

Educational attainment and intergenerational social mobility in SA

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INTRODUCTION

South Africa's racially segregated past has left it with an income inequality level that ranks amongst the highest in the world, representing a key policy challenge for the current government. Underlying the disparity in income, however, is a deeper source of inequality: differential access to income-earning opportunities in the South African labour market. Large segments of the working age population remain excluded from formal employment in a relatively skills-intensive macro-environment as a result of *inter alia* insufficient educational attainment. In contrast, individuals with high levels of education are able to find work more easily, to command higher wages within a given occupation, and also to improve their chances of upward occupational mobility. Studies by both Blau and Featherman (referred to in Burns 2001) suggest that educational attainment is the main observed determinant of occupational status¹, which directly influences earnings. We are interested in intergenerational social mobility – as influenced by educational status – because it indicates access to opportunity and therefore the ability of the current black generation to overcome its historical disadvantage. From a broader welfare analysis perspective, we are also interested in it since social mobility represents one of the major forces driving changes in the aggregate income distribution over time. Analysing the income distribution at any one point in time using cross-sectional data provides one with only a static picture of welfare.

The focus of this study is thus on analysing the extent of intergenerational social mobility in South Africa over the period 1970 to 2001. Within this framework, its purpose is to determine the extent to which parents' schooling feeds through into their children's schooling, so that we can understand the degree to which the more distant history of weak education in the formerly Black schooling system has influenced learner outcomes through intergenerational transmission of educational status over the past 3 decades. Policy interventions aimed at improving schooling outcomes of Black learners currently attending school are likely to be limited in their efficacy by the degree of social immobility, given the low education levels attained by the parents of this group. However, these learners are precisely the ones which policy should continue to target, particularly if one shares the view of Dahan and Gaviria (2001: 537) that levelling the playing fields may be more effective in terms of achieving equity in the long run than redistributing incomes *ex post*.

¹ Both studies are conducted on data for American males.

The paper begins with an explanation of why we would expect educational attainment to influence the schooling of future generations and briefly presents the findings of authors who have conducted research into this issue. It also touches on other factors which research has indicated are important determinants of educational attainment in South Africa. Next, attention turns to a description of the data sets and methodology employed for purposes for empirical analysis. Preliminary analysis indicates that mean educational attainment has risen substantially over the period under study, with steady progress over almost a century, accelerating for the black population after the 1940s. The South African estimates for two social mobility indices are presented together with comparable values for Latin American countries, a number of which have inequality levels comparable to South Africa's. Finally, the paper concludes with an analysis of the relationship between children's education in 1991 and 2001 and the education and household income of their households of origin, to test how persistent household characteristics are.

ON SOCIAL MOBILITY

As noted above, we are interested in intergenerational social mobility given its implications for the labour market. Intergenerational social mobility is determined by all of the factors which comprise an individual's family background, although parents' education and household economic status – proxied by income or wealth measures – are the two highlighted most often in the literature (see for instance Behrman et al 2001; Case & Deaton 1999; Filmer & Pritchett 1998b). In this paper, we are predominantly interested in the extent to which educational status is transmitted across generations, and the policy implications of this finding. There is a strong relationship between an individual's level of education and his or her standard of living in South Africa, given that unemployment rates are strongly linked with a worker's education level (Bhorat 2003), and that those with tertiary qualifications are able to command a substantial premium in the labour market (Keswell & Poswell 2002). Education both increases the probability of upward occupational mobility and the possibility of upward income mobility (Burns 2001: 1).

Before analysing the reasons why parent's education and household income might matter for child's educational outcomes in more detail, we need to choose a theoretical framework explaining the accumulation of education as our point of departure. Becker's human capital model (referred to in Behrman et al 1998) views schooling as a pure investment, and hypothesises that individuals invest in education until the marginal private benefit from their

investment equals private marginal cost. In the presence of complete markets, family background matters very little here – with the notable exception of intergenerational transfer of genetic endowments that determine children's inherent ability.

Introducing market imperfections changes the entire picture through resulting in differential private marginal benefit and cost curves dependent on household characteristics. Firstly, education policy may affect households differentially depending on their education and income levels: schools may provide higher quality education to better-educated, more affluent parents in response to their greater economic and political strength. This raises marginal private benefits for these households and thus makes education investments more profitable. Secondly, households may decide to make complementary investments in schooling directly through help with homework and so on, or indirectly through maintaining good child health outcomes. One might argue that such costs are lower for wealthy households containing well-educated parents, thus raising the marginal private benefit of schooling. Third, rich well-educated parents may have prestigious social networks that assist their child in obtaining profitable employment after completing education, thus again increasing the marginal private benefit of schooling. Behrman et al (1998: 6-7) outline a number of further reasons for why one might expect differential marginal private cost and benefit curves to exist in the presence of market imperfections. Factors such as those listed above explain why there may be persistence in educational outcomes across generations, with children's future socio-economic status partly determined by their parents' characteristics.

These considerations aside, a further assumption made by Becker's model is that households are able to borrow as much funds as are required to invest in child's schooling, given their expectations of future returns to investment in the form of wages. However, studies by Gormly and Swinnerton (2003) and Edmonds (2004) have shown convincingly that liquidity constraints operate in the South African context – as they might be expected to do throughout the developing world, leading to sub-optimal investment in schooling. It should also be borne in mind that the South African earnings schedule is convex rather than concave, and therefore that an individual needs to complete a considerable number of years of schooling in order to reap substantial gains from his or her investment. In fact, Hertz (2001) points out that returns to education in South Africa are lowest at 5-6 years of schooling, increasing thereafter until at least 14 years. Consequently, a large education budget may be necessary if schooling is evaluated as a human capital investment, and one would therefore expect household income to matter in a very direct way when evaluating educational outcomes. The extent to which

liquidity constraints operate is obviously influenced by parent's education, since educational attainment determines household income levels directly through its impact on the labour force participation decision and earnings. Hausman and Szekely (1999) find that children in Latin America who have better educated mothers that participate in the labour force reach higher education levels than other children do. Quantifying this effect, the authors find that the probability that a child remains in school increases by 5% as a result of his or her mother's labour force participation decision.

Our focus here lies on the importance of intergenerational transmission of educational status for social mobility, so we do not consider the role of household income as a determinant of mobility in great detail². Empirically, parents' education appears to be important for the determination of children's schooling. In their study on Latin American countries, Hausman and Szekely (1999: 20) find that parents' educational attainment is a more important determinant of child's educational attainment than even household income is, accounting for approximately 30% of variation in schooling. Across the board, the intergenerational correlation coefficient on educational attainment ranges from 0.14 to 0.45, averaging 0.29 (Mulligan 1999, referred to in Burns 2001: 2). Burns (2001: 1) suggests that this correlation indicates the upper bound on intergenerational earnings correlation, given that parental preferences for education and wealth appear to influence educational investment decisions more than anticipated increases in the child's future earnings do.

Simple OLS estimates measuring the importance of parental education for child's schooling are typically plagued by upward bias³, since they ignore intergenerational transfer of ability and the possibility of assortative mating (Burns 2001: 3). Furthermore, they only provide snapshots of the population at a given point in time, and thus are not useful for analysing the dynamics of mobility. A number of recent studies measure the impact of family background on social mobility using other methods. Behrman, Birdsall and Szekely (1998) define intergenerational mobility as the degree to which the schooling gaps of children cannot be explained by measures of family background (both parents' educational attainment and household income). Constructing their intergenerational schooling index for Latin American

² The reader is referred to Gormly and Swinnerton (2003) and Edmonds (2004) for further analysis of the ways in which household-level liquidity constraints matter for children's schooling investments in South Africa.

³ One would expect ability and educational attainment to be positively correlated, given that more able children are likely to progress more rapidly and at lower cost through the schooling system. Their education may also be rewarded better in the workplace, raising the marginal private benefits of their educational investment. Regarding assortative mating, more educated women are likely to marry more educated men. Their children may achieve better academically and in the workplace as a result (Behrman & Rosezweig, in Burns 2001: 3).

countries, they find that family background explains 1-32% of the variation in age-group specific schooling gaps, and that the percentage increases with children's age (Behrman et al 1998: 17). Dahan and Gaviria (2001) provide another perspective, defining social mobility as the extent to which a child's success in schooling is not explained by common factors reflected in his/her sibling's schooling outcome. They propose a sibling correlation index, which measures sibling performance relative to mean educational attainment for the sample. Applying this methodology to Latin American countries, the authors find that sibling correlations for the late 1990s range between 0.30 and 0.60, in comparison with 0.21 for the USA. These authors also model intergenerational persistence in schooling outcomes using first-order Markov processes and transition matrices. They find a high degree of association between parents' education and child's education in Latin America, and in particular a high degree of absolute mobility for children with parents at the lower ends of the education distribution.

Studies on mobility in South Africa are very limited in number. Using the October Household Survey 1995, Lam (1999) tackles the issue of intergenerational transfer of educational status but without analysing mobility dynamics. Comparing South Africa with its similarly unequal counterpart Brazil, he shows that child's schooling is dependent on parents' schooling in South Africa, but to a lesser extent than it is in Brazil. Further, the current distribution of education in South Africa is more equal than in Brazil. Interestingly, the impact of parents' education is non-linear: children whose mothers have a university degree progress through 0.22 more school grades per year than children whose mothers have no schooling. This translates into an education advantage of more than 2.5 years by age 18. In contrast, the education of mothers with grade 6 or less schooling has a very small impact on child's schooling. Burns (2001) analyses determinants of schooling gaps in Kwazulu-Natal using KIDS panel data for 1993 and 1998, and finds that parents' education significantly reduces schooling gap ratios. However, this effect is non-linear in another dimension: having a poorly educated mother and a well educated father appear to be as beneficial for a child's schooling outcomes as having two highly educated parents. Both studies find that household income is also important for success in schooling, although substantially less so than parental education.

Given the dearth of mobility studies for South Africa, regression estimates modelling determinants of educational attainment are also worth reviewing. Perhaps the best-known education production function study for South Africa is the one by Case and Deaton (1999).

While not measuring mobility directly, these authors carefully model the determinants of educational attainment using 1993 PSLSD data. Using OLS regressions, these authors show that having a household head with completed secondary schooling may raise a child's educational attainment by more than a quarter of a grade per year relative to children who live in households headed by individuals who have only completed primary schooling. The size of this effect is confirmed in a study conducted by Thomas on 1991 census data (Thomas 1996).

