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Generating Extreme Inequality: Schooling, Earnings, and Intergenerational Transmission of Human Capital in South Africa and Brazil

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Abstract:

Large household surveys are used to analyze links between schooling inequality and earnings inequality in Brazil and South Africa, countries which have long had among the highest levels of income inequality in the world. Although the countries have similar earnings inequality, South Africa has much lower inequality in schooling. The contribution of schooling to earnings inequality is very similar in the two countries, however, due to the convex relationship between schooling and earnings. If the countries traded schooling distributions or returns to schooling there would be little effect on earnings inequality. Both countries demonstrate strong relationships between parents' schooling and children's schooling, a key component of the intergenerational transmission of inequality. Significantly, however, the penalty for having poorly educated parents is much smaller in South Africa. The results suggest that even large improvements in schooling may be associated with inertia in earnings inequality in developing countries.

Datasets used: 1995 South Africa October Household Survey; 1995 Brazil PNAD

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Introduction

South Africa and Brazil have long competed for the dubious distinction of having the most unequal distribution of income in the world. Recent data confirm the two countries as extreme cases. The 1999 World Development Report shows Brazil and South Africa with two of the highest Gini coefficients in the world, 0.60 and 0.58 respectively (World Bank 1999). Available evidence suggests that income inequality has been extreme in both countries for several decades.[1] The countries are also quite comparable in other dimensions. Per capita income is at the high end among developing countries, estimated at $4,720 and $3,400 respectively in 1997 dollars. Social indicators in both countries are more comparable to those of much poorer countries, a fact almost surely related to the high income inequality. The World Bank's estimate of the percentage of population living below its $1-per-day poverty line was 23.6% in Brazil and 23.7% in South Africa, higher than the poverty rates for many countries with much lower per capita income (World Bank 1999).

The persistently high levels of income inequality in these two countries raise intriguing questions about how such extreme inequality is generated both within and across generations. The issue of whether these countries are caught in some kind of "high inequality trap" is an important question with potential lessons for other developing countries with high levels of inequality. Education is one of the most widely discussed determinants of inequality in both countries. Unequal distribution of education, both in quantity and quality, is viewed as contributing to inequality in labor market earnings, and as a key factor in the intergenerational transmission of inequality. As in many other countries, education is also the focus of attention because of its potential as a policy instrument that may reduce inequality at the same time that it raises mean income. Expansion of schooling has the potential to reduce earnings inequality in the next generation, even in the absence of changes in the labor market.

This paper analyzes the relationship between schooling inequality and earnings inequality in South Africa and Brazil, with attention to differences between whites and non-whites in both countries. The analysis is based on large national household surveys collected in each country in 1995. The paper begins by outlining some important theoretical points regarding the link between schooling inequality and

[1] Deininger and Squire (1996) report that the range for Gini coefficients for Brazil from 1960 to 1989 was 0.53 to 0.62, all very high by international standards. They report only one recent estimate for South Africa, reflecting the country's more limited data. Wilson and Ramphele (1989) report Gini coefficients of over 0.6 for South Africa in the 1970s and 1980s.

earnings inequality. The paper then analyzes the evolution of schooling distributions in the two countries, pointing out South Africa's surprisingly better performance in terms of both mean schooling and schooling inequality. The paper then links schooling inequality to earnings inequality, focusing on earnings regressions that include schooling and race. Schooling is shown to play an important, and quantitatively similar, role in explaining earnings inequality in both countries. If Brazil and South Africa traded schooling distributions or returns to schooling there would be almost no effect on earnings inequality in either country. The final sections of the paper analyze the transmission of schooling across generations. There are striking differences in the intergenerational transmission of human capital in the two countries. Although both countries have a high fraction of adults with very low schooling, the penalty to children of having uneducated parents is much smaller in South Africa than in Brazil. The results suggest that South Africa may have better prospects for reducing inequality in the future, given lower inequality in schooling and less transmission of schooling inequality across generations. The results also suggest that there may be important sources of inertia in earnings inequality over time in developing countries. Because of the convex relationship between earnings and schooling, even large improvements in mean schooling and schooling inequality may be associated with little or no improvement in earnings inequality.

Theoretical Links Between Schooling Inequality and Earnings Inequality

The link between education and the distribution of income has long been fundamental to research on the economics of inequality. Theoretical models and vast empirical evidence point to a large explanatory role for schooling in the distribution of income, especially the distribution of labor earnings. The analysis below will focus on inequality in individual labor market earnings. Although other measures, such as per capita household income or per capita household consumption, may be advantageous for analysis of poverty or social welfare, the analysis of inequality in individual earnings is useful if we want to understand how inequality is generated in the labor market. Labor market earnings are also more closely linked conceptually to schooling.

A few theoretical points provide a useful foundation for the empirical analysis of schooling inequality and income inequality in South Africa and Brazil. A useful frame of reference is the standard human capital earnings equation. Leaving experience and other determinants of earnings aside for now, the logarithm of the *i*th worker's earnings can be expressed as

$$\log y_i = a + b S_i + u_i \qquad (1)$$

where y_i is earnings, S_i is years of schooling, and u_i is a residual uncorrelated with schooling. The variance of log earnings, V(log y), a standard mean-invariant measure of earnings inequality, is

$$V(\log y) = b^2 V(S) + V(u). \qquad (2)$$

This simple result demonstrates an important point about the link between schooling inequality and earnings inequality. If the relationship between schooling and earnings is log-linear as in (1), then earnings inequality (as measured by the log variance) is a linear function of the variance in schooling. If we measure inequality in schooling by some standard mean-invariant inequality measure, then we can easily generate a decrease in schooling inequality that is associated with increased earnings inequality. For simplicity, use the coefficient of variation, $CV = s / m$ (the standard deviation divided by the mean) as the measure of schooling inequality. Beginning with schooling S_{i1} for each worker, consider a linear transformation $S_{i2} = g + d S_{i1}$, implying that $s_{s2} = |d| s_{s1}$ and $CV_2 = CV_1[|d|/(1+g)]$. If $d = 1$ and $g > 0$ then this is an additive shift that leaves the variance constant but decreases the coefficient of variation. This leaves income inequality unchanged, while inequality in schooling decreases. If $g > 0$ and $(1+g) > d > 1$, then the variance increases while the coefficient of variation declines, implying that inequality in schooling declines while earnings inequality increases.

Even in the simple case of these linear transformations it is easy to generate any combination of changing inequality in schooling and changing inequality in earnings, including many examples in which changes go in opposite directions. Opposing trends in schooling inequality and income inequality are not just a theoretical possibility – they may be fairly common in the process of economic development. Brazil's experience, for example, shows periods in which declining schooling inequality coincided with increasing income inequality. As shown by Lam and Levison (1992), the trend for cohorts born between 1925 and 1950 was for mean schooling to rise at a slightly faster rate than the standard deviation. Schooling inequality thus declined over this period, as measured by the coefficient of variation and as indicated by constantly improving Lorenz curves for schooling. Since the variance of schooling was rising, however, these reductions in schooling inequality did not cause reductions in earnings inequality. The "explained variance" in the log variance of earnings, $b^2 V(S)$, rose steadily across cohorts, contributing to continued high earnings inequality in Brazil. As shown below, the

variance of schooling has peaked among more recent cohorts in Brazil, suggesting that this component should contribute to declining earnings inequality in the future.[2]

While there is intuitive appeal to the notion that a more equal distribution of schooling should produce a more equal distribution of earnings, there is clearly no theoretical reason to expect such a result. What might be considered unambiguous improvements in the distribution of schooling (as indicated, say, by stochastic dominance), could plausibly lead to increased inequality in earnings. The fundamental reason is that earnings are likely to be a convex function of schooling, the log-linear wage equation being just one simple example of such convexity. This point will be important in analyzing the extreme cases of South Africa and Brazil.

The Data

The analysis is based on large household surveys collected at roughly the same time by the government statistical offices in South Africa and Brazil. The South African data set is the 1995 October Household Survey, a nationally representative sample of about 32,000 households collected by Statistics South Africa (formerly the Central Statistical Service). The Brazilian data set is the 1995 Pesquisa Nacional de Amostra de Domicílios (PNAD), a nationally representative sample of about 85,000 households collected by the IBGE, the Brazilian statistical bureau.[3] The surveys are similar in design and purpose, serving as the primary source of information on employment and earnings. Schooling questions are roughly comparable in the two surveys, and can, with some assumptions, be used to create a measure of single years of schooling.[4] Unfortunately neither survey provides data regarding school quality, an important element of schooling distributions and the intergenerational dynamics of human capital in both countries.[5]

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[2] Ram (1990) shows with cross-national data that the standard deviation of schooling tends to follow an inverted-U pattern in relation to mean schooling, with a peak when the mean is around seven years.

