, one would expect the number of years of education to be inversely related to the age of African children in South Africa. (Nimubona, A and Vencatachellum, D, 2007). This is verified by a simple correlation of -0.58 between age and education years of African children. This serves to illustrate the point that intergenerational education analysis in the context of South Africa's history needs to take into account the way in which race, to a large extent, predicts educational outcome. This historical legacy dominates the intergenerational picture. This is in contrast to the international literature where the focus is on genetic attributes; cultural transmission and the inheritance of wealth (see Bowles and Gintis 2002). However, recently even the international literature has given more attention to group membership and group persistence and its impact on intergenerational mobility.

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[5] This report assumes an insignificant number of mixed marriage and that a parent's race reflects that of their child.

Table 2.2c illustrates the gender differences in years of education across race. For the current generation (the age group 20-35), White males have the most years of education and African males the least – a difference of approximately 2.5 years. Amongst this group's parents, White males had the most years of education and African females the least with a more substantial difference of 9 years. In the current generation, African females are significantly better educated than African males; whereas amongst the current generation of Whites there is no significant difference between the education attainment of females and males.

A summary of the amount and direction of an individual's educational mobility by race, gender and geotype is shown below in Table 2.3. In the table, downwardly mobile, immobile and upwardly mobile mean, respectively, that the child has less, the same or more education than their father or mother.

In general, the upwardly mobile effect dominates: 62% of South Africans are upwardly mobile in terms of educational achievement. This means that 62% of South Africans obtained more years of education than their parents. This corroborates what was evidenced in table 2.2 - that education levels are on the rise. African and Coloured South Africans are more mobile than White South Africans: an African child has a 32% probability of ending up with the education level of his or her father whilst a White child has a 47% probability. A likely explanation for the relative immobility of White South Africans is that in terms of education level, both children and parents are predominately situated at the upper bound relative to non-White South Africans and thus have limited scope for upward movement. This is also a result of the way in which education level was coded with tertiary education being the final category. Many international studies decompose tertiary education into separate categories. This was deemed unnecessary in the South African context where there are only a small amount of tertiary graduates as a percentage of the population (2%), of which the overwhelming majority are White.

The second half of the table analyses individuals on the basis of the geotype in which the dwelling unit was situated.[6] Rural and tribal geotypes have similar profiles in terms of education mobility. Unsurprisingly, urban dwellers are more mobile than their rural or tribal counterparts and experience greater upward mobility and downward mobility. In particular, an urban child has a 29% probability of attaining the same education level as his or her mother, a 65% probability of achieving an education level higher than that of his or her mother, and only a 6% probability of obtaining an education level less than his or her mother.

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[6] For the following analysis, geotype was simplified by amalgamating the formal and informal aspects of urban to form just three categories: rural formal, tribal and urban. Tribal is made up of tribal plus rural informal.

The final section of the table decomposes education mobility by race and gender. African males are generally more mobile, more upwardly mobile and less downwardly mobile than White males. The same pattern holds for African and White females. White females experience the largest probability of downward mobility.

Table 2.3: Transition Matrices of Educational Mobility of Children Relative to their Parents

		Immobile	Upwardly Mobile	Downwardly Mobile
All	Father	34%	61%	5%
	Mother	32%	63%	5%
African	Father	32%	64%	4%
	Mother	31%	66%	4%
White	Father	47%	43%	11%
	Mother	46%	45%	9%
Coloured	Father	34%	58%	9%
	Mother	28%	65%	7%
Geotype				
Rural	Father	38%	58%	5%
	Mother	36%	62%	2%
Tribal	Father	37%	60%	3%
	Mother	36%	60%	3%
Urban	Father	31%	63%	6%
	Mother	29%	65%	6%
Gender				
African Male	Father	31%	64%	5%
	Mother	29%	66%	5%
African Female	Father	32%	65%	3%
	Mother	32%	65%	3%
White Male	Father	49%	43%	9%
	Mother	44%	48%	8%
White Female	Father	45%	43%	13%
	Mother	49%	42%	10%
Coloured Male	Father	37%	52%	11%
	Mother	25%	64%	11%
Coloured Female	Father	31%	62%	7%
	Mother	30%	65%	5%

*the recoded education variable from table 1.4 was used and an age restriction of children older than 20 years was used in order to try capture the final education attainment of the individual whilst not reducing the sample size too much

To capture the ordinal nature of educational attainment we followed Nguyen et al (2003)'s example and recoded educational attainment into six categories. These are detailed in Table A2 in the appendix. We then estimated an ordered logit model that allowed us to inspect the relationship between the educational status of the child and the educational status of their mother and father while controlling for race, gender and age. These ordered logit estimates and the marginal effects for each educational outcome are presented in Table A3 in the appendix. The marginal effects coefficients are there to facilitate interpretation. The estimated coefficients are all significant at the 1% level. The *size* of the coefficients indicates the strength of the intergenerational transmission and the *sign* indicates the direction.