DATA AND METHODOLOGY

This paper utilises the full data sets for the 1970, 1985 and 1991 population censuses, as well as 10% samples drawn from the 1996 and 2001 censuses. For the 1970 census, Statistics South Africa only sampled 5% of blacks, and the 1991 census only contains data for blacks living outside the former TBVC states⁴. Furthermore, there is no income data for blacks in 1970 (check with Derek), and no income data at all for 1985. Across all of the more recent censuses, a substantial number of households reported zero incomes. This is a form of misreporting, since it is not possible to sustain a household without any form of income. To deal with this problem, one can adopt either of two approaches: to throw zero-income households out prior to analysis, or to slot these households into the remaining income categories. Leibbrandt et al (2001) took the first approach in their recent poverty and inequality study, and reported results for indicators both including and excluding the zero-income households from their datasets. This methodology is particularly appropriate if it can be assumed that households that report zero income are in actual fact distributed randomly across the income distribution. In contrast, Whiteford and McGrath (1994) divide the zero-income households in the 1991 census equally into the 5 lowest household income categories, assuming that these households receive little rather than no income.

Investigating the characteristics of zero income households contained in census 2001 reveals that these are likely to be poverty stricken households. Heads of zero income households have lower educational attainment than heads of other households (on average they have only 6.3 years of education – less than complete primary schooling), are more likely to be female and are highly unlikely to be employed – only 2% have secured waged employment.

⁴ To weight up the black population, each of the observations for this group for 1970 is given a weight of 20. For 1991 it is assumed that blacks in the other homelands share similar characteristics to those in the TBVC states, and observations are weighted up accordingly given information on the black population in South African Labour Statistics (Statistics South Africa 1994).

Therefore, it seems that a questionnaire response of zero income indicates that the household receives zero wage income, and is therefore likely to be dependent on remittance or grant income for survival. However, we remain unable to estimate the exact levels of income of such households from census data. Given this uncertainty, we exclude zero income households from all analysis where the household income variable is required as an input.

In this paper, three types of data analysis are applied. The first is descriptive analysis, tracking changes in educational attainment over time in South Africa and linking these to characteristics including race, parental education and household income. The second is the calculation of two social mobility indices that measure absolute and relative social mobility in the South African population. The former type of mobility is linked to the level of economic development since it will reflect a rise in average educational attainment caused by a policy-driven expansion of schooling, while the latter highlights differentials in access to opportunity and is thus not influenced by the level of development. Absolute social mobility may be measured by intergenerational schooling indices, as estimated by Behrman et al (1998), while relative social mobility may be measured by sibling schooling correlation indices, as proposed by Dahan and Gaviria (2001). The usefulness of these measures derives from the hypothesis that if family background matters for schooling, a correlation will be observed between both parent and child's schooling outcomes and between siblings' educational attainment. Here both indices are estimated. The final type of analysis conducted in this paper is the estimation of ordered probits to determine the probability of an individual reaching increasing education levels dependent on his or her family background. For this purpose, we utilise census data for 1991 and 2001 relating to individuals aged 21-25 whose households of origin can be identified from questionnaire responses.

Progress in educational attainment

In order to investigate the historical path of educational attainment, this paper uses the attainment of different birth cohorts from the 2001 census⁵. As educational attainment is a permanent personal characteristic that can be supplemented but not decreased later in life, this allows a fairly accurate picture of historical patterns of educational attainment and therefore of the historical flows through the school system. For older cohorts, the picture may be less accurate, however, if there are differential mortality patterns. These are known to exist

⁵ In this paper, the qualifications included in census questionnaires are converted into formal education grade equivalents. For purposes of this conversion, educational attainment of less than matric with a diploma or certificate is counted as completion of grade 11 at most, to reflect the fact that the final hurdle of the matriculation exam (the only real hurdle in the school system) has not been cleared.

between race groups, , but we have no information about differential mortality between less and more educated groups within any population group, except for strong evidence of higher mortality within the rural part of the black population. Nevertheless, we largely accept this census-based picture of educational attainment as a snapshot of the past, although the availability of an older census – that of 1970 – allows us to supplement some of the data from the 2001 census with the data from three decades earlier for some of the same birth cohorts.

Figure A1 illustrates educational attainment in terms of mean years of education completed according to birth year from these two censuses for all population groups, areas and income groups combined. We see that the 2001 census shows a more volatile picture for earlier years. This is to be expected, given a smaller sample for this census and as a result of mortality amongst older cohorts reducing their numbers considerably, making measurement less accurate. On the other hand, the closer one gets to the census date, the less true it is that mean attainment reflects the final attainment of a particular birth cohort, as many may still be studying or be likely to do so in future. This is illustrated by the 2001 census: attainment peaks in the 1978 cohort, but the decline observed in the most recent birth cohorts is likely to be artificial, reflecting the fact that some of these people were still engaged in education at the time of the 2001 census. For the same reason, we also expect the data for cohorts in the late 1940s that to show lower attainment than those cohorts eventually reached. The vertical line at 1940 is where we spline the two datasets, using attainment data before 1940 from the 1970 census, and thereafter from the 2001 census. This gives relatively smooth data, although it will become clear later that the measurement at higher education levels (matric and above) differed more between the censuses.

Sibling correlation index

The sibling correlation index, as constructed by Dahan and Gaviria (2001), is based on the assumption that those children who have fallen behind their peers in schooling outcomes by their late teens are the ones who are most likely to experience low socio-economic status during their lives. This seems to be a fair assumption to make in a country such as South Africa, where formal sector employment – which is more closely tied to worker’s educational attainment than informal sector employment is – dominates the market for labour. Formally:

$$\rho_a = 1 - (1 - \rho_g) \frac{S - 1}{S - F}$$

$$\text{where } \rho_g = \frac{\sum_{f=1}^F \sum_{s=1}^{S_f} (g_{sf} - \bar{g})^2 \sum_{k=1}^{S_f} (g_{kf} - \bar{g}) / S_f}{\sum_{f=1}^F \sum_{s=1}^{S_f} (g_{sf} - \bar{g})^2}$$

Here F is the number of families in the sample, S is the number of teenage siblings in the sample, and S_f is the number of teenage siblings in family f. g_{sf} is a dummy variable taking a value of 1 if sibling s in family f has passed a pre-determined benchmark grade – set here as the median schooling for each age cohort, and \bar{g} is the average value of the dummy taken across the entire sample. ρ_a corresponds to the adjusted R-squared from a regression of schooling gaps on a set of dummy variables relating to all the families in the sample (Dahan and Gaviria 2001: 543-4). While the simple correlation coefficient ρ_g provides a noisy measure of intergenerational transmission of education, positive values of the adjusted correlation coefficient (ρ_a) provide unambiguous evidence that family background impacts children's schooling outcomes. Sibling correlation coefficients reflect all common factors affecting education of siblings (including community characteristics such as school quality and neighbourhood factors), but omit family influences not common to siblings including varying parental treatment on the basis of birth order. The lower they are, therefore, the more intergenerational social mobility exists.

To compute the index, one needs to identify the children aged 16-20 who have fallen behind in schooling, and then determine the extent to which family background is responsible for these schooling outcomes through analysing sibling correlation coefficients. An aggregate of these correlation coefficients provides us with an index measure of social mobility for each group in which we are interested. An index value that is close to zero suggests that perfect social mobility holds and therefore that family background is irrelevant for the determination of children's educational attainment; conversely, the higher the index value, the less social mobility and thus the more children's schooling depends on parents' schooling.

The advantages of using the sibling correlation index over the methodologies relying on OLS regression are as follows. Firstly, the index does not rely on income variables that are drawn from surveys – these are prone to measurement error, particularly at the top and bottom of the income distribution. Secondly, endogeneity problems resulting from the intergenerational transfer of ability are avoided. Thirdly, the incorrect omission of all unobserved family or household specific factors that occurs in regression model specification is avoided. However,

sibling correlations represent an upper bound on intergenerational correlations rather than reflecting the true unbiased intergenerational correlation (Behrman et al 2001:28). Furthermore, there are cautions from an econometric perspective. First of all, ignoring households containing only 1 child may reduce the precision of estimates. Secondly, there may be a selectivity issue resulting from low fertility households falling out of the sample; this is relevant to analysis if there is a quantity-quality trade-off. Neither of these minor issues affects the usefulness of the estimated correlation coefficient index though.

In this paper, sibling correlation coefficients are estimated for the whole population as well as for each of the race groups for 1985, 1991 and 2001.

Intergenerational schooling mobility index

Behrman et al (1998) calculate an intergenerational schooling mobility index to measure the extent of absolute social mobility in the population. The index is constructed by determining what proportion of variance in the schooling gap for each of a number of child age groups is associated with the weighted average of both parents' schooling and household income. Here the schooling gap is defined as the number of years of schooling that a child should have given his or her age (i.e. age less six years) less the number of years of schooling that the child has obtained. To calculate the index, the schooling gap is regressed on three indicators of family background, namely father's schooling, mother's schooling and household income. Control variables are also added; in our case these are whether the household head is female and whether the household is in a rural area. The coefficients on parents' education and household income are then used as weights to estimate the predicted schooling gap of each child. The variance of this variable is divided by the variance of the actual schooling gap variable to obtain a ratio that is independent of the absolute magnitude of the schooling gap. As above, an index value that is close to zero indicates a high level of mobility, while a value that is close to unity indicates low levels of mobility.

Following Behrman et al (1998), we also divide our sample of children into the following age groups: 10-12, 13-15, 16-18 and 19-21 years. This is to allow for potentially different effects of family background on educational attainment depending on the distance to a child's marginal schooling decisions. The mobility index is estimated for the total population, by race and age of children for 1991 and 2001.

DESCRIPTIVE ANALYSIS

Figures 3 to 12 in the Appendix show patterns of educational attainment by year of birth over the past century. Figure 3 shows mean educational attainment for people born in each year for which data is available, based on the censuses for 1970 and 2001. The purpose of the graph is to show that the curves follow each other quite closely, and thus to justify using the methodology outlined above, i.e. splining the two censuses. Figure 4 shows the result of the spline. Note the rising educational attainment over time, particularly for the group of individuals born from 1950 onwards.

Figure 7 disaggregates mean educational attainment patterns by race. White individuals exhibit the smallest increase over time, although starting from a much higher base of 8 years of education in 1890. The educational attainment for Indians born during the second half of the 20th century reflects a very rapid rise, with Indians born just before 1980 attaining the similar schooling levels as whites (i.e. just less than 12 years). Coloureds and blacks show a more modest increase, to a level of grade 10 for the most recently included cohort. Note how the black and total population curves converge for cohorts born in later years, with the fairly rapidly growing black population becoming a larger proportion of the total. Figure 8 further disaggregates the black population by location-type: clearly urban individuals have substantially better educational attainment than rural individuals. However, a qualifier should be added here. The census divides individuals into locations according to where they are living at the time the census is taken. There may thus be a self-selection issue: more educated people are more likely to migrate to urban areas if they perceive that they stand to gain the most from participating in urban labour markets.