[3] The PNAD samples at different rates in different states – the sample weights provided by IBGE are used throughout the analysis here to adjust for differential sampling.

[4] The South African survey does not distinguish between Grades 1, 2 and 3 (Substandards A and B and Standard 1) and there is no distinction above Grade 12 (Standard 10) other than receiving a university degree. The Brazil survey provides a more complete distribution, although in some of the analysis below it will be collapsed above Grade 11 (completion of secondary school) for comparability.

[5] Hanushek et al. (1996) provide some evidence on the effects of school quality in Brazil. Fedderke et al. (1998) document racial disparities in school quality in South Africa. Case and Deaton (1999) provide evidence of important links between school quality and earnings in South Africa.

Race is important in discussions of inequality in both South Africa and Brazil, although issues of race and ethnicity differ substantially between the two countries. Attention to racial differences will be included in the analysis below. The South Africa OHS asks respondents to identify themselves in one of four population groups – African, colored, Indian, and white. The Brazil PNAD asks respondents to indicate their "race or color" – white, black, brown, yellow, or

indigenous. In the analysis below these will be collapsed into white and non-white. There is no assumption that these designations are comparable across the two populations. They are used in order to provide at least partial evidence on the gaps between whites and non-whites in the two populations, and the role that these gaps play in the distribution of schooling and earnings.

The Evolution of Schooling Distributions in Brazil and South Africa

Brazil and South Africa have both had disappointing performance in recent decades in the expansion of schooling, relative to their level of per capita income (Birdsall and Sabot, 1966; Fedderke et al., 1998). Table 1 presents summary statistics for the schooling on whites and non-whites in South Africa and Brazil for five year age-groups in 1995. The table gives a picture of the history of schooling in both countries from cohorts born in the late 1920s to cohorts born in the early 1970s.[6] Columns 1-3 give sample sizes for each cell. The percentage non-white differs considerably between the two countries, 86% for the 20-69 age group in South Africa, compared to 43% in Brazil.[7] Columns 4-6 show the mean schooling for each cohort for non-whites, whites, and the total population. In South Africa mean schooling has risen substantially for non-whites, rising from 3.4 years for the oldest cohort to 9.3 years for those age 20-24. The gap in mean schooling between whites and non-whites is over 7 years for the oldest cohort, falling to around 2.5 years for the youngest cohort. In Brazil there is also steady improvement over time, but the means for both whites and non-whites are noticeably lower in every age group than the corresponding cells for South Africa. Looking at the 25-29 cohort, for

[6] The cross-section surveys will differ from the true cohorts histories to the extent that mortality and migration have selected non-randomly on cohorts over time. Since lower education groups will presumably have had higher mortality, the patterns shown here are likely to understate actual improvements in schooling over time. The effects of selective immigration or emigration are unlikely to be important in Brazil, but may have effects that are difficult to predict in South Africa.

[7] The breakdown of the non-white population in Table 1 (with mean schooling in percentages) are as follows: The South African non-white population is 79% African (mean schooling 7.0 years), 16% colored (7.4 years), 5% Indian (10.1 years). The non-white Brazilian population is 86% brown (mean schooling 4.7 years), 12% black (4.2 years), 1% yellow (9.5 years) and 0.1% indigenous (3.2 years).

example, non-whites in South Africa have 3.2 years more schooling than non-whites in Brazil, and 1.2 years more schooling than Brazilian whites. Trends in mean schooling for the combined population are plotted in the top panel of Figure 1 using finer age detail. Figure 1 shows centered three-year moving averages of single year age groups from age 21 to 65. Figure 1 shows that overall mean schooling grew at similar rates in the two countries from roughly the 1930 to 1960 birth cohorts (ages 65 to 35), but Brazil's growth rate is much slower among more recent cohorts.

Columns 7-9 of Table 1 show the standard deviation in years of schooling. As shown above, this is an important summary statistic in analyzing earnings inequality. The trends in the standard deviation demonstrate some intriguing features. For non-whites in South Africa the standard deviation peaks in the cohort aged 45-49. The changes across cohorts are relatively small, however, with the standard deviation hovering around 4 years even though the mean increases around 10% for every 5-year cohort. In Brazil the standard deviation for non-whites, whites, and the total population also shows a peak at some point between the youngest and oldest cohorts. The second panel of Figure 1 plots the standard deviation in schooling for the overall populations. One of the most significant patterns is that the standard deviation for the total South African population, a value that is important in explaining overall earnings inequality, drops steadily from the oldest cohorts to the youngest, falling by about 1/3 from the 65-69 year age group to the 20-24 age group. The pattern for Brazil is quite different – the standard deviation for the total Brazilian population is lower than South Africa's at the high ages, rises steadily for about 20 years, then falls among more recent cohorts to roughly the same level as for older cohorts. Interestingly, the quite different trends across cohorts in the two countries produce almost identical standard deviations for the overall adult population. As seen in Table 1, although mean schooling for the total adult Brazil population is 2.2 years lower than in South Africa, the standard deviations for the two overall populations are surprisingly similar, 4.3 in Brazil compared to 4.2 in South Africa. If returns to schooling were similar in the two countries, and if inequality were explained by Equation (2), earnings inequality would be similar in the two countries, in spite of schooling distributions that in other dimensions are quite different. Among younger cohorts, South Africa clearly has lower variance in schooling than Brazil, a factor which in and of itself should give it an advantage in lowering earnings inequality in the future.

Columns 10-12 in Table 1 and the bottom panel of Figure 1 show the coefficient of variation in years of schooling, a standard mean-invariant measure of inequality. The trends show steady declines from older cohorts to younger cohorts for every population group in both countries. The pattern in both countries is for steadily rising means and steadily falling inequality in schooling over time. The levels of

inequality differ substantially, however. South African whites have by far the lowest inequality in schooling in every age group. Perhaps more surprisingly, non-white South Africans have lower inequality than either non-white, white, or the combined Brazilian population in every age group. As seen graphically in Figure 1, schooling inequality among all groups in South Africa, as measured by the coefficient of variation, is considerably below combined inequality in Brazil for every age group.

Important additional details about the schooling distributions in the two countries are shown in Figures 2 and 3. Figure 2 shows trends in schooling in South Africa for male and female whites and non-whites, using three measures – mean schooling, the percentage completing grade 7 (Standard 5, completion of primary school), and the percentage completing grade 12 (Standard 10, completion of secondary school). The top panel shows the gradual but incomplete convergence in mean schooling of whites and non-whites noted above in Table 1. The mean schooling of males and females is very similar, with a slight male advantage among older cohorts having disappeared among younger cohorts. The second panel of Figure 2 shows that completion of primary school has been nearly universal for whites for decades. Non-whites have lagged considerably behind, but the percentage completing grade 7 has risen to around 70% for recent cohorts. The bottom panel of Figure 2 shows that the least progress in closing the gap between whites and non-whites in South Africa has been made in completion of secondary school. While the gap has closed steadily over time, only about 30% of non-whites in their mid-twenties completed grade 12, compared to over 80% among whites. As with mean schooling, there is little difference between males and females for either the percentage completing grade 7 or the percentage completing grade 12, especially among younger cohorts.

Figure 3 shows trends in schooling for Brazil using three roughly comparable measures – mean schooling, the percentage reaching grade 4 (the first level of primary schooling), and the percentage reaching grade 11 (completion of secondary schooling). As in South Africa, all of the panels show relatively similar schooling of males and females, with a female advantage become more evident among recent cohorts in Brazil. Further evidence on the poorer performance of Brazil's schooling system is provided in the bottom two panels of Figure 3. The percentage completing grade 4 has never been higher than 60% for any group, and is only 30% among younger cohorts of non-white males. This compares to 70% of non-white males and females completing grade 7 among recent cohorts in South Africa. The percentage completing grade 11 is below 40% for all cohorts, with very little improvement for cohorts born after 1955.