From a cursory examination of the ordered logit results, there is evidence of non-linearity in the intergenerational transmission of education. This is demonstrated by the increasing size of the coefficients on the level of both the mothers' and fathers' education. In addition, the estimated effect of educational transmission is stronger for the father than the mother. For example, a child whose father has a matric plus certificates or diplomas (Y=5), is 36 percentage points more likely to have a matric plus certificates or diplomas than the child whose father has no or limited schooling. The corresponding effect of mother's education level on her child's level of education is 21 percentage points. The direction of the strength of education transmission illustrated here is similar to that found in a similar study by Nguyen *et al* (2003) on intergenerational education mobility in the US.

Male children have a small positive coefficient suggesting marginally more upward mobility in education compared to their female counterparts. The ordered logit was performed separately for sons and daughters (not shown here). For sons, the educational transmission was stronger for the father than the mother. For daughters, the educational transmission was stronger for the mother than the father.

Strong negative coefficients on the African and Coloured coefficients emphasise the important point that the intergenerational mobility is taking place at different parts of the educational distribution for different race groups.

3. Occupational Mobility

3.1 Item Non-response for Occupational Mobility Questions

For this analysis three variables were constructed: children's occupation; mother's occupation and father's occupation. Child's occupation was created by taking the occupation codes from Section E of the adult questionnaire for regular work 1, regular work 2, casual work, self-employed work and the occupation code for when the respondent once ever worked. Precedence was given to the occupation from regular work 1 in the case of multiple jobs. The parental occupation variables include information from two sources:

1. For non-resident or deceased parents – child recall in Section D of the NIDS adult questionnaire

2. For resident parents – self-reported in Section E of the NIDS adult questionnaire

Table 3.1: Occupation Codes and Skill Level

	Major Group	Skill Level
1.	Legislators, senior officials and managers	4
2.	Professionals	4
3.	Technicians and associate professionals	3
4.	Clerks	2
5.	Service Workers and shop and market sales workers	2
6.	Skilled agricultural and fishery workers	2
7.	Craft and related trades workers	2
8.	Plant and machinery operators and assemblers	2
9.	Elementary occupations	1
0.	Armed forces and unspecified occupations	1

Table 3.1 explains the occupation codes and the skill level associated with each occupation. These are the South African Standard Classification of Occupations (SASCO) taken from Statistics SA and based on the United Nations' International Standard Classification of Occupations (ISCO-1988).

Table 3.2 describes the non-response for the constructed variables. As in the parental education case, non-response of father's occupation is primarily driven by problems with recall with 85% of non-response being 'don't know' values. This is unsurprising given that a major source of information on father's occupation relies on the child's recall. Similarly, non-response in the mother's occupation is driven by don't know values but to a lesser extent than father's. Non-response for child's occupation is negligible.

Table 3.2: Item non-response for child and parental occupation

Variable	Total	missing/refused/don't know		... of total non-response	
		Freq.	Percent	%don't know	%missing
Mother's occupation	6668	976	14.6%	61%	39%
Father's occupation	11071	2962	26.8%	84.8%	15%
Child's occupation	5812	256	4.4%	71%	28.5%

Whereas every respondent and their parent have some education, this is not necessarily the case for occupation. Approximately 25% of the adults in the data are less than 22 years of age and thus there is a high likelihood of them being full-time students or learners or unemployed. There are other reasons for adults not having ever worked in an occupation including domestic and child-caring duties. For the parents of the interviewed adult, there are two main reasons why they might not have any occupation status:

1. Parent is resident but has never worked in an occupation; or works on their own plot or food garden
2. The adult respondent answered yes to D6 but the parent is actually not resident.

3.2 Analysis of Occupational Mobility

The occupation transition matrices depicted below lend some insight into occupation mobility by race, gender, geotype, and age. These occupation mobility matrices show the joint distribution of children's occupation skill level and that of their parents. The skill level associated with each occupation is given in Table 3.1 above. Table 3.3 provides the occupation transition matrix for fathers and mothers and their children. Table 3.4 summarises the effect of race, gender and geotype on occupation mobility and finally Table 3.5 takes into account age and its *intra*-generational implications for occupation mobility.