We turn next to a look at patterns of educational attainment by level schooling. Figure 9 shows that when the lowest schooling hurdle – completed primary education – is used, the racial gap in attainment has narrowed very considerably. There is only a difference of 14% between the proportion of the best performing race group (whites) which have completed primary school and the proportion of the most poorly performing one (blacks) which have achieved the same. Moving on to higher hurdles – completed matric and tertiary qualifications (see figures 10 and 11) – the picture looks rather different. Racial gaps remain large, although at matric-level substantial gains have been made by younger Indian cohorts; the proportion of Indians born in 1980 who have passed matric is approximately the same as the proportion of whites born in the same year who are in the same position. Note however

that the gap between Indian and white attainment at tertiary level remains large, suggesting that access to tertiary institutions is constrained by factors that are not as limiting at secondary school level. The most significant of these may well be finance, since university or college education is considerably more expensive than secondary schooling. Figure 12 highlights the differential performance of blacks across rural and urban areas once again. When viewing figures 10-12, it should be remembered that the steep drops around birth cohorts from 1980 are due to individuals who had not completed their education by 2001 (the most recent census from which data is extracted) rather than dropping out.

Figure 13 shows the educational progress of individuals aged 21-25 in 2001, disaggregated by race. Note that whites and Indians follow similar patterns of attainment, with modest drop-out at higher secondary school grades. Coloureds perform better than blacks at passing lower grades, although this is largely due to there being larger numbers of blacks who never enrol. By grade 9 coloureds have lost their initial advantage, pointing to high drop-out rates for this group between grades 4 and 8. Case and Deaton (1999) refer to the PSLSD 1993 study, in which illness, pregnancy and cost of schooling were mentioned as the most significant deterrents to continuing schooling. Viewing attainment curves for each census year (Figure 14), one can see that there has been an upward shift in attainment between each of the census years, although this progress has slowed in recent years. A particularly interesting feature of the graph is that almost 30% of 21-25 year old children never enrolled in school. This had changed drastically by 1980, with almost universal grade 1 enrolment achieved by this year. The pattern that applies to the total population also applies to blacks (see figure 15), although the rise in attainment over time is more dramatic. In 1970, 40% of 21-25 year old black children had never enrolled in school and fewer than 1% had passed matric. By 2001, these figures had improved to 9% and 36% respectively. While non-enrolment has not been as large a problem for them, coloureds appear to drop out in large numbers in secondary school, generally around age 15 – a phenomenon long known to exist and that appears to be at least in part linked to earlier labour market access due to better labour market links and networks amongst this group than amongst many blacks (see figure 16). Whites and Indians have approximately 80% matric pass rates, an achievement that is the result of rapid catch up at higher education levels by Indians and more modest improvement by whites, who had already achieved virtually universal education up to grade 8 by 1970 (see figures 17 and 18).

The third set of graphs belonging in the category of descriptive analysis links family background (captured in this analysis by income and parents' education) to children's

schooling. These attainment profiles by age follow the approach taken by Filmer and Pritchett (1998a, 1998b), who evaluate child's attainment on the basis of economic status. Firstly we evaluate schooling performance on the basis of income, as the above authors do. For this purpose, we divided the black population into five quintiles according to income, and the smaller white and coloured populations into an upper and a lower half each. Figures 19-21 show the attainment profiles for 1991 for 16-20 year old individuals belonging to different race groups, disaggregated by household per capita income quantile. Note the strong link between family background and schooling outcomes that is evident in all of these graphs – in each one, individuals in the upper quintiles perform markedly better than those in the lower quintiles, although for whites the difference between upper and lower quintiles is smaller than for other race groups. Figures 22-24 reflect the same information, but for 2001. There is clearly substantially less stratification by socio-economic status amongst blacks in more recent years, and also slightly less amongst coloureds.

Figures 25-28 show educational attainment for blacks in the same age group in each of the census years from 1985 to 2001, disaggregated by average parental educational attainment⁶. Note the large differences in attainment by average parents' education level in 1985: only 10% of black children who had parents with no education managed to pass grade 10, while 43% of children whose parents' average schooling level was matric achieved the same. This intergenerational transmission of schooling appears to have weakened somewhat by 1991, when a considerable relative shift upward in the performance of children whose parents have no education is visible. Indeed, it is encouraging to note that all of the attainment curves for black children aged 16-20 shifted upwards substantially during the period 1985-1991. From that time onwards, there does not seem to be any significant change in attainment patterns by parental education level, suggesting that these remained largely static after the expansion of secondary schooling during the 1970s and 80s. The table below reflects average educational attainment for all children aged 16-20 years on the basis of their parents' educational attainment, for the period 1985-2001.

⁶ For 1985 the results are slightly less reliable, since it is not possible to identify who the parents of children in a household are; for purposes of this paper, we assume that the household head and his/her spouse are the parents.

Table 1: Mean Educational Attainment by Race and Parent Education Category							
Data set	Race group	Average Parent Education Category					
		0 yr No Schooling	1-6 yrs Incomplete Primary	7-11 yrs Incomplete Secondary	12 yrs Matric	>= 13 yrs Tertiary Qualifications	Total
Census 1985	Black	4.94	6.86	8.36	7.84	7.19	6.65
	Coloured	5.49	7.10	8.93	9.09	8.50	7.72
	Indian	9.61	10.07	10.74	11.40	11.57	10.44
	White	9.75	10.16	10.81	11.26	11.43	11.00
	All	5.20	7.16	9.28	10.45	10.55	7.79
Census 1991	Black	6.80	8.04	9.33	10.04	10.64	8.06
	Coloured	6.55	7.94	9.62	10.88	11.34	8.81
	Indian	10.15	10.59	11.06	11.40	11.63	10.93
	White	10.56	10.74	10.94	11.39	11.59	11.20
	All	6.85	8.12	9.76	10.98	11.32	8.64
Census 1996	Black	7.55	8.41	9.48	10.17	10.64	8.54
	Coloured	7.46	8.44	9.93	10.94	11.31	9.35
	Indian	10.46	10.81	11.13	11.41	11.72	11.12
	White	10.40	10.60	10.86	11.27	11.51	11.16
	All	7.58	8.46	9.77	10.80	11.18	8.92
Census 2001	Black	7.56	8.86	9.83	10.40	10.81	8.87
	Coloured	7.23	8.74	10.17	10.93	11.43	9.73
	Indian	9.54	10.71	11.32	11.49	11.86	11.30
	White	8.39	10.24	10.72	11.21	11.49	11.13
	All	7.56	8.87	10.04	10.82	11.23	9.23

To summarise: in South Africa, there is much lower schooling inequality within younger cohorts than within older cohorts. Most of the recent improvements in schooling have disproportionately benefited students in the lower deciles of the schooling distribution (Lam 1999). The intra-racial inequality that remains is largely driven by socio-economic status – family background appears to be a relatively important determinant of educational attainment, particularly for non-white children. Most of the interracial inequality in schooling derives from variation in secondary schooling attainment: the vast majority of whites complete grade 12, while less than 40% of blacks complete this level of schooling.

Despite the observed improvements in educational attainment over the past few decades, however, Lam (1999: 6) comments that South Africa has performed relatively poorly in expanding schooling, given the country's level of per capita income. Furthermore, the increase in quantity of education has not been accompanied by an equally large improvement in school quality in the former black schooling system. Crouch and Magoboane (1998) investigate performance amongst poor schools, and find that their quality is highly variable. The fact that still so few blacks and coloureds pass matric suggests that schooling expansion has not necessarily benefited individuals in a way that will serve them well in our skills-hungry labour market.

RESULTS

Sibling correlation index

Firstly, the results for the sibling correlation index are presented. Figure 1 below shows estimated values of the adjusted correlation coefficient ρ_a , placing South Africa in an international context. Comparison with Latin American countries is interesting from an analytical perspective because these economies are plagued by high levels of inequality in the same range as South Africa's. At a level of 0.37 in 2001, South Africa's schooling mobility appears to be relatively high; this value of the index is on par with the most mobile country in Latin America (Panama) and not too far from the value for the USA. Interestingly, South Africa is much more mobile by the sibling correlation measure than Brazil – a country with which it is often compared. This is in line with Lam's (1999) findings regarding schooling mobility across these two countries.