Table 2 provides one way of analyzing the evolution of schooling distributions in the two countries. The table shows the mean schooling of each decile of the schooling distribution for those age 55-59 and 25-29. The difference between these, shown in Columns 3 and 6, show the improvement in schooling across cohorts in each decile of the distribution. In both countries rising mean schooling has been associated with a compression of the schooling distribution, with the top deciles showing much smaller increases in mean schooling than deciles in the middle of the distribution. Some important differences between South Africa and Brazil are apparent in Table 2, however. The improvements over time in South Africa are much more concentrated at the bottom of the schooling distribution than they are in Brazil. The second, third, and fourth deciles from the bottom show the biggest improvements in South Africa, while the sixth, seventh, and eighth deciles show the biggest improvement in Brazil. It is not clear whether this is somehow related to initial conditions, given Brazil's initially lower mean schooling, or is a reflection of something inherently less egalitarian in Brazil's schooling policies. Whatever the reason, however, it is an important difference in the changes over time in the two countries, with South Africa clearly showing larger improvements at the bottom of the distribution. The last four rows of Table 2 show the mean, standard deviation, coefficient of variation, and Gini coefficient. The Gini coefficient, like the coefficient of variation, shows that both distributions become more equal over time, by roughly similar magnitudes, with South Africa's distribution always more equal than Brazil's. Lorenz curves for schooling distributions (not shown) demonstrate Lorenz dominance consistent with the rankings implied by the coefficients of variation and Gini coefficients. The South African distribution Lorenz dominates the Brazil distribution within each age group, and the distribution for 25-29 year-olds Lorenz dominates the distribution for 55-59 year-olds within each country.[8]

Male Earnings Inequality in Brazil and South Africa

Turning from the distribution of schooling to the distribution of earnings, this section analyzes earnings inequality among males ages 30-49 in Brazil and South Africa in 1995. The analysis is limited to men in the prime working ages in order to minimize the importance of labor supply decisions. We

[8] Using the 1991 South African census, Thomas (1996) shows similar convergence in the schooling of white and non-whites over time, but concludes that those at the bottom of the black schooling distribution had lower-than-average growth in mean schooling. This conclusion is heavily influenced by fact that the bottom quintile of the black schooling distribution has zero schooling until recent cohorts. The average growth in mean schooling for this quintile is therefore very low over 50 years, a result that is nonetheless consistent with the fact that the second and third lowest deciles actually show the largest improvement in mean schooling between the 55-59 age group and the 25-29 age group in Table 2.

will see that even in the case of these men in the ages where the strongest labor force attachment might be expected, a significant fraction of men report zero earnings, especially in South Africa. Table 3 shows the distribution of schooling and monthly earnings for white and non-white males age 30-49 in South Africa and Brazil. Columns 1-3 show the frequency distribution of years of schooling. A substantial fraction of non-white men have less than one year of schooling in both countries, 12.4% in South Africa and 23.4% in Brazil. The schooling advantage of South African non-whites compared to Brazilian whites and non-whites can be seen again in Table 3. Almost 62% of non-white Brazilian men have not gone past the fourth year of schooling, compared to under 24% in South Africa.

Columns 4-6 of Table 3 show mean monthly earnings, normalized relative to non-whites with zero schooling. (Men with zero earnings are included in these averages.) In South Africa the mean earnings of non-white men with university degrees are 10 times greater than earnings of non-white men with no schooling. The comparable figure for Brazil is an 11.3 times earnings advantage. There are very few white men in the low schooling categories in South Africa, making it impossible to get meaningful estimates of mean earnings in these cells. Above grade 8 the data indicate a substantial earnings advantage for white South African men. For those with grade 12, a cell with many observations for both groups, mean earnings for whites are 2.9 times that of non-whites. Returns to schooling appear to be very low for non-whites (and are impossible to estimate for whites) through grade 5 in South Africa. Above grade 5 there are significant returns to schooling for both whites and non-whites. Comparing the relationship between earnings and schooling in the two countries, a striking difference is the high returns to schooling in Brazil in the early years of schooling. Non-white men with 4 years of schooling have earnings that are 2.3 times greater than those with zero schooling. This compares to only a 1% earnings advantage over the same range in South Africa. Columns 7-9 show the percentage of men reporting zero earnings in the previous month. This is an important component of earnings inequality in South Africa, with over 25% of non-white men reporting zero earnings. Much lower fractions of men report zero earnings in Brazil. Less than 10% of all Brazilian men age 30-49 report zero earnings, with somewhat higher fractions in the lower schooling groups.

Figure 4 plots the mean log earnings by years of schooling for the same age group, restricting the sample to men with positive earnings. Several important points emerge from Figure 4. Returns to schooling over the first 5 years are negligible in South Africa, but are very high in Brazil. Returns to schooling above grade 7 are relatively high in both countries for both whites and non-whites. Returns are 15% to 20% per year of schooling at most schooling levels above grade 7. Returns to schooling are similar for whites and non-whites in both countries, with some evidence of higher returns for non-whites

at high schooling levels in both countries. Finally, the earnings gap between whites and non-whites is substantially higher in South Africa than in Brazil, with some evidence that the gap converges slightly at higher schooling levels.

The patterns shown in Figure 4 are generally consistent with other estimates of returns to schooling in the two countries. As in Moll (1996), these results show low returns early years of schooling in South Africa, although these results suggest substantially higher returns to later years of primary schooling than Moll found using surveys up through the 1991 census. Case and Deaton (1999) and Mwabu and Schultz (1996, 1998) estimate flexible wage regressions using the 1993 South African Living Standards Survey. Both point out that the wage-schooling gradient for black Africans has a steeper slope than that for whites in the range for secondary education and above where the two distributions overlap. The Brazil patterns, including the high returns to early years of schooling, are similar to the patterns reported by Lam and Schoeni (1993) and Strauss and Thomas (1996) using data from the 1982 PNAD.

Table 4 provides measures of inequality for both schooling and earnings for the full sample of men aged 30-49, and for the sub-sample who report positive earnings in the previous month. The latter group is used in Figure 4 and will be used in earnings regressions below. Earnings inequality is higher in South Africa than in Brazil for this group, as indicated by the Gini coefficient, the variance of log earnings, and the coefficient of variation. The separate estimates within racial groups are worth noting. Earnings inequality is very high within each population sub-group, with Gini coefficients over 0.5 for every group. Looking at men with positive earnings, the Ginis are surprisingly similar across the four sub-groups. The Ginis for white and non-white South Africans are 0.506 and 0.533 respectively, while the Ginis for white and non-white Brazilians are 0.537 and 0.525. Inequality within the white and non-white sub-groups in Brazil is almost as high as for the population as a whole, while overall inequality in South Africa is considerably higher than for either of the sub-populations. This suggests that between-race inequality is a much larger component of overall earnings inequality South Africa than in Brazil.

Columns 4-6 of Table 4 demonstrate once again the higher mean and lower inequality in the schooling distribution for South Africa relative to Brazil. Mean schooling for men aged 30-49 is about 2.3 years higher in South Africa than in Brazil, and even the mean for non-white South Africans is about 1.5 years higher than the overall Brazilian mean. The Gini and other measures of schooling inequality continue to demonstrate South Africa's much lower schooling inequality. The surprising feature of Table 4, however, is that South Africa's much lower inequality in schooling is associated with higher inequality in earnings. Even comparing only the non-white populations, South Africa's much more equal schooling

distribution does not translate into a more equal distribution of earnings. The following section explores this relationship further, using earnings regressions as the basis for decomposing earnings inequality.

Earnings Regressions and Decomposition of Earnings Inequality

The simple decomposition of log variance given in Equation (2) can be generalized to capture more flexible representations of the relationship between schooling and earnings and to include additional determinants of earnings. Consider a generalization of the earnings equation in Equation (1):

$$\log y_i = a + b'\mathbf{S}_i + g'\mathbf{Z}_i + u_i, \qquad (3)$$

where b and g are vectors of parameters, **S** is a vector of schooling variables (such as single-year schooling dummies), and **Z** is a vector of other variables such as age and race. The variance of log earnings now includes all of the variance and covariance terms implied by (3), so it is difficult to make simple statements about the role of the distribution of schooling in explaining earnings inequality. One straightforward approach is to estimate Equation (3) as a regression and use the estimated coefficients in combination with the distribution of characteristics to simulate counterfactual distributions of earnings. For example, we can simulate earnings inequality if the coefficients on race or schooling went to zero. It is also possible to combine one country's distribution of characteristics with the other country's coefficients in order to analyze the relative importance of the distribution of characteristics versus the returns to those characteristics in explaining earnings inequality in the two countries.