Table 3.3: Occupation Transition matrix

a) Father and child occupation matrix   **b) Mother and child occupation matrix**

	Child						Child				
Father	**1**	**2**	**3**	**4**	**Total**	**Mother**	**1**	**2**	**3**	**4**	**Total**
1	380984	467971	26527	121515	996997	**1**	975062	1306400	43049	270521	2595032
	38.21%	**46.94%**	**2.66%**	**12.19%**			**37.57%**	**50.34%**	**1.66%**	**10.42%**	
2	1183155	2607421	196369	634941	4621886	**2**	212248	635351	79934	228570	1156103
	25.60%	**56.41%**	**4.25%**	**13.74%**			**18.36%**	**54.96%**	**6.91%**	**19.77%**	
3	21006	72461	24989	28743	147199	**3**	21106	73653	32711	69263	196733
	14.27%	**49.23%**	**16.98%**	**19.53%**			**10.73%**	**37.44%**	**16.63%**	**35.21%**	
4	59013	303217	97299	413929	873458	**4**	72725	320749	82415	213467	689356
	6.76%	**34.71%**	**11.14%**	**47.39%**			**10.55%**	**46.53%**	**11.96%**	**30.97%**	
Total	1644158	3451070	345184	1199128	6639540	**Total**	1281141	2336153	238109	781821	4637224
	24.76%	**51.98%**	**5.20%**	**18.06%**	**100.00%**		**27.63%**	**50.38%**	**5.13%**	**16.86%**	**100.00%**

In Table 3.3a), the first row deals only with those children whose fathers were in the first skills level category. Reading across it, is evident that 38.2% of these fathers' children are again in this category, 46.9% have moved up to the second skills level, 2.66% had moved to the third skills level and 12.19% had moved all the way up to an occupation with the highest skill level. The second, third and fourth rows provide similar details for those fathers with occupations characterised by the second, third and fourth skills level respectively.

The red diagonal line represents those that have experienced no occupation mobility between generations: 38.2% of fathers who were in the first skills level have children who have remained in this level of skill and similarly, 47.4% of fathers in the fourth skill level category have children in this category. It appears that there is less mobility in the bottom two skills levels than in the higher skill levels. This illustrates the non-linear pattern of intergenerational occupation transmission. The popularity of using transition matrices in mobility analysis lies in this ability to portray non-linearity; which is lacking from simple correlation analysis. Overall, there appears to be limited mobility with a large proportion of children pursuing the same occupations as their fathers.

There is a similar analysis between children and their mothers in Table 3.3b. In both figures there is a heavy concentration in the second skills level, over 50% and much less so in the third skills level with a meagre 5%. This imbalance can be attributed partly to the skills level categorisation illustrated in Table 3.1. For example, in Table 3.3b, 46.5% of children who have mothers in the highest skills category have an occupation associated with a skill level of 2. In addition, more children with fathers in the third skills level category moved down to the second skills category than remained in this category. Thus, in both figures there is evidence of

downward occupation mobility and a bias towards the second skills category. The imbalance attributed to the skills categorisation suggests that a more creative approach to categorising skill levels might be called for. NIDS provides a rich source of disaggregated occupation data which could be used to this end.

<p style="text-align:center">Table 3.4: Summary of Transition Matrices by Gender, Race and Geotype</p>

		Immobile	Upwardly Mobile	Downwardly Mobile
Race				
African	Father	51%	20%	29%
	Mother	41%	46%	13%
White	Father	54%	28%	19%
	Mother	29%	32%	38%
Coloured	Father	51%	25%	24%
	Mother	42%	40%	17%
Gender	Father & son	60%	19%	21%
	Mother & daughter	48%	36%	17%
Geotype				
Rural	Father	59%	20%	21%
	Mother	42%	49%	9%
Tribal	Father	50%	18%	31%
	Mother	46%	41%	13%
Urban	Father	51%	23%	26%
	Mother	39%	43%	18%

Table 3.4 suggests that, in general, compared to education mobility, occupation mobility in South Africa is limited. The probability of children pursuing the same occupation skill level as their parents dominates either moving up or down the skills level ladder across race, gender and geotype. A notable exception is the upward mobility of children in terms of their mother's occupation relative to their father's occupation. This is most apparent for African, rural and urban children and their mothers where children have a 46%, 49% and 43% probability of obtaining an occupation with a skill level higher than that of their mothers for African, rural and urban respectively. This maternal upward mobility is probably driven by the fact that the majority of 'mothers' fill occupations of the lowest skill category (63%) but that structural changes in the economy have allowed children more latitude. Thus, as in the White education case, mobility is bounded; but in this case at the bottom of the distribution, therefore now there is a bias towards upward mobility. This is especially true given the intergenerational

improvements in education. However, the fact that this mobility has been more muted for fathers and children despite improvements in education hints at more subtle dynamics.

Compared to education mobility presented in Table 2.3 where an average of 6.5% experienced downward mobility, Table 3.4 paints a bleak picture of intergenerational occupation mobility where there is an average of 21% experiencing downward mobility. In addition, across all categories there is a greater probability that a child will experience downward mobility relative to their father's occupation skill level than their mother's. One surprising exception to this is for Whites: White children have a 38% probability of obtaining an occupation skill level lower than their mother's and have a 19% probability of obtaining an occupation skill level lower than their father's. Furthermore, the White mother-child occupation skill link is the most fluid with a child experiencing almost equal probabilities of having a skill level below their mother's or a skill level above their mother's.