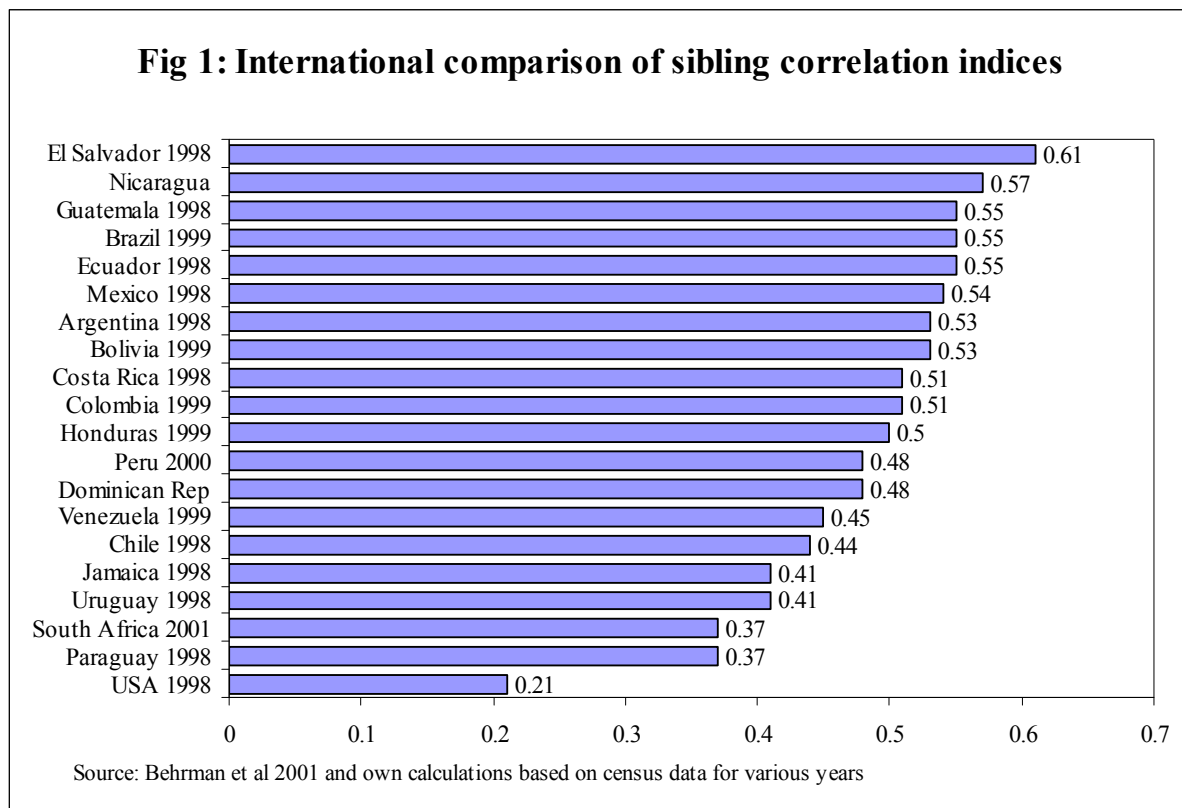
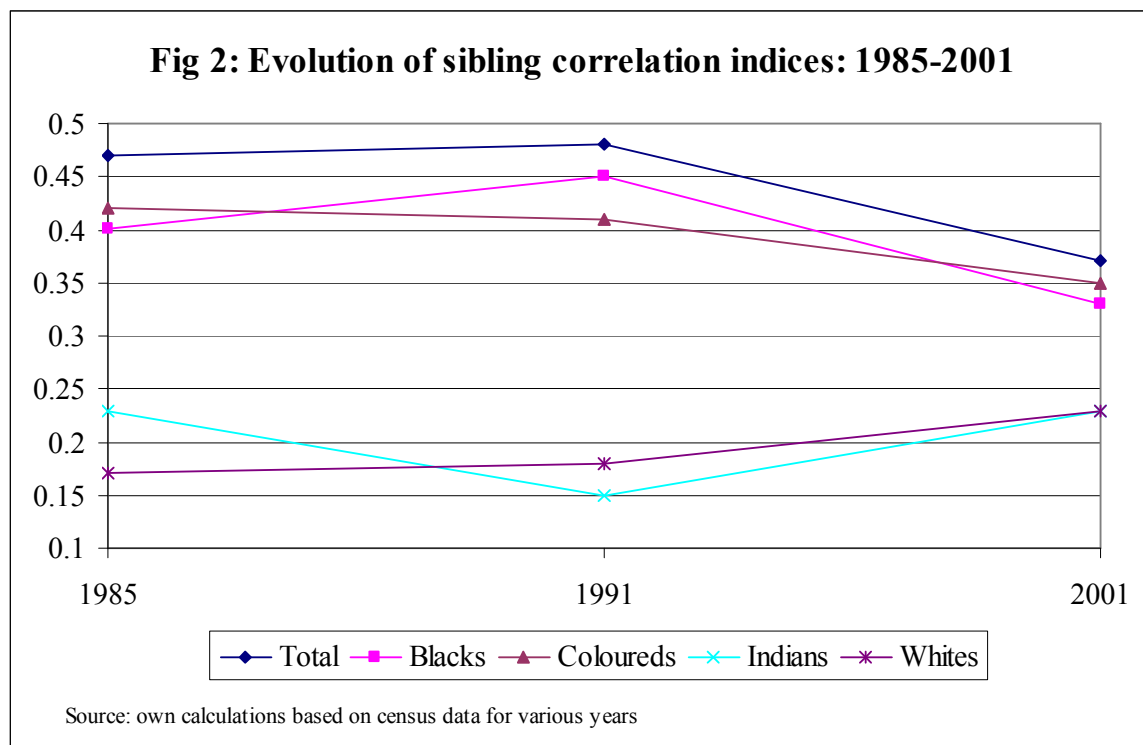


Figure 2 below presents the evolution of sibling correlation coefficients over time, both for the total population and for each population group. Social mobility for the total population has increased substantially since 1991, a phenomenon which appears to be driven by the schooling outcomes of coloured and black children. This is an encouraging finding, particularly for black children who must overcome both low levels of household resources and low levels of parent educational attainment during their schooling careers. Although not presented here, quintile estimates for blacks indicate that the values of these sibling correlations are remarkably stable across the black population. It is clear that Indian and white children are most socially mobile – as one might expect given their access to relatively good quality schooling and substantial private household resources. However, the social mobility of both of these groups as measured by sibling schooling correlations appears to have been declining since 1991, in contrast with the other groups. Note that while this might at first glance appear to be a shift to the detriment of white and Indian children, the truth is the opposite. If family background plays an increasingly important role in the schooling of children in more affluent households headed by better educated parents, then this implies that white and Indian children have become more likely to continue to enjoy the relatively high socio-economic status of their parents during their adult lives.



Intergenerational schooling mobility index

We turn next to estimates of the intergenerational schooling mobility index. Firstly, we once again place South African children's social mobility – as estimated by this index – in international comparison. Table 2 below presents values of the index for the South African population against comparable values for Brazil (which has the lowest social mobility in Latin America by this measure) and the highest social mobility country in Latin America by this measure, Chile. Readers who are interested in comparing South Africa with all Latin American countries are referred to Behrman et al (1998) for further estimates of the magnitude of this index for a broad spectrum of Latin American countries.

Table 2: International comparison of intergenerational schooling mobility using the mobility index by Behrman et al (1998)

Country	Year	Intergenerational schooling mobility indices				
		10-12	13-15	16-18	19-21	Average
South Africa	1991	0.11	0.16	0.22	0.22	0.16
	2001	0.05	0.09	0.13	0.15	0.10
Chile*	1994	0.04	0.05	0.12	0.17	0.09
Brazil*	1995	0.25	0.25	0.29	0.32	0.28
Latin American average*		0.11	0.15	0.19	0.23	0.17

Note: an index value closer to zero indicates greater social mobility

* Source: Behrman et al (1998)

Source for South Africa: own calculations based on census data

For both years for which we have data, South Africa exhibits substantially more mobility than Brazil does, although our society is not as mobile as the Chilean one. The index rises more rapidly with age in South Africa than in Brazil though, suggesting that grade repetition and drop-out become increasingly bigger obstacles to completing school in the prescribed number of years as pupils grow older. Once again, a large increase in social mobility over the 1990s is evident in the estimates for South Africa. In 1991, levels of social mobility were close to the Latin American average, while by 2001 they had risen substantially closer to the most mobile end of the Latin American spectrum.

Table 3: Intergenerational schooling mobility by race

	Year	Intergenerational schooling mobility indices				
		10-12	13-15	16-18	19-21	Average
Blacks	1991	0.13	0.15	0.16	0.16	0.12
	2001	0.05	0.07	0.09	0.10	0.08
Coloureds	1991	0.08	0.13	0.16	0.17	0.12
	2001	0.03	0.08	0.14	0.17	0.10
Indians	1991	0.00	0.01	0.03	0.05	0.05
	2001	0.00	0.00	0.01	0.06	0.03
Whites	1991	0.00	0.00	0.03	0.05	0.02
	2001	0.00	0.00	0.02	0.08	0.02

Note: an index value closer to zero indicates greater social mobility

Source: own calculations based on census data

Table 3 shows the same index calculated by race and age cohort. Note the dramatic drop in immobility within the black population group during the 1990s. It is also interesting to observe that the indices for the total population show greater immobility than the indices for individual population groups. This suggests that a large part of the immobility is to be found in the differential progress of the different groups, rather than in differential educational progress within groups as reflected by the regressors of income and parent education. This accords with Lam's (1999) finding that despite high levels of overall schoolings inequality, inequality within race groups is low. The explanation here is that the indices for the total population span a broad range of levels of social mobility associated with the different race groups comprising the total group of children aged 10-21, while levels of social mobility within race groups are less variable.

Ordered Probit Analysis

Finally, an ordered probit is estimated for both 1991 and 2001 to determine the role of family background factors in the probability of attaining progressively higher education levels. We include individuals aged 21-25 since this group may be expected to have completed their education. The dependent variable takes on a value of 1 for incomplete primary, 2 for complete primary and/or incomplete secondary, 3 for matric, and 4 for tertiary qualifications. The explanatory variables include years of education of household head, log of household per capita income (note that zero income households are dropped from this analysis), and dummy variables indicating whether the household is a rural area and whether the head of household is female. There is also a variable that reflects the educational attainment of the household's spouse (which we assume to be the other parent of the child), or – in the case of single families – takes on the value of the household head's educational attainment. Note that all of the individuals in the sample are identified as children of household heads, and therefore 21-25 year olds who have set up their own households are excluded from analysis. This introduces a possible self-selection problem, as those children of this age who are still resident in the parental home may not be representative of all children of this age group. The results should thus be interpreted as applying only to children who are still resident in their household of origin.

Table 4 below contains the results of probit estimation. It is clear from these probits that educational progress across the broad educational categories (from no education through the other two school categories to progress past the matric hurdle) is influenced very strongly by parental characteristics. The education of the household head and of his or her spouse plays a

strong role in the education of the children, and the household's economic position also has a positive influence, as the coefficient on the log of per capita income suggests. This applies across all population groups, and also to both the census periods to which this was applied, 1991 and 2001. Not unexpectedly, rural residence has a separate negative influence on successful progression across the education categories. However, it is less obvious why the coefficients on female headed households, which are negative for all groups for 2001, are positive in 1991, a somewhat surprising result.

Table 4: Ordered probit equations for educational attainment of 21-25 year old individuals

1991

Dependent variable: Level of education attained										
	All		Black		White		Coloured		Indian	
Years of education of household head	0.0565	***	0.0456	***	0.0547	***	0.0492	***	0.0415	***
	0.0006		0.0008		0.0017		0.0012		0.0021	
Years of education of household head's spouse	0.0449	***	0.0427	***	0.0552	***	0.0608	***	0.0305	***
	0.0006		0.0008		0.0019		0.0013		0.0020	
Log household per capita income	0.2326	***	0.1433	***	0.3328	***	0.3023	***	0.2792	***
	0.0012		0.0015		0.0044		0.0032		0.0059	
Urban/rural indicator (1=rural)	-0.1552	***	-0.1812	***	-0.0819	***	-0.5092	***	-0.0706	**
	0.0032		0.0039		0.0138		0.0101		0.0279	
Female household head indicator	0.0678	***	0.1091	***	0.0463	***	-0.0165	**	-0.0092	
	0.0029		0.0037		0.0095		0.0065		0.0138	
n	673000		373957		107990		147178		43875	
Pseudo R-squared	0.15		0.07		0.07		0.12		0.06	

2001

Dependent variable: Level of education attained										
	All		Black		White		Coloured		Indian	
Years of education of household head	0.0465	***	0.0403	***	0.0916	***	0.0596	***	0.0530	***
	0.0014		0.0016		0.0062		0.0040		0.0071	
Years of education of household head's spouse	0.0491	***	0.0491	***	0.0805	***	0.0562	***	0.0498	***
	0.0014		0.0016		0.0067		0.0041		0.0068	
Log household per capita income	0.1378	***	0.1142	***	0.1431	***	0.2360	***	0.1886	***
	0.0027		0.0033		0.0100		0.0095		0.0160	
Urban/rural indicator (1=rural)	-0.1506	***	-0.1737	***	-0.1644	***	-0.3682	***	-0.1356	
	0.0073		0.0078		0.0506		0.0354		0.1180	
Female household head indicator	-0.0198	***	-0.0178	**	0.0509	*	-0.0487	**	-0.0073	
	0.0064		0.0072		0.0280		0.0197		0.0398	
n	120429		91206		10029		14373		4821	
Pseudo R-squared	0.10		0.07		0.08		0.11		0.07	

CONCLUSION

Studies on intergenerational mobility in South Africa usually use cross-sectional datasets. Though illuminating, such methods do not allow investigation of another time dimension, viz. changes in intergenerational mobility over time, or in intergenerational transfers of educational characteristics.