Table 5 reports earnings regressions using the sample of 30-49 year old men with positive earnings. Three regressions are estimated for each country. The first includes only age, age squared, and a dummy for being white. Comparing the South African regression (Column 1) and the Brazil regression (Column 4) for this specification, the coefficient for white in South Africa is almost three times as large as the coefficient in Brazil, and the R-squared for the regression is 0.34 in South Africa compared to 0.10 in Brazil. While this regression has no direct causal interpretation, it provides an informative baseline about the unadjusted racial component of inequality in each country. The second regression in Table 5 omits the racial dummy and adds a flexible specification for schooling with 11 dummy variables (with zero schooling omitted). This regression has an R-squared of 0.49 in South Africa and 0.42 in Brazil, indicating that in a statistical sense schooling accounts for a very high fraction of wage inequality

in the two countries. The coefficients correspond to the patterns plotted in Figure 4, with the early years of schooling having very low returns in South Africa but much higher returns in Brazil.[9]

The third regression in Table 5 (Columns 3 and 6) combines the race and schooling variables, making it possible to separate the partial effects of these two important components of inequality. As expected, given the high correlation between race and schooling documented above, the partial effects of both race and schooling are diminished when both are included in the regression. The partial effect of race continues to be much higher in South Africa than in Brazil. The basic shape of the schooling coefficients are not much affected by controlling for race, however, and the magnitudes fall by surprisingly modest amounts. The returns to moving from 10 years of schooling to 12 years of schooling, for example, falls from 0.68 to 0.52 in South Africa and from 0.56 to 0.53 in Brazil when the white dummy is added to the regression. The R-squared for the regression including age, race, and schooling is 0.56 in South Africa and 0.44 in Brazil, both very high levels of explanatory power for an earnings regression using only individual characteristics. As shown at the bottom of Columns 3 and 6, the unexplained variance is relatively similar in the two countries, 0.55 in South Africa and 0.60 in Brazil.

The coefficients from Regressions 3 and 6 in Table 5 can be used to construct counterfactual simulations decomposing components of inequality and combining one country's characteristics with the other country's coefficients. Figure 5 provides a graphical representation of the results of such an exercise. The coefficients from Regressions 3 and 6 of Table 5 are used in various combinations to generate predicted earnings for each individual in the sample. Four simulations are done for each combination of coefficients. In the first simulation South Africa's coefficients (Regression 3) are applied to the South African sample. In the second simulation Brazil's coefficients (Regression 6) are applied to the South Africa sample. In the third simulation Brazil's coefficients are applied to the Brazil sample. In the fourth simulation South Africa's coefficients are applied to the Brazil sample. The first set of simulations, shown in the top group in Figure 5, simply uses the coefficients on age and age squared, creating a baseline level of inequality corresponding to the case in which the coefficients on race and schooling are all assumed to be zero and there is no residual variance. The second group adds the

[9] The regressions assume that earnings-schooling gradients for whites and non-whites are parallel, an assumption that we have seen is not entirely accurate. Figure 4 demonstrates, however, that this does not do great injustice to the data, with differences between countries being much greater than differences between racial groups within each country. The assumption makes it possible to carry out the decompositions and counterfactual simulations below.

effect of race. Note that these simulations are based on the coefficients from a regression that includes both race and schooling, so these effects of race do not include any effects resulting from the correlation between schooling and race. They can be interpreted as representing the counterfactual in which all differences in schooling are eliminated or, equivalently, there is no partial effect of schooling on earnings. Measured in this way the results suggest that the partial effect of race *per se* explains only a small fraction of total inequality in either country. The variance of log earnings in South Africa would be 0.128 if the racial distribution and the effects of race on earnings remained the same but all other sources of inequality disappeared. If the effect of race were the same as in Brazil the log variance would be much smaller, only 0.014, a reflection of the much smaller coefficient on race in Brazil. The last bar in group 2 shows that if South Africa's large coefficient on race were combined with Brazil's much larger non-white population, the race component of inequality in Brazil would be much higher than it is, and would be almost double the race component in South Africa. The third group shows the effect of adding in each country's residual variance.

The fourth group in Figure 5 looks at the effect of schooling on inequality, under the counterfactual assumption that the partial effect of race is zero. This might be thought of as the simulated effect of eliminating racial discrimination in earnings without making any changes in schooling. These simulations show the intriguing result that the combination of schooling distributions and schooling coefficients have almost identical effects in South Africa and Brazil. Using one country's coefficients with the other country's characteristics has very little effect on the implied level of inequality. The previous sections showed that South Africa has a more egalitarian distribution of schooling than Brazil by any measure. The previous section also showed important differences in the shape of the schooling-earnings profile between the two countries, especially at low levels of schooling. In spite of these differences, the results in Figure 5 indicate that neither country's level of inequality would change much if it traded either schooling coefficients or schooling distributions with the other. In both countries the combination of schooling distributions and schooling coefficients tend to produce high earnings inequality. Just as it is the standard deviation in schooling, and not the coefficient of variation, that drives the variance of log earnings in Equation (2), South Africa's lower inequality in schooling does not in and of itself produce lower inequality in earnings. The explanation of this is that lower inequality is in some sense offset by the higher mean – while both of these are positive aspects of South Africa's schooling distribution, the convex relationship between schooling and earnings means that the level of earnings inequality generated is very similar to that implied by Brazil's schooling distribution with its lower mean and higher inequality.

The sixth group of simulations in Figure 5 shows the combined effects of age, race, and schooling. These simulations indicate that South Africa's coefficients produce substantially higher inequality when combined with either the South African or the Brazilian population. The contrast between these simulations and the previous group using only schooling demonstrate the strong role of race in explaining South Africa's high earnings inequality. If Brazil had the same effects of schooling and race on earnings as South Africa, Brazil's inequality would be higher than South Africa's. Put another way, if South Africa had Brazil's coefficients on schooling and race, inequality would be substantially reduced. It is obviously the race coefficients that make the difference, since we have seen that changing schooling coefficients alone has relatively small effects. The seventh group adds residual variance to the combined effects of age, race, and schooling. This simply reproduces total variance in log earnings for South Africa and Brazil in the first and third bars. In the counterfactual cases in which the other country's coefficients are used, we see that South Africa would have substantially smaller earnings inequality if it could trade regression coefficients with Brazil. If Brazil had its existing distribution of characteristics and residual variance, but had South Africa's regression coefficients, it would have slightly higher inequality than South Africa.

These simulations reveal a number of important points about the determinants of earnings inequality in South Africa and Brazil. First, the distributions of schooling in the two countries imply very similar levels of inequality, in spite of South Africa's more equal schooling distribution. The relationship between schooling and earnings also produce very similar levels of inequality, with very little change resulting from the countries trading schooling coefficients. Both the distributions of schooling and the relationship between schooling and earnings tend to produce high inequality, and in combination account for a substantial component of earnings inequality in both countries. The second important point is that South Africa's higher level of earnings inequality in this prime age male group can clearly be attributed in a statistical sense to the much higher partial effect of race on earnings in South Africa. The racial composition of the population is not particularly important in explaining the differences between the two countries, however, as demonstrated by the fact that Brazil's inequality would be similar to South Africa's if its very different racial composition were combined with South Africa's coefficients.

The Link Between Parent's Schooling and Children's Schooling

The previous sections demonstrate the strong role played by education in explaining the high level of earnings inequality in Brazil and South Africa. They also demonstrate important differences in the distributions of schooling in the two countries, with South Africa showing better performance in raising

mean schooling and reducing schooling inequality. A fundamental component of the link between schooling inequality and income inequality is the transmission of schooling across generations. The hope that improvements in one generation's distribution of schooling will reduce inequality lies not only with the potential reductions in earnings inequality for that generation, but also with the potential for further improvements in the distribution of education among that generation's children.

The link between parent's schooling and children's schooling has several dimensions. The most direct link can be thought of as a productivity effect of parental education working through a schooling production function. This includes direct effects such as the parents' ability to help children with homework, as well as more indirect effects such as the advantages of parents giving their children better language skills. Other sources of an association between parents' schooling and children's schooling are less directly causal. Parents' education will be correlated with income and other resources related to children's schooling. Parents' education will also be associated with community and neighborhood characteristics that affect children's schooling. Some of these variables will be observable, making it possible to identify some of the separate mechanisms driving the relationship between parents' and children's schooling outcomes. Many are unobservable, however, making it difficult to distinguish among alternative explanations. The results below use flexible specifications to analyze the reduced form effects of mother's and father's schooling, taken separately and together, then add father's income and region of residence to see the effect they have on the estimated effects of parents' schooling.