African South Africans are marginally less mobile than White South Africans. An African child has on average a 46% probability of ending up with the occupation skill level of his or her parent versus a White child who has on average a 41% probability.

Table 3.5: 'Cohort' Transition Matrices

Age of Child: Less than 30

Father	Child 1	2	3	4	Total	Mother	Child 1	2	3	4	Total
1	87255	118294	14171	10602	230322	1	326241	495910	8960	42370	873481
	37.88%	51.36%	6.15%	4.60%			37.35%	56.77%	1.03%	4.85%	
2	355006	964250	49618	89661	1458535	2	109735	293067	13783	78445	495030
	24.34%	66.11%	3.40%	6.15%			22.17%	59.20%	2.78%	15.85%	
3	9713	36681	391	2337	49122	3	15390	38388	15266	5886	74930
	19.77%	74.67%	0.80%	4.76%			20.54%	51.23%	20.37%	7.86%	
4	25739	126195	42820	101331	296085	4	19776	169736	18831	56965	265308
	8.69%	42.62%	14.46%	34.22%			7.45%	63.98%	7.10%	21.47%	
Total	477713	1245420	107000	203931	2034064	Total	471142	997101	56840	183666	1708749
	23.49%	61.23%	5.26%	10.03%	100.00%		27.57%	58.35%	3.33%	10.75%	100.00%

Age of Child: Between 30 and 45

Father	Child 1	2	3	4	Total	Mother	Child 1	2	3	4	Total
1	151267	212444	10989	59680	434380	1	380659	540621	22714	136568	1080562
	34.82%	48.91%	2.53%	13.74%			35.23%	50.03%	2.10%	12.64%	
2	500418	1041866	96960	306414	1945658	2	60229	254771	52832	101341	469173
	25.72%	53.55%	4.98%	15.75%			12.84%	54.30%	11.26%	21.60%	
3	2704	20950	23749	24074	71477	3	5104	20175	15117	36650	77046
	3.78%	29.31%	33.23%	33.68%			6.62%	26.19%	19.62%	47.57%	
4	14745	91129	23183	147596	276653	4	29446	107902	29342	110399	277089
	5.33%	32.94%	8.38%	53.35%			10.63%	38.94%	10.59%	39.84%	
Total	669134	1366389	154881	537764	2728168	Total	475438	923469	120005	384958	1903870
	24.53%	50.08%	5.68%	19.71%	100.00%		24.97%	48.50%	6.30%	20.22%	100.00%

Age of Child: More than 45

Father	Child 1	2	3	4	Total	Mother	Child 1	2	3	4	Total
1	128901	102259	1367	47239	279766	1	210132	197113	11375	85093	503713
	46.07%	36.55%	0.49%	16.89%			41.72%	39.13%	2.26%	16.89%	
2	264608	466562	37999	220424	989593	2	30771	66819	4804	41240	143634
	26.74%	47.15%	3.84%	22.27%			21.42%	46.52%	3.34%	28.71%	
3	8589	14830	0	2332	25751	3	612	15090	2328	24955	42985
	33.35%	57.59%	0.00%	9.06%			1.42%	35.11%	5.42%	58.06%	
4	18529	68822	30966	141628	259945	4	16749	33298	31494	45497	127038
	7.13%	26.48%	11.91%	54.48%			13.18%	26.21%	24.79%	35.81%	
Total	420627	652473	70332	411623	1555055	Total	258264	312320	50001	196785	817370
	27.05%	41.96%	4.52%	26.47%	100.00%		31.60%	38.21%	6.12%	24.08%	100.00%

It is necessary to clarify that this report assumes that the parent's occupation, as reported by the child, is the final or most dominant occupation of the parent during their life-time. In contrast to this, Wave 1 of NIDS captures the current occupation of the child. Thus, we are not necessarily comparing the parent and child occupations at the same stage of their careers. This "age effects" problem is a perennial thorn in the side of occupational and income mobility measurement.

Table 3.5 gives some attention to the confounding effect of age (and experience) by looking at intergenerational patterns at three separate age categories of the child. As the age of the children increases, the more the skill level of the child comes to reflect that of their parents. This is unsurprising given that age is synonymous with experience and one acquires skills through one's lifetime. This is most apparent for the highest skill category: for children under 30, there is a 21.47% probability that they will end up with a skill level of 4 like their mother. This increases to 35.8% for 'children' older than 45 years of age. This phenomenon of acquiring skills can be used to explain why, in Table 3.3b, 46.5% of children who have mothers in the highest skills category have an occupation associated with a skill level of 2.

To formalise the findings from the transition matrices, an ordered logit on occupational skill level was conducted for children over 25 years of age. As was done earlier for education, Table A4 in the appendix presents both the ordered logit estimates and the marginal effects for each occupation skill level. All coefficients are significant at the 1% level, thus there is strong evidence of intergenerational transmission of occupational status attainment.