This paper has set out the evidence from censuses covering a time span of thirty years regarding progress with educational attainment, and in particular it tried to focus on whether such progress is curtailed by strong intergenerational immobility. The evidence appears to be mixed. Whilst attainment rates have been rising over a long period, they are still highly skewed by race. Moreover, intergenerational immobility appears to play a smaller role than is the case in some other societies, yet race still appears to act as a strong barrier to improved performance for many. Given that race differentials have historically been large, any immobility amongst those groups with the least education – blacks and coloureds – is bound to reduce attainment progress of future generations.

Yet the South African evidence also points to one group amongst whom educational attainment increased very rapidly, viz. Indians. Their experience is an interesting example, although it is surprising that their gains at tertiary level have been somewhat smaller than at school level.

What is surprising about the descriptive results is the evidence they provide reflecting that for many of the groups there has been little improvement since the mid 1980s in the patterns of progress of children with parents holding a given level of education. This implies that some of the progress in attainment that we are now witnessing amongst blacks may be the result of earlier progress: Higher parent education is driving higher child education. An acceleration would be possible if there were further increases in continuation rates at higher standards for children whose parents have given levels of education, but such progress seems to have slowed. This problem may be particularly acute at the highest school levels, where the matric hurdle still seems to be a major one for many to clear. This indicates that there need be continuing concerns with the quality of the education that children receive.

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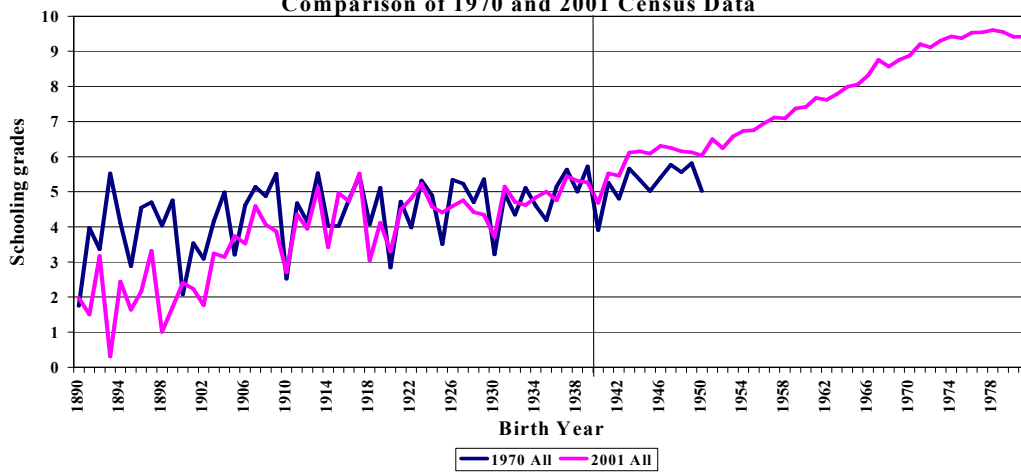
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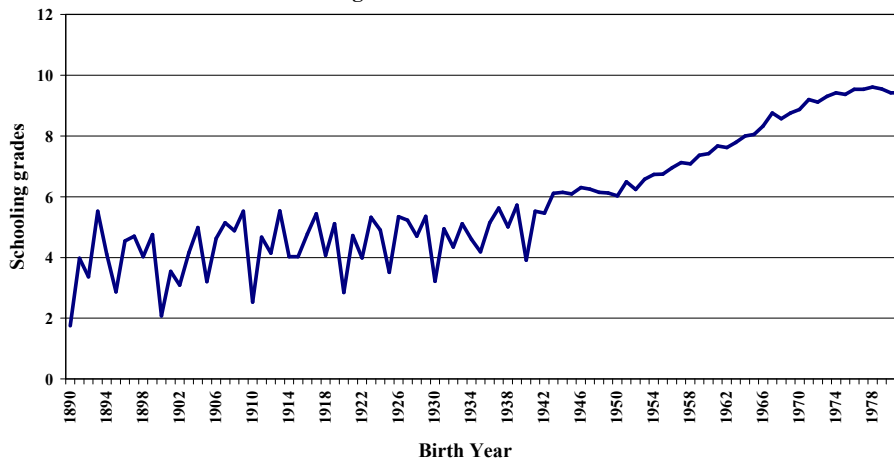
APPENDIX

**Figure 3: Mean Educational Attainment by Birth Cohort:
Comparison of 1970 and 2001 Census Data**



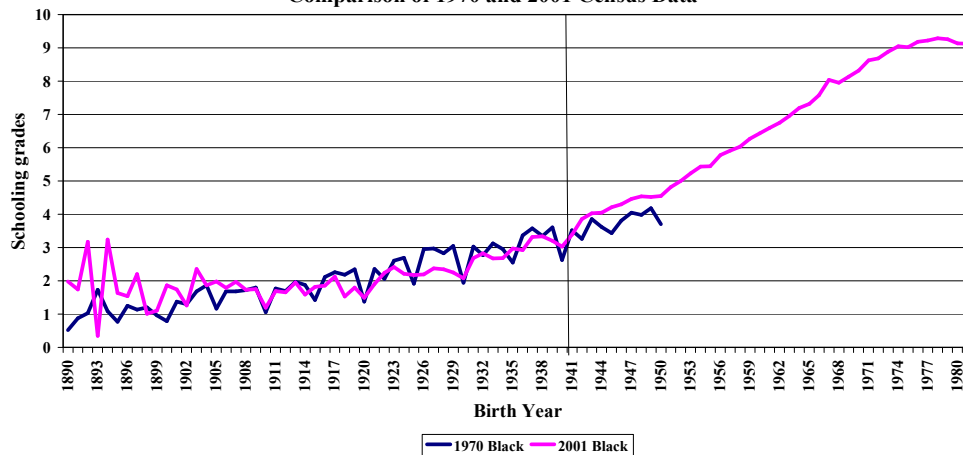
Source: Own calculations based on 1970 and 2001 Census data

**Figure 4: Mean Educational Attainment by Birth Cohort:
Using Combined Census Data**



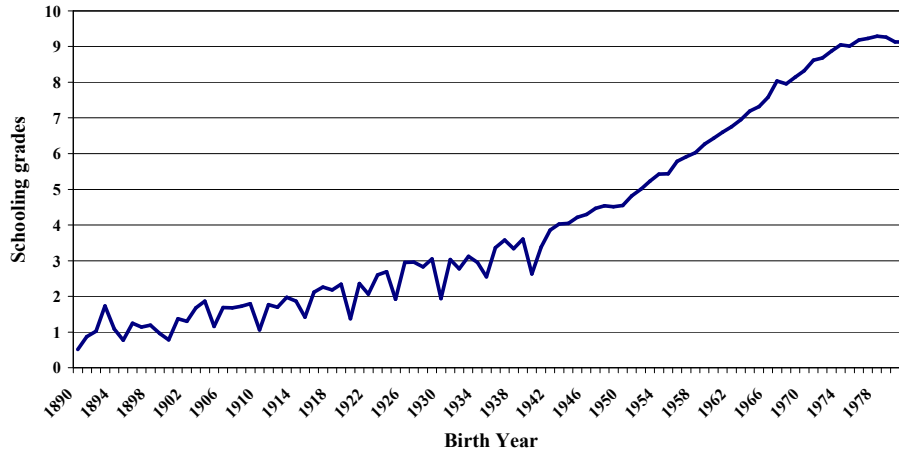
Source: Own calculations based on 1970 and 2001 Census data

**Figure 5: Mean Black Educational Attainment by Birth Cohort:
Comparison of 1970 and 2001 Census Data**



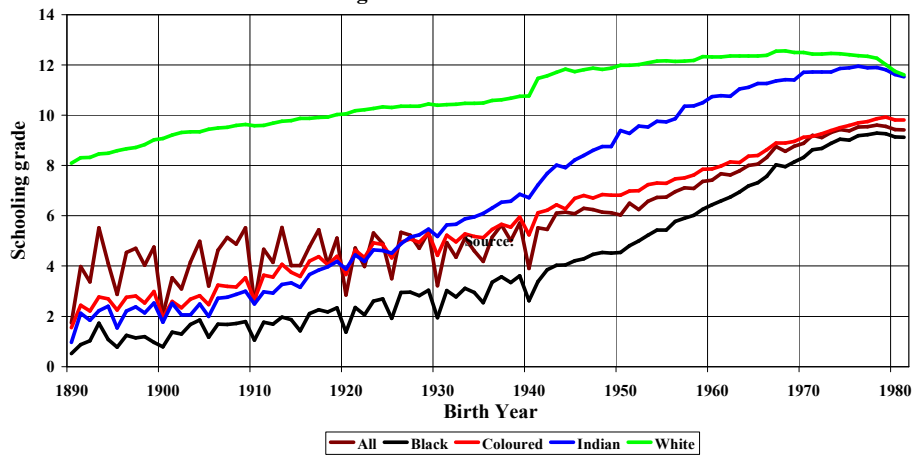
Source: Own calculations based on 1970 and 2001 Census data

**Figure 6: Mean Black Educational Attainment by Birth Cohort:
Using Combined Census Data**



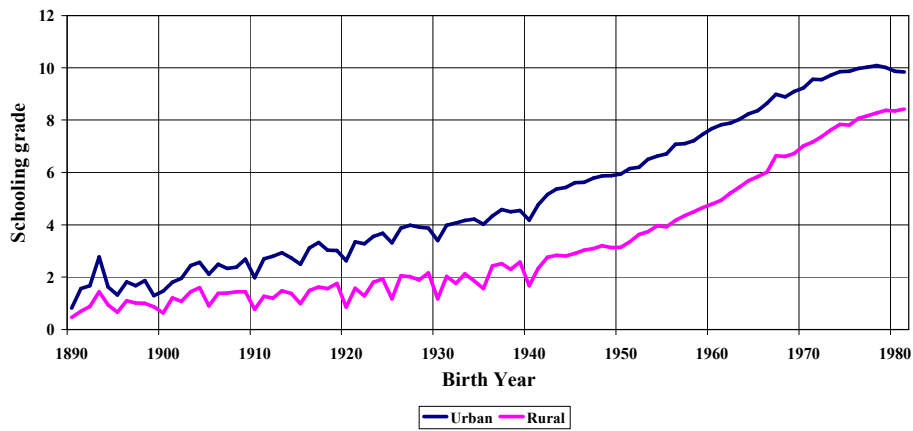
Source: Own calculations based on 1970 and 2001 Census data