Table 6 shows the bivariate relationship between mother's schooling and the schooling of children ages 13 to 17. The first three columns show the distribution of schooling among the mothers. In South Africa 22% of non-white children ages 13-17 have mothers with no schooling, compared to 32% in Brazil. Taking whites and non-whites together, 64% of Brazilian children ages 13-17 have mothers with less than five years of schooling. Table 6 shows, not surprisingly, that children with better-educated mothers have more schooling at a given age. The advantage of having a better-educated mother is much larger in Brazil than in South Africa, however. Comparing the schooling of non-white 17 year-olds whose mothers have university education with those whose mothers have zero schooling, there is a five-year advantage in Brazil, compared to less than a three-year advantage in South Africa. For 13 year-olds this gap is 3.3 years in Brazil, compared to only 1.6 years in South Africa.

Table 6 also presents a useful summary measure of schooling attainment that will be used in the regressions below – the number of grades completed per year of age since age 6. For a student who began school at age 6 and advanced one grade per year, this measure would equal 1.0 at every age. A

value of 0.5 indicates that a child is advancing through school at only 50% of the target rate. A striking feature of this measure is that it changes very little with age for any given population sub-group. Non-white Brazilians, for example, have progressed only 0.45 grades per year by age 13, very similar to the 0.47 and 0.46 rates observed at ages 15 and 17.[10] Non-white South Africans, by comparison, have advanced at a much faster rate of 0.82, 0.81, and 0.79 grades per year at ages 13, 15, and 17. This measure will be analyzed further below.

The relationship between mother's schooling and children's schooling for 13 and 17 year-olds is shown graphically in Figure 6. Three patterns are especially noticeable in this figure. First is that for each racial group the South African graph shows higher levels of schooling attainment at every age. The second striking pattern is the much steeper slope of the relationship between mother's education and children's education in Brazil. Especially noticeable is the sharp rise in children's schooling associated with a rise in mother's schooling from zero to four years in Brazil. Almost no change is observed in South Africa over this same range. The third striking feature in Figure 6 is the fact that there is almost no gap between the schooling of whites and non-whites in South Africa, once the schooling of the mother has been controlled for. This comparison can only be made at the higher schooling levels where there is sufficient overlap in the schooling distributions. As will be shown below, regression estimates controlling for both mother's and father's schooling confirm this pattern for most ages and for a variety of specifications. Education of the mother also explains much of the schooling gap between white and non-white children in Brazil, but not to the same degree as in South Africa.

Figure 6 shows clearly that there is an overall schooling advantage for South African children compared to Brazilian children, especially for those with uneducated parents. For non-white 17 year-old children with university educated parents, mean schooling in South Africa is about 2 years higher than in Brazil. For non-white 17 year-olds whose parents have no schooling, the gap is over 4 years – 7.7 years in South Africa compared to 3.5 years in Brazil. Similar gaps are seen at all other ages. The much stronger relationship between parent's education and children's education in Brazil is potentially an important factor in the intergenerational transmission of inequality. Somewhat surprisingly, given the history of unequal access to education under South Africa's apartheid policies, even non-white children

[10] Note that the measure includes all children of a given age, with no restriction to those still enrolled in school. The surprising fact that the measure is roughly the same for 13 year olds and 17 year olds indicates that the large shortfalls in schooling attainment are the result of relatively constant rates of grade repetition rather than the result of children dropping out of school.

of poorly educated parents in South Africa have not faced the same disadvantage in schooling as the children of poorly educated parents in Brazil.

Regression Analysis of Children's Schooling Outcomes

The bivariate relationship between mother's schooling and children's schooling shown in Figure 6 suggests strong intergenerational links in human capital, with potentially important differences between the two countries. The relationship between mother's schooling and children's schooling may pick up a large number of effects, however, and is difficult to interpret in and of itself. Mother's schooling is likely to be correlated with father's schooling, father's income, and other variables such as region that may affect schooling. In order to get a closer understanding of the relationship between parents' schooling and children's schooling, Tables 7 and 8 present regression estimates with a number of alternative combinations of independent variables. The dependent variable is the number of years of schooling per year of age since age six, discussed above. As noted, the mean of this "schooling per year" variable is roughly constant across ages in a given population group. The effects of independent variables have a straightforward interpretation. The male-female differential, for example, can be interpreted as a differential rate of schooling attainment, eliminating the need to interact sex with age. Results using years of completed schooling lead to similar conclusions, but require analysis by separate age groups or extensive age interactions to produce meaningful results.

Table 7 presents results for Brazil, using the sample of children ages 13 to 17 in the 1995 PNAD. [11] Regression 1 includes all children ages 13-17 who live with their mother, a sample of 31,969 children. This specification includes dummy variables for single years of age, male, and white, and dummies for years of mother's schooling. The results are similar to the patterns shown graphically in Figure 6. Children whose mothers have university degrees (15 or more years of schooling) have advanced through school 0.42 years more per year of age (since age six) than children whose mothers have no schooling. By age 17 this is a 4.6 year advantage (11×0.42), roughly the same advantage shown in

[11] The percentage of Brazilian children in the sample who live with their mother is 78% for age 13 nonwhites, 78% for age 17 non-whites, 86% for age 13 whites, and 83% for age 17 whites. The percentage who live with their father is 71% for age 13 nonwhites, 67% for age 17 non-whites, 79% for age 13 whites, and 74% for age 17 whites. Not surprisingly, living arrangements are not random with respect to schooling outcomes – mean schooling is 3.2 years for 13-year old non-whites who live with both parents, compared to 2.8 years for those who live with neither parent. No attempt is made to adjust for this selectivity.

Figure 6. The effects of the first few grades of mother's schooling are substantial. Children whose mothers have completed four years of schooling have a 0.23 grade per year of age advantage over mothers with no schooling, implying a 2.3 grade advantage by age 16. Regression 1 also shows a 0.1 grade per year of age advantage of being white, and a 0.08 grade per year disadvantage of being male.

Regression 2 uses only the father's schooling, restricting the sample to the 27,370 children whose father is present in the household. The effects of father's schooling are remarkably similar to the effect of mother's schooling, a result that will partly be explained by the high correlation in parents' schooling, with each of these regressions picking up some effect of both parents' schooling combined. It is more interesting to include both mother's and father's schooling in the same regression, estimating the partial effects holding the other parent's schooling constant. Regression 3 includes both parents' schooling, without any additional controls. Although various researchers have identified larger effects of mother's schooling than father's schooling on outcomes such as children's schooling (Strauss and Thomas, 1995), the results in Regression 3 show little difference. In spite of the highly non-parametric specification for parents' schooling and the high correlation in mother's and father's schooling, the coefficients are estimated very precisely. The effect of the mother having four years of schooling is 0.155, compared to 0.170 for the father. The effects at eight years, the completion of primary school, are remarkably similar at 0.193 and 0.197 for mother and father respectively. These partial effects will be discussed further below, when they will be compared to the results for South Africa.

Regressions 4 and 5 add additional variables to the model. Regression 4 adds the logarithm of father's monthly earnings, a test of the extent to which the effects of education are working through income.[12] The partial effect of father's earnings is fairly modest. The coefficient of 0.05 implies that a 10% increase in father's earnings would imply a 0.005 increase in grade attainment per year of age. This result is consistent with the small effect of income on grade attainment estimated by Barros and Lam (1996) for 14 year-olds in Brazil. As argued in Barros and Lam (1996), the explanation may be that the income variable picks up mostly transitory income, permanent income being better captured by the father's schooling. Measurement error in the income variable may also bias the estimate toward zero. The inclusion of the current earnings does lower the estimated effect of father's schooling, but the effects of schooling are still large. Even after controlling for current earnings there is a 0.15 grade per

[12] The sample is restricted to children who live with their father and whose father reports positive earnings in the previous month.

year advantage of having a father with four years of schooling compared to a father with zero schooling. Regression 5 adds 27 state dummies, as a partial test of the extent to which the estimated effects of parents' schooling are due to regional differences in school availability, school quality, and other variables that affect school outcomes. The inclusion of state dummies has a relatively minor effect on the estimated effects of parents' schooling. The coefficients for mother's schooling are hardly affected at all, and in some cases increase rather than decrease. Whatever the effects of parental schooling represent, they are clearly as large within states as across states.