There is evidence of non-linearity in the intergenerational transmission of occupation. This is evidenced by the increasing size of the coefficients on the level of both the mothers' and fathers' occupation skill level: i.e. the intergenerational link in occupational status becomes stronger as one moves from low skilled occupations (code 1) to higher skilled occupations (code 4). The exception to this is occupation skill level 4 for mothers. However, this could be distorted by the small number of observations in this category.

It is difficult to conclude whether the estimated effect of occupational transmission is stronger for the father than the mother. However, the occupational transmission is definitely more persistent for the father at high end of the skills level. For example: a child whose father is a professional (i.e. of skill level 4) is 20 percentage points more likely to be a professional than the one whose father has an elementary occupation. The corresponding effect of mother's occupation skill level on her child's occupation is 13 percentage points.

Once again, the strong negative coefficients for Africans and Coloureds show that, on average, the occupational mobility for children from these racial groups is occurring within lower

segments of the occupational distribution than for White children. Analogously, the positive male coefficient suggests that male children are situated higher up the occupational distribution than females, all other things held equal.

One of the reasons that the ordered probit is so useful is that age is included in the model and therefore controlled or "held equal" in the above results. As it turns out age is interesting in its own right. The positive sign on the age coefficient and negative sign on the age-squared coefficient jointly show us that older children will be in better occupations but that this effect slows down over time.

4. Correlation for Education and Occupation

Internationally, it is standard to measure educational and occupational mobility by looking at correlations between parent and child levels of education and occupation. Table 4.1 displays a summary of correlation coefficients by race and gender for both occupation and education. The first column depicts spearman rank coefficients for occupation skill level. The second column gives the Pearson correlation coefficients for years of education.

Table 4.1: Summary - Correlation coefficients for Occupation and Education

	Occupation (Ranked)			Education (Years)	
	correlation	obs	prob	correlation	obs
Mother and child	0.3023	2480	0.000	0.5208	12587
Father and child	0.2054	3403	0.000	0.5386	10886
African					
Mother and child	0.2112	1570	0.000	0.448	10214
Father and child	0.1420	2154	0.000	0.4411	8798
White					
Mother and child	0.1147	204	0.102	0.3237	734
Father and child	0.2009	351	0.000	0.3958	727
Coloured					
Mother and child	0.2232	684	0.000	0.5895	1466
Father and child	0.1347	840	0.000	0.6387	1201
African male					
Mother	0.1325	755	0.000	0.4321	4055
Father	0.1113	1126	0.000	0.4348	3484
African female					
Mother	0.2797	815	0.000	0.4604	6159
Father	0.1591	1028	0.000	0.4463	5314
White male					
Mother	-0.0269	91	0.800	0.2413	323
Father	0.2993	156	0.000	0.4204	324
White female					
Mother	0.2444	113	0.009	0.4061	411
Father	0.0969	195	0.178	0.3738	403
Coloured male					
Mother	0.0931	316	0.099	0.5405	585
Father	0.1294	382	0.114	0.6268	484
Coloured female					
Mother	0.3155	368	0.000	0.6264	881
Father	0.1287	458	0.006	0.6481	717

Notes:

*recoded occupation variables were used; education is a continuous variable measured in years (with weights).

*the probability value refers to the test of Ho: variable 1 and variable 2 are independent.

In the analysis that follows, a correlation of zero indicates that a person's occupation rank or number of years of education is independent of that of his or her parent, implying that there is mobility amongst ranks across generations but that this is unsystematic. A correlation of 1 implies that occupation ranks or education years do not change from generation to generation.[7] A negative correlation would imply strong evidence of downward mobility.

From the above, it appears that the intergenerational transmission of occupation skill level status is marginally stronger for Africans than for Whites, an average of 0.18 and 0.16 respectively. The mother-child occupation transmission is twice as strong for Africans than for White South Africans. Within the African and Coloured groups, the mother-child transmission is much stronger than the father-child one. The reverse is true for Whites. Beller and Hout (2006, 31) claim that a father's absence from his family can reduce the correlation between his occupation and the occupation status of his children. South Africa has a long tradition of migrant labour which profoundly affected African family structures which might explain the strong maternal link. These correlation results corroborate the earlier findings of the transition matrices.

Taking gender into account, mother-daughter intergenerational occupation transmission for Africans, Whites and Coloureds are the most persistent with coefficients of 0.28, 0.24, and 0.31 respectively. The father-son transmission is only persistent for Whites with a correlation of 0.3. The father-daughter transmission and mother-son transmissions for Whites are insignificant meaning that the daughter or the son's occupation skill level is independent of that of their father or mother. Surprisingly, given the high coefficient for Whites, the father-son transmission for Africans exhibits a low persistence of only 0.11, less than the mother-son transmission of 0.13.