**Figure 7: Mean Educational Attainment by Birth Cohort and Race:
Using Combined Census Data**



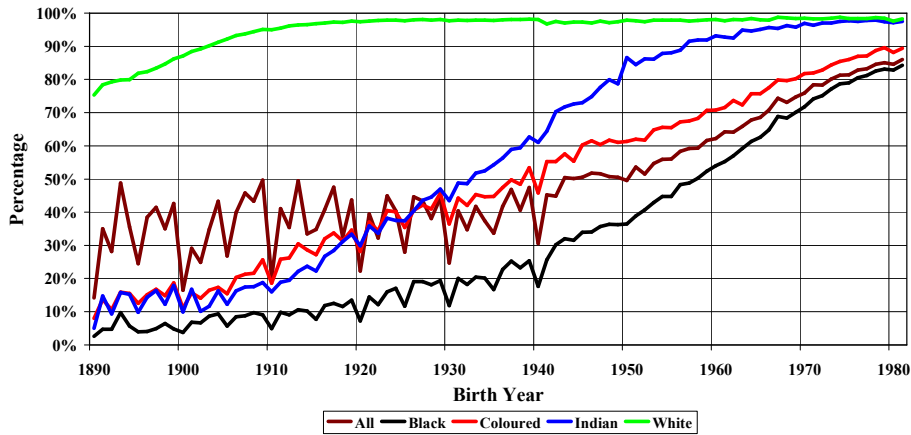
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**Figure 8: Mean Black Educational Attainment by Birth Cohort and
Location Type: Using Combined Census Data**



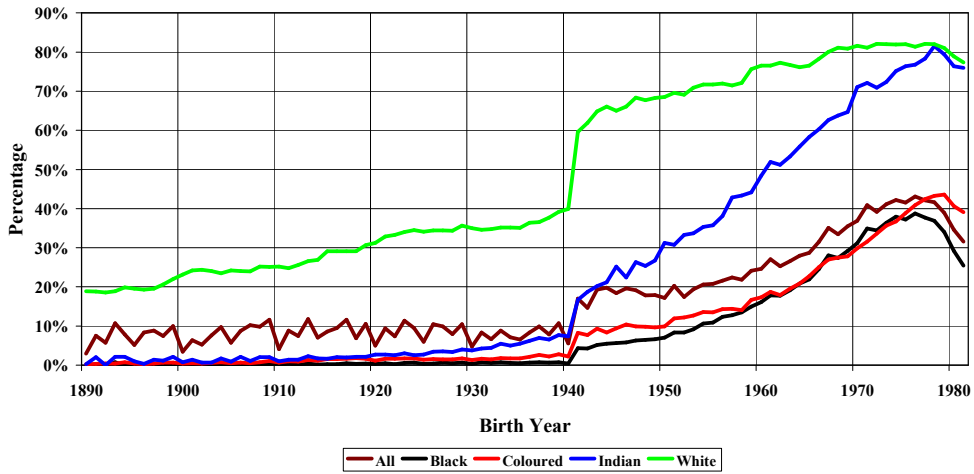
Source: Own calculations based on 1970 and 2001 Census data

Figure 9: Proportion of Population with Complete Primary Schooling by Birth Cohort and Race



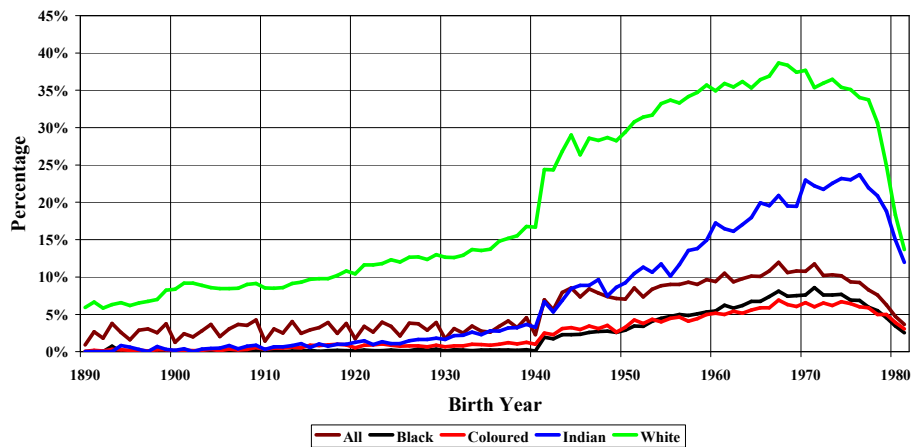
Source: Own calculations based on 1970 and 2001 Census data

Figure 10: Proportion of Population with Matric by Birth Cohort and Race



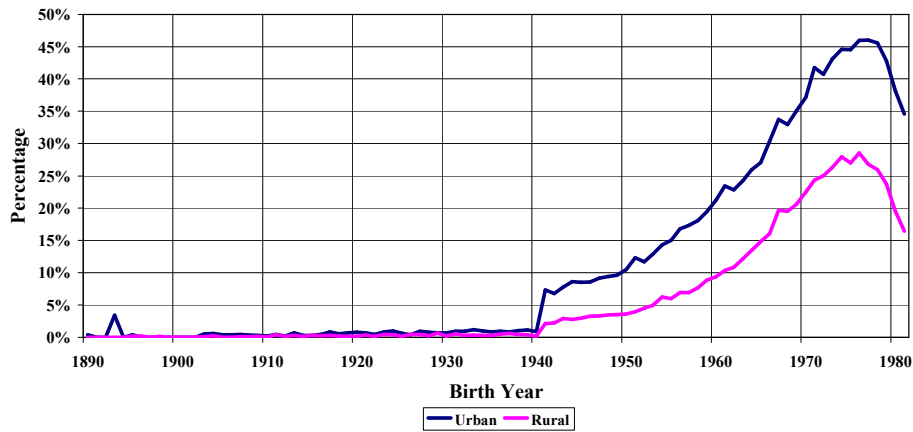
Source: Own calculations based on 1970 and 2001 Census data

Figure 11: Proportion of Population with Tertiary Qualifications by Birth Cohort and Race



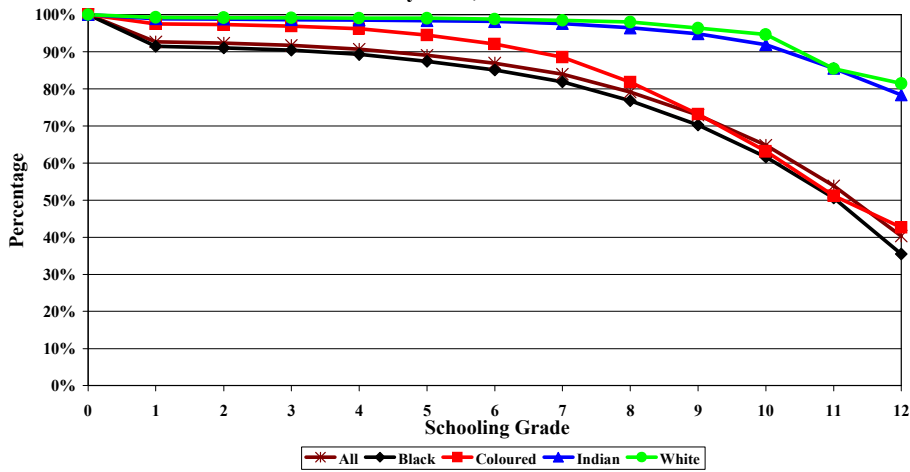
Source: Own calculations based on 1970 and 2001 Census data

Figure 12: Proportion of Black Population with Matric by Birth Cohort and Location Type



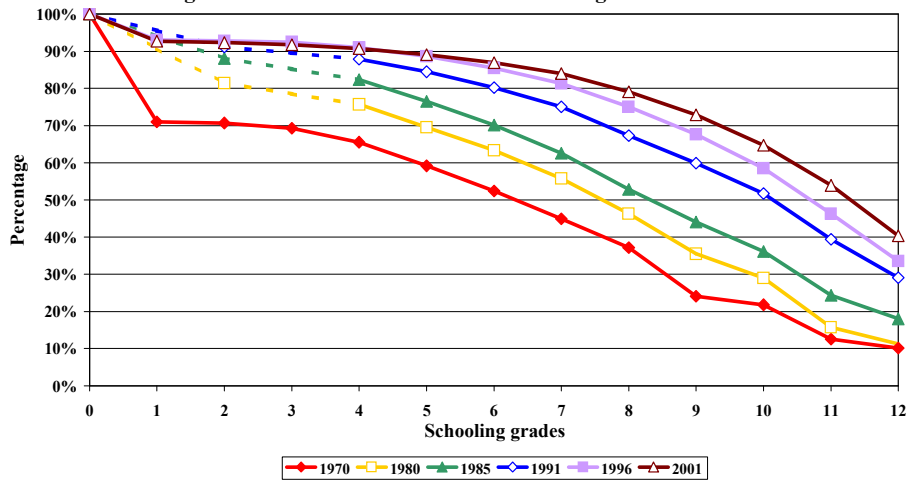
Source: Own calculations based on 1970 and 2001 Census data

Figure 13: Attainment Profile of Individuals Aged 21-25 Years by Race, 2001



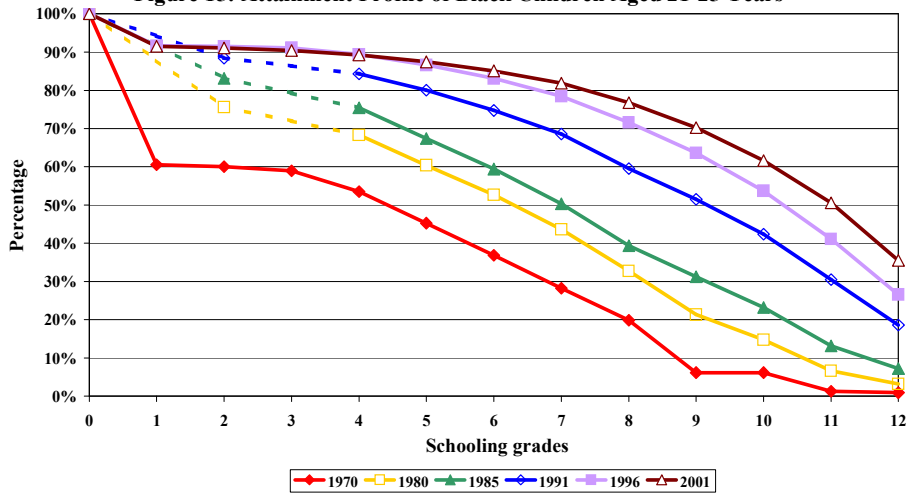
Source: Own calculations based on Census 2001 data