Table 8 presents analogous results for South Africa, using the sample of children ages 13 to 17 in the 1995 OHS Not surprisingly, the results for Regression 1, which includes the 11,759 children who can be matched with their mothers, show patterns similar to the simple bivariate relationship between mother's schooling and children's schooling in Figure 6.[13]. Children whose mothers have university degrees (15 years of schooling or more) have advanced through 0.22 more grades per year of age (since age six) than children whose mothers have zero schooling. By age 17 this is a $11 \times 0.22 = 2.4$ year advantage, roughly the same advantage shown in Figure 6. This contrasts with a 0.42 grade per year advantage in Brazil. Also in contrast to the results for Brazil, the effect of schooling up to grade 6 is very small. The coefficient on 4 years of schooling is only 0.02 in South Africa, one-tenth as large as the corresponding coefficient for Brazil. Regression 1 also shows a modest but statistically significant advantage of being white of about 0.025 years of schooling per year of age, implying a gap of only two-tenths of a year at age 16. Surprisingly, this is only one quarter as large as advantage of being white in Brazil. The disadvantage of being male in South Africa is about 0.05 grades per year of age.

As in Brazil, the coefficients from Regression 2, which uses only the father's schooling, are roughly comparable to the coefficients for mother's schooling in Regression 1. When we move to Regression 3, in which both parents' schooling are included, we continue to find that the effects of father's and mother's schooling are similar. Having a father who has completed 12 years of schooling (completion of secondary school) implies a 0.13 grade per year advantage over having a father with zero schooling, compared to 0.12 grade advantage from having a mother with 12 years of schooling. These are roughly

[13] The percentage of South African children in the sample who live with their mother is 79% for age 13 nonwhites, 77% for age 17 non-whites, 95% for age 13 whites, and 92% for age 17 whites. The percentage who live with their father is much lower than in Brazil – 49% for age 13 nonwhites, 52% for age 17 non-whites, 88% for age 13 whites, and 86% for age 17 whites. As in Brazil, living arrangements

half as large as the partial effects estimated for completion of secondary school (11 years) estimated for both mothers and fathers in Brazil.

The effect of father's income in South Africa, estimated in Regression 4, is similar to the effect estimated for Brazil. The coefficient on log of father's monthly earnings is 0.055 in South Africa, compared to 0.049 in Brazil. Both effects are quite small, perhaps indicating the relatively minor role played by transitory earnings in children's schooling. The inclusion of father's earnings lowers the estimated effect of father's education, but as in Brazil the effects continue to be quite large. Regression 5 adds dummy variables for South Africa's nine provinces. As in Brazil, the inclusion of these regional controls has a relatively modest effect on the estimated schooling coefficients, and increases the explanatory power of the regression by a surprisingly small amount, from 0.226 to 0.246.

The partial effects of mother's and father's schooling for both countries, based on the coefficients from Regression 3, are shown graphically in Figure 7. The figure plots predicted values for the completed schooling of a non-white 14 year-old female. The predicted values are calculated by holding one parent's schooling constant at 4 years (roughly the mean for the Brazilian sample) and varying the schooling of the other parent. While this is a somewhat artificial exercise, it provides a clear interpretation of the partial effects estimated in Regression 3. The choice of any other level of spouse's schooling would simply raise or lower the predicted value to some level parallel to the line shown. The predicted values for mother's and father's schooling necessarily cross at 4 years of schooling by construction. Changes in schooling moving away from 4 years show the partial effect of each parent's schooling, holding constant the schooling of the other parent.

Several striking features emerge from Figure 7. Two noticeable features have already been noted in Figure 6 – the substantially higher level and flatter slope of the South African relationship compared to that for Brazil. The new feature apparent in Figure 7 is the comparison of the effects of mother's and father's schooling. In each country the effects of mother's and father's schooling are very similar to each other. Surprisingly, there is no evidence of the larger effect of mother's schooling that is frequently observed by other researchers. These results are consistent with the results observed for the relationship between parental schooling and a number of human capital outcomes in Brazil by Lam and Duryea (1999). The bottom line from Figure 7 is that there appears to be significantly weaker

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are not random with respect to schooling outcomes – mean schooling is 5.8 years for 13-year old non-whites who live with both parents, compared to 5.4 years for those who live with neither parent.

transmission of schooling inequality across generations in South Africa than in Brazil, a result that may have important implications for future inequality in both schooling and earnings. Not only does South Africa have a more equal distribution of schooling than Brazil in the present, South Africa should experience a much larger reduction in inequality in the next generation. Although South Africa's current advantage in schooling inequality has not translated into a more equal distribution of earnings, there is evidence that the variance in schooling is falling in South Africa, and that future improvements in the distribution of schooling are likely to lead to reductions in earnings inequality.

Conclusions

How do Brazil and South Africa generate such extreme income inequality, inequality that is among the highest in the world? Are there common features of these two countries that explain the persistently high level of inequality and provide lessons relevant to other developing countries? Do current patterns of inequality in the two countries tell us anything about the prospects for reducing inequality in future generations? This paper cannot provide a complete explanation of these complex questions, but the paper demonstrates a number of points about the critical role played by schooling in generating inequality. Drawing on large national household surveys collected in the two countries in 1995, several key patterns emerge.

First, schooling plays a very large role in explaining earnings inequality in both countries. Earnings regressions containing only variables for age and schooling explain well over 40% of the (very high) variance in log earnings in both countries. Although an estimate like this picks up many confounding factors and is not a measure of the causal role of schooling, this is much higher than the explanatory power of schooling in most countries. The large contribution of schooling in explaining earnings inequality comes from two components – high dispersion in the distribution of schooling and a large effect of schooling on earnings. Although there are important differences between the two countries in both the shape of the schooling distribution and the relationship between schooling and earnings, the effects of each component on the distribution of earnings are surprisingly similar. The paper shows that if Brazil and South Africa traded either schooling distributions or earnings regression coefficients, there would be little change in earnings inequality in either country. The surprising fact that South Africa's lower schooling inequality does not in and of itself have an equalizing effect on the distribution of earnings results from the convex relationship between schooling and earnings. The results suggest that there is an important element of inertia in the evolution of schooling distributions and income distributions over time in developing countries. Large improvements in mean schooling and mean-adjusted schooling

inequality in both countries are associated with relatively little change in the variance of schooling, and hence relatively little change in earnings inequality. The results for South Africa and Brazil indicate that the implications of a simple log earnings equation extend to a very flexible parameterization of schooling and earnings.

Not surprisingly, race plays a large role in explaining inequality in South Africa. The earnings advantage of whites, after controlling for schooling, is about three times as large in South Africa as in Brazil, a difference that in a statistical sense completely explains why earnings inequality among 30-49 year old males is higher in South Africa than in Brazil. If the effects of race were the same in the two countries, earnings inequality would be very similar, with slightly lower inequality in South Africa. At the same time, eliminating the partial effect of race on earnings would in and of itself have a relatively small effect on earnings inequality in South Africa. The distribution of schooling, combined with a large effect of schooling on earnings, plays a much larger role than race *per se* in explaining earnings inequality.

The paper demonstrates important differences in the evolution of schooling distributions in the two countries. South Africa has had better success in making primary schooling universal, with recent cohorts of non-whites in South Africa having higher mean schooling than both whites and non-whites in Brazil. In addition to a higher mean, South Africa for many years has had substantially lower inequality in schooling, as measured by Lorenz curves and any standard inequality measure. South Africa's more egalitarian distribution of schooling has not translated into a more equal distribution of earnings, however. Although this is partly due to the large racial gap in earnings, the paper shows that even if there were no effect of race on earnings in South Africa, the country would still have a level of income inequality comparable to Brazil's.

Looking to future generations, the paper demonstrates striking differences in the intergenerational transmission of human capital in the two countries. Although both countries have a high fraction of adults with low schooling, the penalty to children of having uneducated parents is much smaller in South Africa than in Brazil. The gradient mapping parents' schooling to children's schooling has both a higher mean and a flatter slope in South Africa than in Brazil. Analysis of the partial effects of mother's and father's schooling indicate that they have almost identical effects on children's schooling attainment in each country. Both countries demonstrate similar schooling outcomes for males and females, with a slight female advantage for recent cohorts in both countries. The long-run implications for schooling inequality and income inequality would appear to be more optimistic for South Africa, since schooling inequality is much lower to begin with and is less strongly transmitted across generations. In spite of

what appears to be a strong tendency toward inertia in earnings inequality, the sustained improvements in schooling inequality in both countries should eventually reduce earnings inequality, with South Africa having a significant head start in both the level of schooling inequality and the gains that can be expected across generations.