In general, there is greater intergenerational persistence for education than for occupation; this differs from the conclusions made earlier using transition matrices. Coloureds exhibit the highest degree of persistence in education with a correlation between father and child's education of 0.64. Whites have higher intergenerational education mobility than Africans with correlation coefficients of 0.36 and 0.44 respectively. This is in line with Nimubona and Vencatchellam (2007) who found that the correlation between the educational attainments of an African head of household and that of the current generation of African children equals 0.25, and the corresponding number for Whites is 0.19. This is as expected as one would assume that Whites are less constrained by their parents' education than Africans. However, despite these

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[7] It is important to keep in mind that a small correlation does not necessarily mean that there is no relationship between the two variables as the correlation coefficient only measures the strength of a *linear* (straight-line) relationship.

results corroborating the ordered logit results, these correlation estimates contradict Table 2.5 where Whites were found to be less mobile than Africans and Coloureds. This disparity might be due to the fact that correlations ignore the non-linearity of intergenerational transmission.

The gender dimension displays similar results to that observed for occupation: there is once again the strong link between African female and mother and White male and father, with the weakest link being between White male and mother. For both Coloured male and Coloured female there is a strong degree of persistence of intergenerational education transmission for both mother and father.

5. Income of Co-Resident Parent and Child

There are a number of tricky problems associated with measuring the intergenerational transmission of earnings. Solon (2002) has identified two such problems. Firstly, when measuring father's income it is important to try to capture the long-run earnings measure. Thus it is necessary to use five or more years of data for both father and son instead of relying only on single year measures which are error-ridden proxies for long-run earnings. With the first wave of NIDS, this is not possible. However, as research on earnings mobility has been a major theme from other multiyear panel data sets, this highlights the importance of conducting further waves of NIDS to facilitate such work.

The second problem associated with measuring the intergenerational earnings elasticity is in incorporating the life-cycle nature of earnings. This is the age/experience problem that we flagged in our discussion of occupation. The fact that a person's age affects his or her earnings requires a cohort analysis of income. At this stage of NIDS, only the first wave of data is available. Thus intergenerational income analysis is restricted to the contemporaneous income of co-residing parents and children. Further waves will help reduce the biases inherent in correlating the incomes of two generations living within the same household.

Table 5.1: Number of Co-residing parents

	Mothers	Fathers
Number Unique	3013	1210
Number Multiple mentions	3788	1537

Table 5.1 isolates co-residing parents. There are 1210 fathers who live with their children, but including the multiple mentions per child, there are 1537 fathers. Similarly for mothers, there are 3013 living with their children and including the multiple mentions, there are 3788.[8]

Mean labour income for co-resident parents and children is presented in Table 5.2. Income for parents and children is the individual monthly labour income earned from all labour market sources.[9] There is a huge disparity evident between the mean income of mothers (R 2727 per month) and fathers (R4232 per month) with fathers earning 1.5 times that of mothers. The table also illustrates the limited number of observations available for the analysis of

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[8] Correlations will be slightly biased towards mothers and fathers with multiple children.
[9] Labour market income is an aggregation of income from several sources: main and secondary job; casual wages; self-employment income; 13th cheque; other bonus; profit share; 'helping friends' income; and extra piece-rate income.

contemporaneous income for co-residing children and their parents, 268 and 149 data points for mothers and fathers respectively.

Table 5.2: Co-resident parents mean labour income

	Mean	No. of observations of income data for both a parent and child
Mother	R 2726.88	268
Father	R 4231.68	149
Child	R2439.57	875

Table 5.3 gives the income correlation coefficient between mothers and their co-resident children and fathers and their co-resident children. Bowles and Gintis (2002) summarise the research findings on income persistence across generations by stating that it is greater for sons than daughters. A tentative analysis of our correlations would conclude that, for the NIDS too, there is slightly greater income persistence between father and child and more income mobility between mother and child. Unfortunately, sample sizes became exceedingly small when one ventures to decompose the correlation by race and gender or age.

Table 5.3: Co-resident Income correlations for parents and their child

Income	*correlation*	*obs*
Mother and child	0.2192	268
Father and child	0.2529	149

A large amount of the international literature focuses on the coefficient of intergenerational income mobility between a father and a son (Solon 1992; Bowles and Gintis (2002); Grawe and Mulligan (2002); Solon (2002); Bjorkland and Chadwick (2003)). Thus, comparative international estimates are available. However, it is necessary to highlight the difficulty of conducting comparisons across international studies. Indeed, Solon (2002) questions whether the differences among estimates across countries reflects actual cross-country differences in intergenerational mobility or whether the differences stem from differences across studies in earnings measures, age ranges or other sample selection criteria. Despite these inconsistencies, the general conjecture is that intergenerational transmission of economic status is stronger in developing countries. Solon (2002) concedes that it is difficult to test this hypothesis given the data limitations in developing countries. The two developing countries represented in the Solon (2002) are Lillard and Kilburn's (1995) study of Malaysia and Hertz's (2001) study on South Africa. As in this report, Hertz's study is limited to contemporaneous income reports from co-residing fathers and sons in KwaZulu-Natal. Co-residing generations are likely to display

different intergenerational earnings associations. The Malaysian estimate of intergenerational earnings elasticity of 0.26 and the South African estimate of 0.44 both support the conjecture of a strong intergenerational transmission.