Figure 14: Attainment Profile of Children Aged 21-25 Years



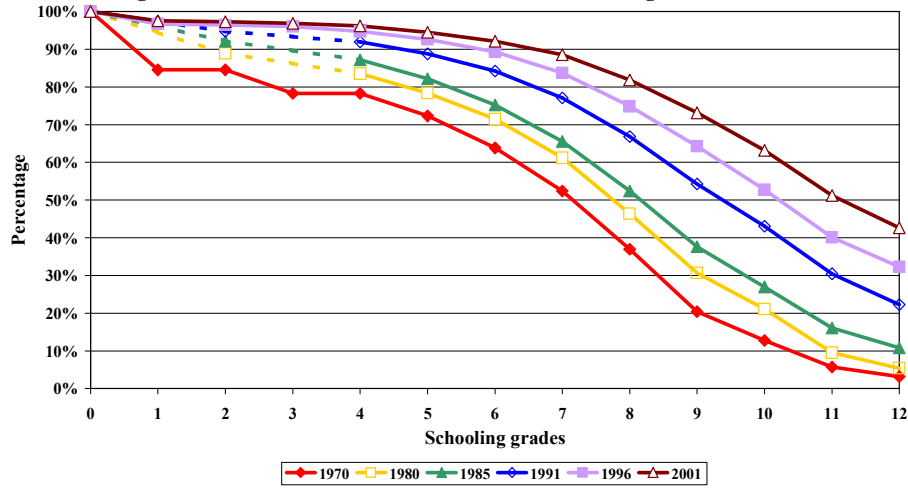
Source: Own calculations based on Census data for various years

Figure 15: Attainment Profile of Black Children Aged 21-25 Years



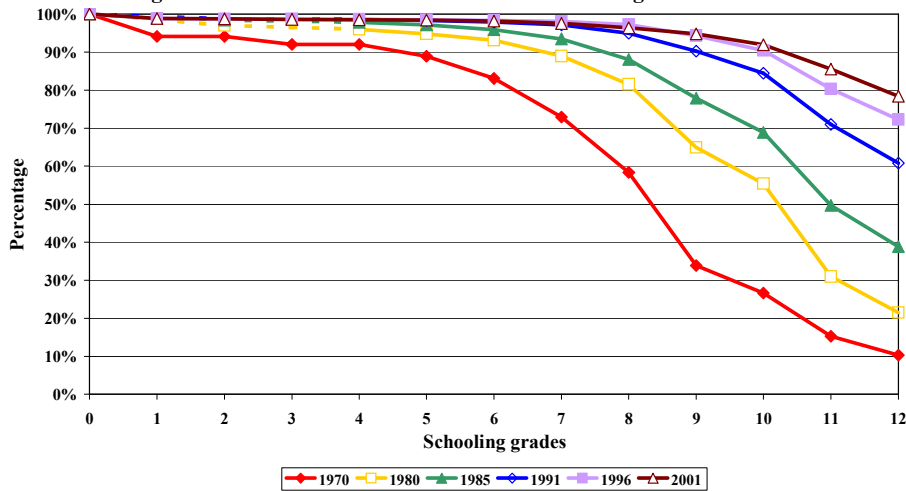
Source: Own calculations based on Census data for various years

Figure 16: Attainment Profile of Coloured Children Aged 21-25 Years



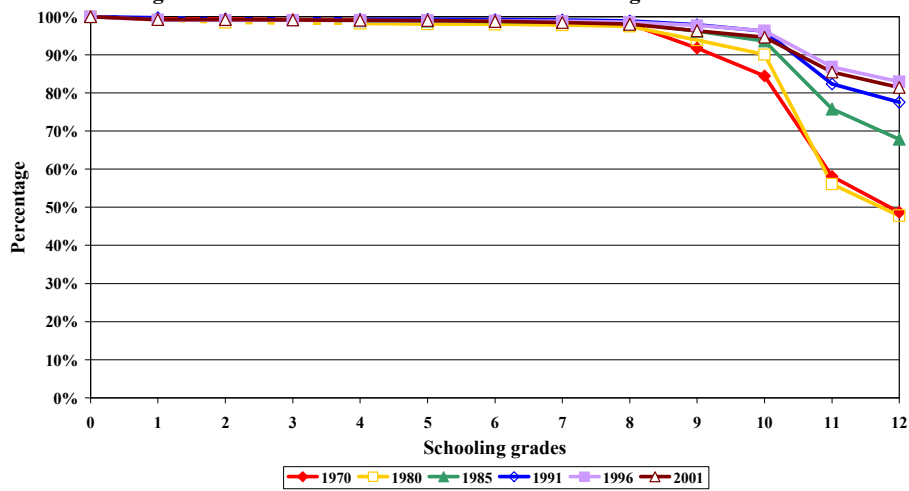
Source: Own calculations based on Census data for various years

Figure 17: Attainment Profile of Indian Children Aged 21-25 Years



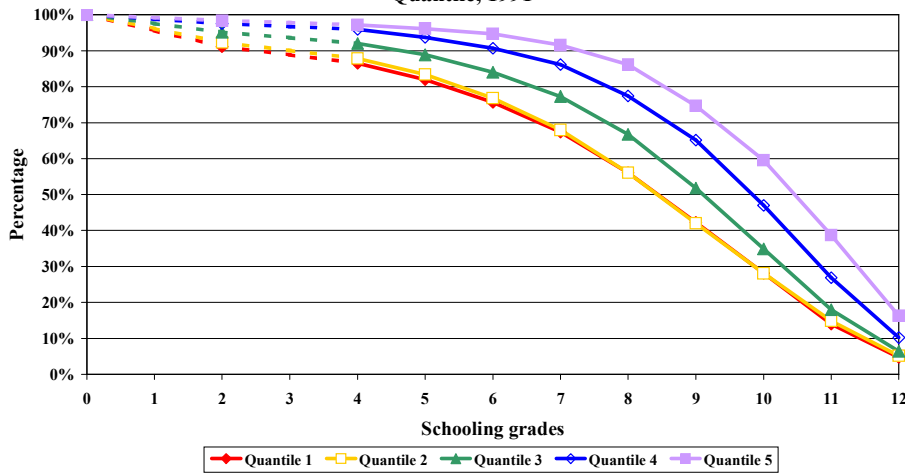
Source: Own calculations based on Census data for various years

Figure 18: Attainment Profile of White Children Aged 21-25 Years



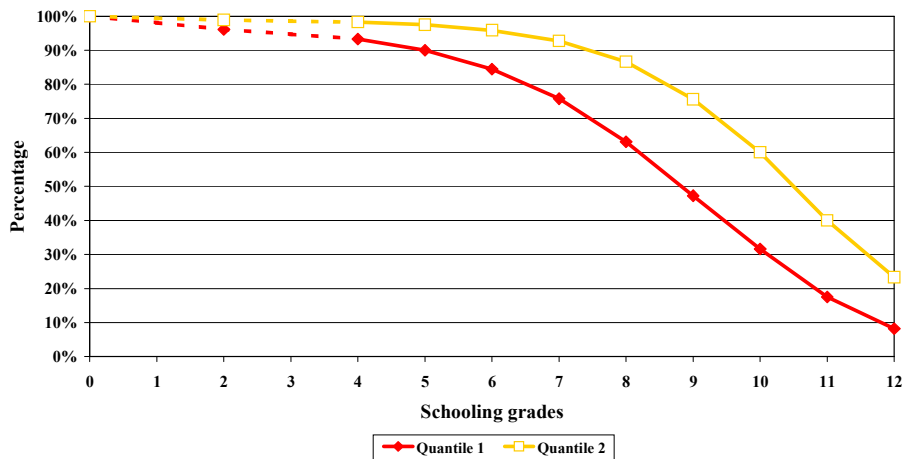
Source: Own calculations based on Census data for various years

Figure 19: Attainment Profile of Black Children Aged 16-20 Years by Quantile, 1991



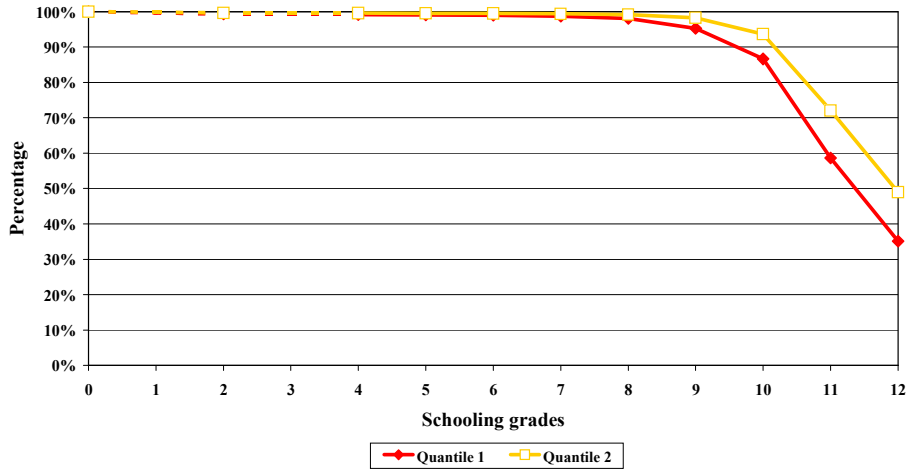
Source: Own calculations based on Census 1991 data

Figure 20: Attainment Profile of Coloured Children Aged 16-20 Years by Quantile, 1991



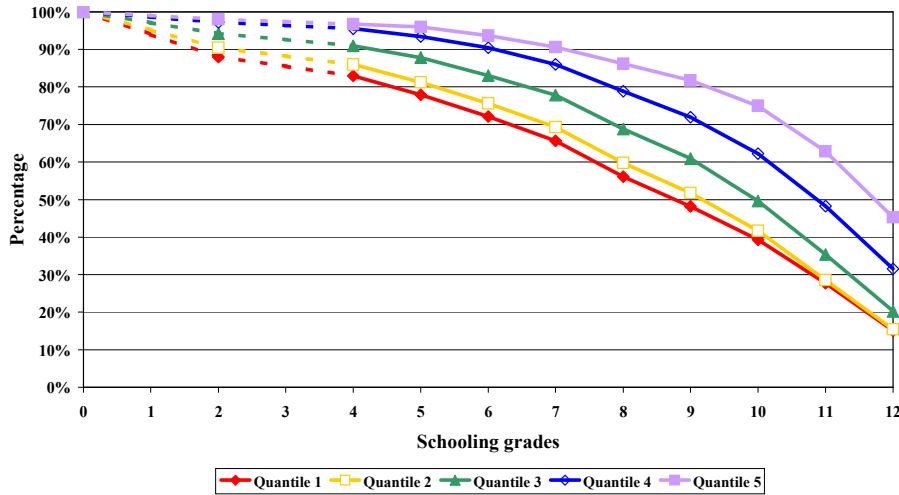
Source: Own calculations based on Census 1991 data

Figure 21: Attainment Profile of White Children Aged 16-20 Years by Quantile, 1991