References

Barros, Ricardo and David Lam (1996) "Income and Education Inequality and Children's Schooling Attainment in Brazil," in Nancy Birdsall and Richard Sabot (eds.), *Opportunity Foregone: Education in Brazil*, Washington: Inter-American Development Bank.

Birdsall, Nancy, and Richard Sabot (eds.) (1996) *Opportunity Foregone: Education in Brazil*, Washington: Inter-American Development Bank.

Case, Anne, and Angus Deaton (1999) "School Inputs and Education Outcomes in South Africa," *Quarterly Journal of Economics*, forthcoming.

Deninger, Klaus, and Lyn Squire (1996) "A New Data Set Measuring Income Inequality," *The World Bank Economic Review,* 10(3): 565-91.

Fedderke, J.W., R. de Kadt, and J. Luiz (1998), "Uneducating South Africa: The Failure to Address the Need for Human Capital – a 1910-1993 Legacy," manuscript, Department of Economics, University of Witwatersrand.

Hanushek, Eric, Joao Batista Gomes-Neto, and Ralph Harbison (1996) "Efficiency-Enhancing Investments in School Quality," in Nancy Birdsall and Richard Sabot (eds.), *Opportunity Foregone: Education in Brazil*, Washington: Inter-American Development Bank.

Lam, David, and Suzanne Duryea (1999) "Effects of Schooling on Fertility, Labor Supply, and Investments in Children, With Evidence From Brazil," *Journal of Human Resources*, 34(1): 160-192.

Lam, David, and Deborah Levison (1992) "Declining Inequality in Schooling in Brazil and its Effects on Inequality in Earnings," Journal of Development Economics, 37: 199-225.

Lam, David, and Robert Schoeni (1993) "Effects of Family Background on Earnings and Returns to Schooling: Evidence from Brazil," *Journal of Political Economy,* 101(4): 710-740.

Moll, Peter (1996) "The Collapse of Primary Schooling Returns in South Africa, 1960-90," *Oxford Bulletin of Economics and Statistics,* 58: 185-209.

Mwabu, Germano, and T. Paul Schultz (1996) "Education Returns Across Quintiles of the Wage Function: Alternative Explanations for Returns to Education by Race in South Africa," *American Economic Review,* 86(2): 335-339.

Mwabu, Germano, and T. Paul Schultz (1998) "Wage Premia for Education and Location, by Gender and Race in South Africa," Yale Economic Growth Center Discussion Paper No. 785.

Ram, Rati (1990) "Educational Expansion and Schooling Inequality: International Evidence and Some Implications," *Review of Economics and Statistics,* 72(2): 266-273.

Strauss, John and Duncan Thomas (1995) “Human Resources: Empirical Modeling of Household and Family Decisions," in Jere Behrman and T.N. Srinivasan (eds.) *Handbook of Development Economics*, Volume III, Amsterdam: North Holland Press.

Strauss, John, and Duncan Thomas (1996) “Wages, Schooling, and Background: Investments in Men and Women in Urban Brazil,” in Nancy Birdsall and Richard Sabot (eds.), *Opportunity Foregone: Education in Brazil*, Washington: Inter-American Development Bank.

Thomas, Duncan (1996) “Education Across Generations in South Africa,” *American Economic Review*, 86(2): 330-334.

Wilson, Francis, and Mamphela Ramphele (1989) *Uprooting Poverty: The South African Challenge*, New York: W. W. Norton.

World Bank. (1999) World Development Report 1998/99. New York: Oxford University Press.

Table 1. Summary Statistics for Distribution of Schooling by Five Year Age Groups
South Africa, 1995 October Household Survey, and Brazil, 1995 PNAD Household Survey

Age Group	***Number of Observations***			***Years of Completed Schooling***								
				Mean			Standard Deviation			Coefficient of Variation		
	Non-White	White	Total	Non-White	White	Total	Non-White	White	Total	Non-White	White	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
South Africa												
20-24	11,065	928	11,993	9.30	11.78	9.49	3.07	1.38	3.05	0.33	0.12	0.32
25-29	9,329	1,055	10,384	8.71	12.08	9.05	3.61	1.43	3.60	0.41	0.12	0.40
30-34	7,890	1,221	9,111	7.97	11.95	8.50	3.88	1.61	3.90	0.49	0.14	0.46
35-39	7,235	1,353	8,588	7.41	12.00	8.14	3.89	1.70	4.00	0.52	0.14	0.49
40-44	5,652	1,176	6,828	6.55	11.84	7.46	4.02	1.80	4.23	0.61	0.15	0.57
45-49	4,910	1,088	5,998	5.98	11.58	7.00	4.03	1.74	4.30	0.67	0.15	0.61
50-54	3,645	824	4,469	5.25	11.49	6.40	4.01	1.66	4.41	0.76	0.14	0.69
55-59	3,396	784	4,180	4.53	11.15	5.77	4.00	1.77	4.51	0.88	0.16	0.78
60-64	2,790	686	3,476	4.11	10.91	5.45	3.91	2.01	4.51	0.95	0.18	0.83
65-69	2,437	681	3,118	3.40	10.64	4.98	3.71	2.11	4.55	1.09	0.20	0.91
Total	58,349	9,796	68,145	7.22	11.63	7.85	4.14	1.76	4.18	0.57	0.15	0.53
Wtd.Pct.	85.6%	14.4%	100%									
Brazil												
20-24	14,443	14,633	29,076	5.65	7.51	6.65	3.56	3.62	3.71	0.63	0.48	0.56
25-29	13,244	14,100	27,344	5.48	7.55	6.61	3.92	4.00	4.10	0.72	0.53	0.62
30-34	12,203	13,993	26,196	5.23	7.46	6.50	4.02	4.25	4.30	0.77	0.57	0.66
35-39	10,714	12,547	23,261	4.84	7.23	6.21	4.06	4.40	4.42	0.84	0.61	0.71
40-44	8,847	10,712	19,559	4.31	6.73	5.71	4.02	4.58	4.52	0.93	0.68	0.79
45-49	6,970	8,909	15,879	3.45	6.03	4.97	3.84	4.65	4.52	1.11	0.77	0.91
50-54	5,418	7,009	12,427	2.91	5.22	4.28	3.57	4.48	4.29	1.23	0.86	1.00
55-59	4,676	5,941	10,617	2.40	4.46	3.61	3.22	4.17	3.94	1.34	0.94	1.09
60-64	3,598	4,873	8,471	2.00	4.04	3.24	2.97	3.99	3.75	1.48	0.99	1.16
65-69	2,897	4,182	7,079	1.48	3.73	2.87	2.53	3.92	3.62	1.71	1.05	1.26
Total	83,010	96,899	179,909	4.43	6.54	5.64	3.96	4.39	4.34	0.89	0.67	0.77
Wtd. Pct.	42.9%	57.1%	100%									

Table 2. Mean years of schooling by schooling decile
All persons age 25-29 and 55-59, Brazil and South Africa, 1995

Schooling Decile	South Africa			Brazil			South Africa minus Brazil	
	Age 55-59	Age 25-29	Increase	Age 55-59	Age 25-29	Increase	55-59	25-29
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	0.00	1.16	1.16	0.00	0.09	0.09	0.00	1.07
2	0.00	5.23	5.23	0.00	2.19	2.19	0.00	3.04
3	0.58	7.02	6.45	0.00	3.69	3.69	0.58	3.33
4	3.49	8.44	4.96	1.17	4.33	3.16	2.31	4.11
5	5.58	9.69	4.12	2.54	5.43	2.90	3.04	4.26
6	7.10	10.66	3.56	3.38	7.19	3.81	3.72	3.47
7	8.09	11.74	3.65	4.00	8.22	4.22	4.09	3.52
8	9.69	12.00	2.31	4.47	10.59	6.12	5.22	1.41
9	11.47	12.00	0.53	7.82	11.00	3.18	3.65	1.00
10	12.74	12.92	0.19	12.72	13.62	0.89	0.01	-0.69
Total:								
Mean	5.77	9.05	3.28	3.61	6.61	3.01	2.16	2.44
Std. Dev.	4.51	3.60	-0.91	3.94	4.10	0.15	0.56	-0.50
C.V.	0.78	0.40	-0.38	1.09	0.62	-0.47	-0.31	-0.22
Gini	0.44	0.21	-0.23	0.56	0.35	-0.21	-0.12	-0.14