Table 5.4 attempts to replicate Hertz's findings with NIDS data. The income elasticity that results is 0.1906.[10] This is actually closer to the Malaysian finding than the South African finding and suggests significantly less persistence than Hertz finds in KwaZulu-Natal.

Table 5.4: An estimate of intergenerational Earnings Elasticity

	Child's labour income
Father labour income	0.1132**
	(0.0527)
Constant	2,237.902***
	(405.9503)
Observations	79
R-squared	0.0566
F-stat	4.62

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*age of child is restricted to less than 40

*post-stratification weights are used

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[10] This is the beta coefficient of 0.1132 multiplied by the ratio of the resident father's mean income (R4655.7) to the co-resident son's mean income (R2765.15). Sons are under 40 years of age.

6. Conclusion

A preliminary analysis of intergenerational education mobility has shown an overall upward mobility across race, age, geotype and gender. This implies that the current generation of South Africans has a high probability of attaining an education level above that of their parents. From the transition matrices, African and Coloured South Africans appear to be more mobile than White South Africans. However, this result conflicts with the results obtained from the correlations above, which show White South Africans to be more mobile. More complex statistical analysis is needed to verify this.

In general, intergenerational occupation mobility in South Africa is limited with the probability of children pursuing the same occupation as their parents being the most likely, across race, gender, geotype. In addition, African South Africans are less mobile than White South Africans. In spite of this, there is considerable upward mobility of children in terms of their mother's occupation. Finally, as the age of the children increases, the more their skill level comes to reflect that of their parents.

In conclusion, it is clear that NIDS represents a rich source of data for intergenerational research in South Africa. This preliminary analysis has served to point out the potential benefits of a panel for researching, in particular, the income dynamics across generations. We eagerly await more waves.

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Appendix

Table A1: Recoding for Years of Education

Original coding of education variable	Corresponding Years of Education
0 – 12 (grades)	0-12 years
13 = NTC 1	10 years
14 = NTC 2	11 years
15 = NTC 3	12 years
16 = certificate < grade 12	10 years
17 = diploma < grade 12	11 years
18 = Certificate + grade 12	13 years
19 = diploma + grade 12	14 years
20 = bachelors degree	15 years
21 &22 = (bachelors degree + diploma & honours degree)	16 years
23 = higher degree	18 years
25 = no schooling	0 years

Table A2: Recoding of Education (ordinal)

Code	Label	Label Explanation
Y=1	Limited or no schooling	No schooling; grades 0,1,2,3
Y=2	Junior school	Grades 4,5,6,7
Y=3	High school	Grades 8,9,10,11
Y=4	Certificates + diplomas < grade 12	NTC 1; NTC 2; certificate with less than matric; diploma with less than matric
Y=5	Certificates + diplomas + grade 12	NTC 3; grade 12; Certificate with grade 12; diploma with grade 12
Y=6	Tertiary	Bachelors' degree; bachelors degree and diploma; honours degree; higher degree (masters, doctorate)