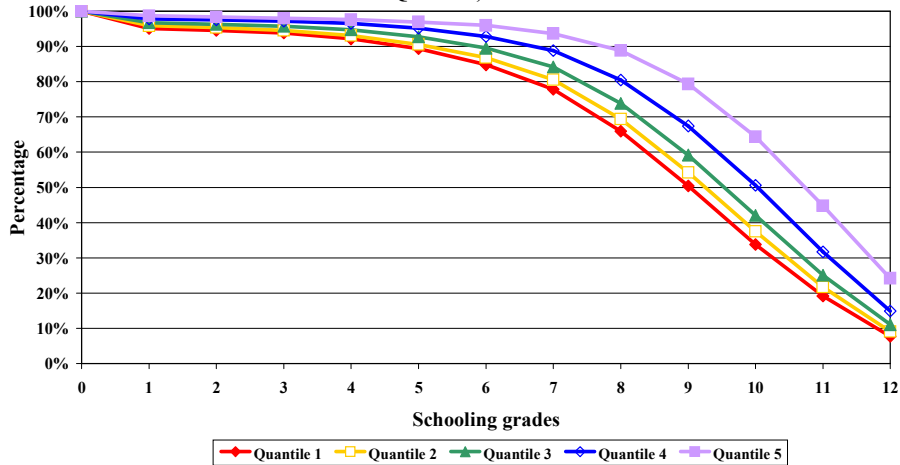
Source: Own calculations based on Census 1991 data

Attainment Profile of Black Children Aged 21-25 Years by Quantile, 1991



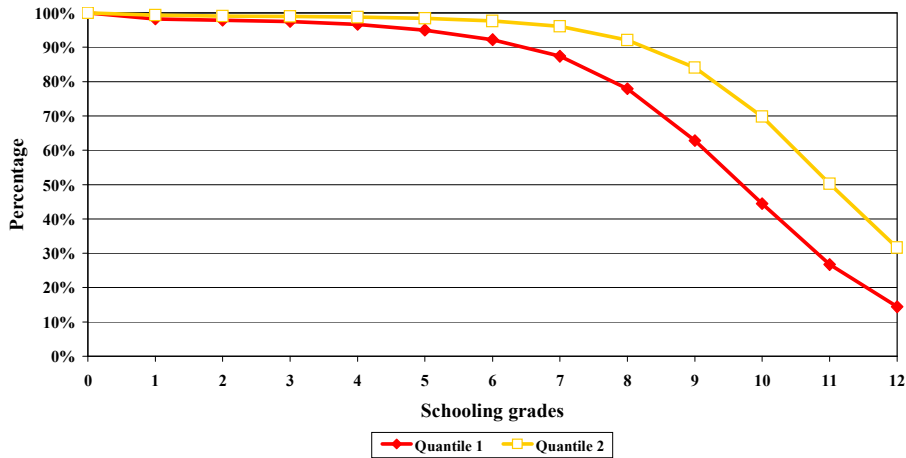
Source: Own calculations based on Census 1991 data

Figure 22: Attainment Profile of Black Children Aged 16-20 Years by Quantile, 2001



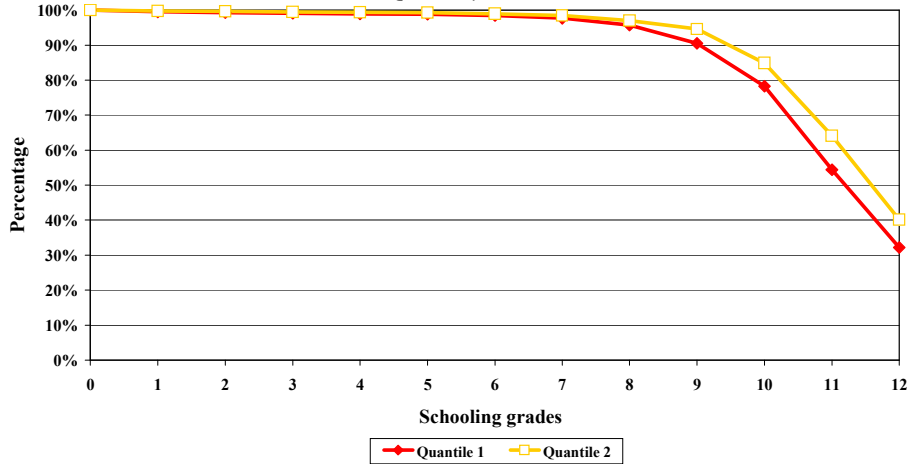
Source: Own calculations based on Census 2001 data

Figure 23: Attainment Profile of Coloured Children Aged 16-20 Years by Quantile, 2001



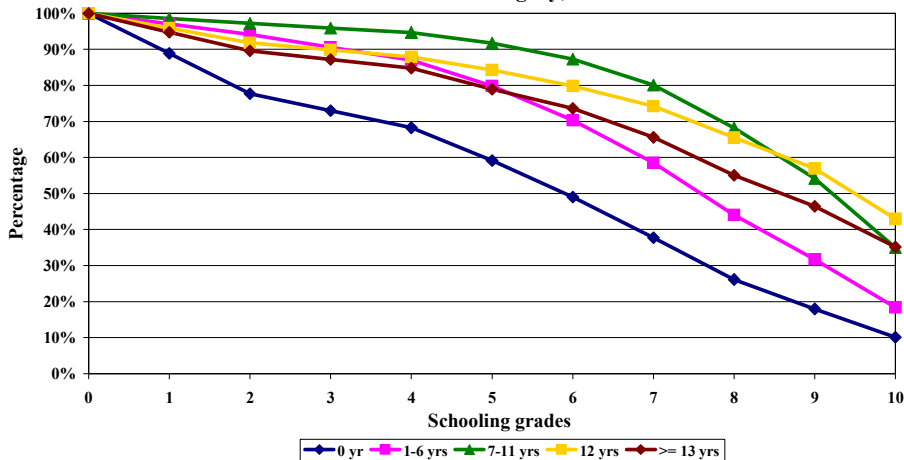
Source: Own calculations based on Census 2001 data

Figure 24: Attainment Profile of White Children Aged 16-20 Years by Quantile, 2001



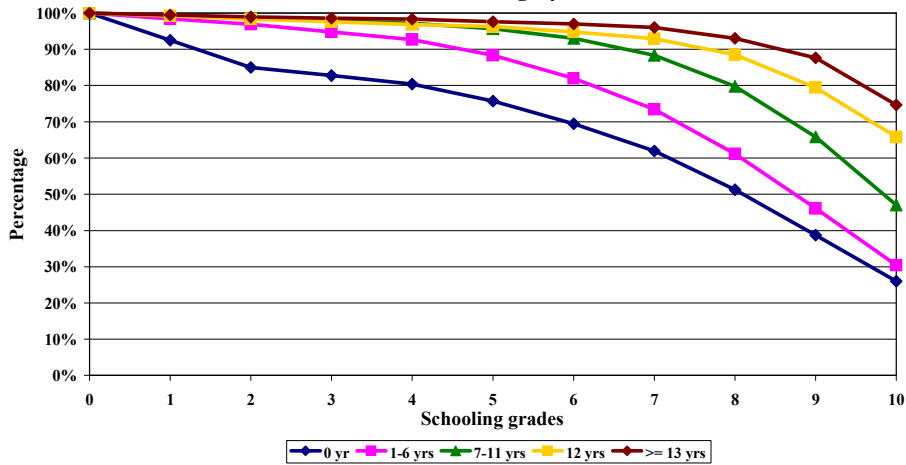
Source: Own calculations based on Census 2001 data

Figure 25: Attainment Profile of Black Children Aged 16-20 Years by Parent Education Category, 1985



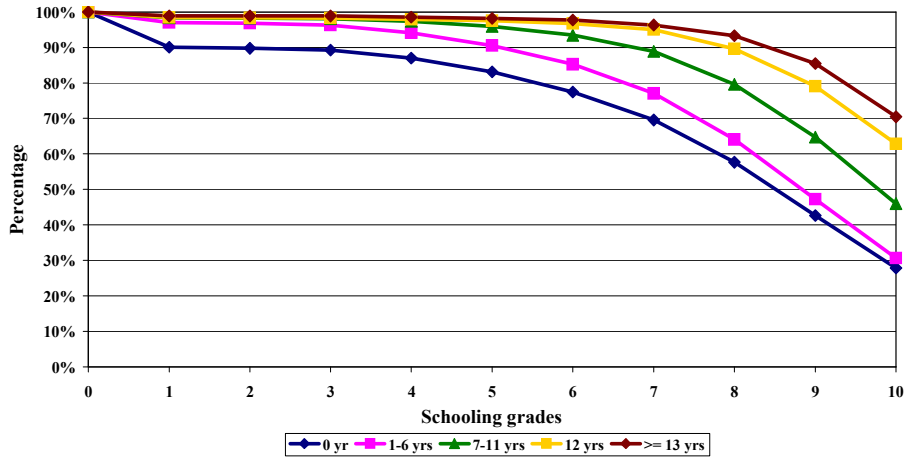
Source: Own calculations based on Census 1985 data

Figure 26: Attainment Profile of Black Children Aged 16-20 Years by Parent Education Category, 1991



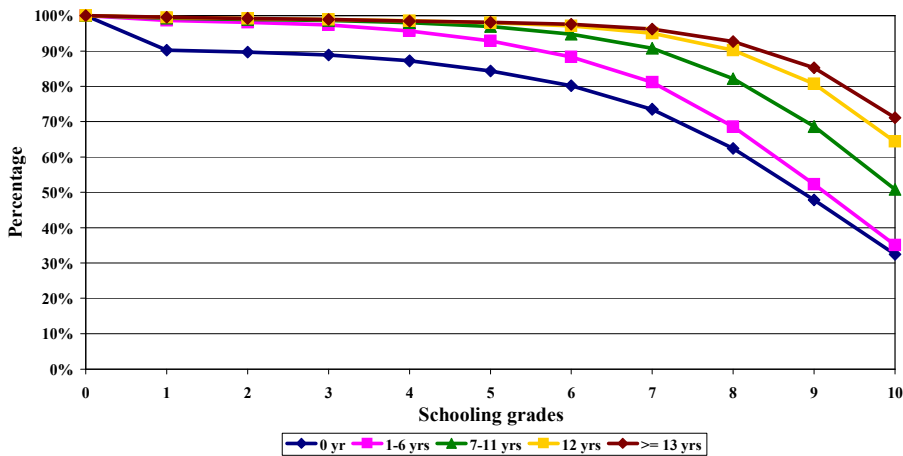
Source: Own calculations based on Census 1991 data

Figure 27: Attainment Profile of Black Children Aged 16-20 Years by Parent Education Category, 1996



Source: Own calculations based on Census 1996 data

Figure 28: Attainment Profile of Black Children Aged 16-20 Years by Parent Education Category, 2001



Source: Own calculations based on Census 2001 data