Table A3: Education Mobility: Results from the Estimation of an Ordered Logit

	Ordered Logit coefficients	Marginal Effects					
		Y=1	Y=2	Y=3	Y=4	Y=5	Y=6
Age	-0.0284***	0.0025***	0.0031***	0.0002***	-0.0003***	-0.0051***	-0.0004***
	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
age2	-0.0003***	0.0000***	0.0000***	0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Male	0.0176***	-0.0015***	-0.0019***	-0.0001***	0.0002***	0.0032***	0.0002***
	(0.001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0002)	(0.0000)
African	-1.650***	0.1010***	0.1488***	0.1271***	-0.0098***	-0.3262***	-0.0409***
	(0.0022)	(0.0001)	(0.0002)	(0.0003)	(0.0000)	(0.0004)	(0.0001)
Coloured	-1.549***	0.2241***	0.1371***	-0.1398***	-0.0174***	-0.1917***	-0.0123***
	(0.0028)	(0.0006)	(0.0001)	(0.0004)	(0.0000)	(0.0002)	(0.0000)
Father_edu_2	0.754***	-0.0525***	-0.0761***	-0.0410***	0.0070***	0.1485***	0.0141***
	(0.0017)	(0.0001)	(0.0002)	(0.0002)	(0.0000)	(0.0004)	(0.0000)
Father_edu_3	0.971***	-0.0658***	-0.0959***	-0.0581***	0.0084***	0.1921***	0.0192***
	(0.0018)	(0.0001)	(0.0002)	(0.0002)	(0.0000)	(0.0004)	(0.0001)
Father_edu_4	1.519***	-0.0736***	-0.1222***	-0.1648***	0.0045***	0.3088***	0.0473***
	(0.0078)	(0.0002)	(0.0004)	(0.0012)	(0.0001)	(0.0014)	(0.0004)
Father_edu_5	1.830***	-0.0937***	-0.1487***	-0.1826***	0.0057***	0.3622***	0.0572***
	(0.0028)	(0.0001)	(0.0002)	(0.0004)	(0.0000)	(0.0005)	(0.0002)
Father_edu_6	3.089***	-0.0971***	-0.1694***	-0.3523***	-0.0119***	0.4166***	0.2141***
	(0.0047)	(0.0001)	(0.0001)	(0.0004)	(0.0001)	(0.0004)	(0.0008)
Mother_edu_2	0.714***	-0.0506***	-0.0727***	-0.0363***	0.0068***	0.1398***	0.0131***
	(0.0016)	(0.0001)	(0.0002)	(0.0002)	(0.0000)	(0.0003)	(0.0000)
Mother_edu_3	0.972***	-0.0664***	-0.0964***	-0.0568***	0.0085***	0.1920***	0.0191***
	(0.0018)	(0.0001)	(0.0002)	(0.0002)	(0.0000)	(0.0004)	(0.0001)
Mother_edu_4	1.407***	-0.0709***	-0.1167***	-0.1469***	0.0053***	0.2882***	0.0411***
	(0.0068)	(0.0002)	(0.0004)	(0.0011)	(0.0000)	(0.0013)	(0.0004)
Mother_edu_5	1.016***	-0.0641***	-0.0969***	-0.0737***	0.0078***	0.2050***	0.0219***
	(0.0029)	(0.0001)	(0.0002)	(0.0004)	(0.0000)	(0.0006)	(0.0001)
Mother_edu_6	1.842***	-0.0812***	-0.1372***	-0.2121***	0.0018***	0.3613***	0.0675***
	(0.0055)	(0.0001)	(0.0002)	(0.0008)	(0.0001)	(0.0008)	(0.0004)
Observations	1.42E+07	*** p<0.01, ** p<0.05, * p<0.1					
Pseudo-R2	0.203	Standard errors in parentheses					
chi2	8.98E+06						

*post-stratification weights were included
*This logit is restricted to 'children' older than 20 years. This restriction was enforced in order to try and capture the final education level.
*omitted base dummies: White, female, mother education level 1, father education level 1

Table A4: Occupation Mobility: Results from the Estimation of an Ordered Logit

	Ordered Logit coefficients	Marginal Effects			
		Y=1	Y=2	Y=3	Y=4
age	0.0710***	-0.0117***	0.0001***	0.0028***	0.0088***
	(0.0010)	(0.0002)	(0.0000)	(0.0000)	(0.0001)
age2	-0.0009***	0.0002***	-0.0000***	-0.0000***	-0.0001***
	(1.20e-05)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
male	0.644***	-0.1061***	0.0005***	0.0251***	0.0805***
	(0.0025)	(0.0004)	(0.0001)	(0.0001)	(0.0003)
African	-1.470***	0.2047***	0.0724***	-0.0540***	-0.2231***
	(0.0044)	(0.0005)	(0.0005)	(0.0002)	(0.0008)
Coloured	-1.286***	0.2628***	-0.1049***	-0.0422***	-0.1157***
	(0.005)	(0.0012)	(0.0008)	(0.0002)	(0.0003)
Father_occ_2	0.251***	-0.0426***	0.0028***	0.0098***	0.0301***
	(0.0036)	(0.0006)	(0.0001)	(0.0001)	(0.0004)
Father_occ_3	0.388***	-0.0573***	-0.0128***	0.0156***	0.0545***
	(0.0075)	(0.0010)	(0.0005)	(0.0003)	(0.0012)
Father_occ_4	1.188***	-0.1493***	-0.0905***	0.0438***	0.1961***
	(0.0051)	(0.0005)	(0.0008)	(0.0002)	(0.0011)
Mother_occ_2	0.842***	-0.1224***	-0.0316***	0.0331***	0.1209***
	(0.0032)	(0.0004)	(0.0003)	(0.0001)	(0.0005)
Mother_occ_3	1.496***	-0.1596***	-0.1655***	0.0467***	0.2783***
	(0.0075)	(0.0005)	(0.0014)	(0.0001)	(0.0018)
Mother_occ_4	0.850***	-0.1166***	-0.0459***	0.0332***	0.1292***
	(0.0043)	(0.0005)	(0.0005)	(0.0002)	(0.0008)
Observations (weighted)	2565600	Standard errors in parentheses			
chi2	679439	*** p<0.01, ** p<0.05, * p<0.1			
Pseudo_R2	0.112				

*post-stratification weights were included