Table 3. Monthly Earnings by Highest Grade Completed, Males Age 30-49
Whites and Non-Whites, South Africa and Brazil, 1995

	Percentage in Schooling group			Mean Monthly Earnings (relative to non-whites with zero schooling)			Percentage reporting zero earnings		
	Non-white	*White*	*Total*	*Non-white*	*White*	*Total*	*Non-white*	*White*	*Total*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
South Africa									
Schooling:									
None	12.4%	0.30%	10.4%	1.00	--	1.00	30.1%	--	30.4%
1-3 Years	5.3%	0.04%	4.5%	0.89	--	0.89	30.8%	--	30.9%
4 Years	5.8%	0.09%	4.9%	1.01	--	1.02	30.1%	--	30.0%
5 Years	5.7%	0.09%	4.8%	1.11	--	1.11	32.6%	--	32.6%
6 Years	7.4%	0.09%	6.1%	1.23	--	1.23	30.5%	--	30.4%
7 Years	9.3%	0.09%	7.8%	1.36	--	1.36	30.2%	--	30.2%
8 Years	11.9%	2.19%	10.3%	1.74	3.80	1.82	28.4%	27.5%	28.4%
9 Years	6.9%	1.50%	6.0%	2.09	12.80	2.54	26.3%	2.9%	25.3%
10 Years	10.6%	14.4%	11.2%	2.76	7.82	3.85	24.2%	7.4%	20.6%
11 Years	5.3%	4.0%	5.1%	3.31	9.51	4.13	27.1%	6.4%	24.3%
12 Years	11.7%	40.1%	16.5%	4.58	13.47	8.20	16.9%	3.6%	11.5%
12 + diploma	4.7%	18.1%	6.9%	6.59	16.58	10.94	5.7%	1.7%	3.9%
University	2.2%	17.5%	4.8%	9.99	21.85	17.23	4.6%	2.7%	3.4%
Total	100%	100%	100%	2.43	14.29	4.41	25.7%	4.6%	22.1%
Number of Obs.	11,629	2,329	13,958						
Percentage	83.3%	16.7%	100%						
Brazil									
Schooling:									
None	23.4%	8.3%	14.9%	1.00	1.45	1.14	13.4%	14.8%	13.8%
1 Year	4.6%	2.1%	3.2%	1.22	1.66	1.38	12.2%	11.6%	12.0%
2 Years	7.3%	4.5%	5.7%	1.47	1.94	1.68	9.1%	11.4%	10.1%
3 Years	9.5%	7.1%	8.1%	1.69	2.18	1.93	11.0%	11.1%	11.0%
4 Years	17.0%	18.9%	18.1%	2.28	2.89	2.64	9.6%	9.7%	9.7%
5 Years	7.0%	7.5%	7.3%	2.19	2.87	2.59	11.5%	9.3%	10.2%
6 Years	3.2%	3.7%	3.5%	2.59	3.49	3.13	12.1%	9.7%	10.6%
7 Years	3.5%	3.9%	3.8%	2.81	3.50	3.22	7.7%	8.0%	7.8%
8 Years	8.0%	10.6%	9.5%	3.07	4.26	3.83	9.8%	7.4%	8.2%
9 Years	1.3%	1.6%	1.4%	2.95	4.21	3.72	14.5%	8.5%	10.9%
10 Years	1.5%	2.3%	2.0%	3.43	4.96	4.46	7.5%	10.1%	9.2%
11 Years	9.4%	14.5%	12.3%	4.67	6.15	5.66	6.8%	6.6%	6.7%
Some Univ.	1.4%	4.0%	2.9%	6.83	8.41	8.08	9.9%	5.1%	6.1%
University	2.9%	10.9%	7.5%	11.28	14.67	14.10	4.8%	4.0%	4.1%
Total	100%	100%	100%	2.48	4.89	3.85	10.5%	8.7%	9.5%
Unweighted N	18,843	21,662	40,505						
Weighted Pct.	43.3%	56.7%	100%						

Note: Results not reported for cells with fewer than 30 observations.

Table 4. Measures of Inequality in Schooling and Earnings, Males Age 30-49 Whites and Non-Whites, South Africa and Brazil, 1995

	Monthly Earnings			Years of schooling		
	Non-white	*White*	*Total*	*Non-white*	*White*	*Total*
	(1)	(2)	(3)	(4)	(5)	(6)
South Africa						
All men 30-49						
Number of observations	11,629	2,329	13,958	11,629	2,329	13,958
Mean	1,517	8,903	2,749	7.33	12.00	8.11
Standard Deviation	4,842	16,049	8,372	4.00	1.82	4.12
Coefficient of Variation	3.192	1.803	3.045	0.546	0.151	0.508
Gini Coefficient	0.653	0.527	0.707	0.308	0.072	0.283
Men with positive earnings						
Number of observations	8,646	2,221	10,867	8,646	2,221	10,867
Mean	2,040	9,336	3,532	7.61	12.08	8.52
Standard Deviation	5,520	16,311	9,341	4.04	1.67	4.10
Coefficient of Variation	2.71	1.75	2.65	0.53	0.14	0.48
Gini Coefficient	0.533	0.506	0.623	0.298	0.068	0.265
Log Variance	0.864	0.660	1.235	0.222	0.020	0.207
Brazil						
All men 30-49						
Number of observations	18,809	21,610	40,419	18,809	21,610	40,419
Mean	359	710	558	4.44	6.84	5.80
Standard Deviation	567	1,031	879	4.01	4.50	4.45
Coefficient of Variation	1.579	1.453	1.575	0.903	0.657	0.768
Gini Coefficient	0.575	0.577	0.596	0.496	0.373	0.431
Men with positive earnings						
Number of observations	16,837	19,757	36,594	16,837	19,757	36,594
Mean	401	778	616	4.52	6.97	5.92
Standard Deviation	585	1,055	904	4.04	4.51	4.48
Coefficient of Variation	1.46	1.36	1.47	0.89	0.65	0.76
Gini Coefficient	0.525	0.537	0.554	0.491	0.367	0.426
Log Variance	0.936	0.998	1.064	0.426	0.413	0.436

Note: Earnings are in 1995 Rands for South Africa and 1995 Reals for Brazil.

Table 5. Earnings Regressions, Log Monthly Earnings in Main Job, Males Age 30-49
South Africa, 1995 October Household Survey, and Brazil, 1995 PNAD Household Survey

	Regressions for South Africa						*Regressions for Brazil*					
	(1)		(2)		(3)		(4)		(5)		(6)	
Variable	**Coef.**	***SE***	**Coef.**	***SE***	**Coef.**	***SE***	**Coef.**	***SE***	**Coef.**	***SE***	**Coef.**	***SE***
White	1.587	*0.022*			0.819	*0.021*	0.634	*0.010*			0.278	*0.009*
Schooling:												
1-3 years			-0.008	*0.046*	-0.010	*0.043*			0.423	*0.015*	0.383	*0.015*
4 years			0.100	*0.044*	0.090	*0.041*			0.809	*0.015*	0.731	*0.015*
5 years			0.161	*0.045*	0.150	*0.042*			0.847	*0.019*	0.768	*0.019*
6 years			0.279	*0.041*	0.269	*0.038*			1.066	*0.025*	0.983	*0.025*
7 years			0.405	*0.038*	0.397	*0.036*			1.056	*0.024*	0.977	*0.024*
8 years			0.604	*0.035*	0.571	*0.033*			1.212	*0.017*	1.119	*0.017*
9 years			0.790	*0.040*	0.733	*0.038*			1.258	*0.036*	1.169	*0.036*
10 years			1.181	*0.034*	0.968	*0.032*			1.388	*0.031*	1.287	*0.031*
11 years			1.188	*0.042*	1.041	*0.040*			1.575	*0.016*	1.474	*0.016*
12 years			1.858	*0.029*	1.484	*0.029*			1.950	*0.026*	1.815	*0.026*
>= 15 years			2.480	*0.040*	1.970	*0.040*			2.459	*0.018*	2.314	*0.018*
Age	0.101	*0.023*	0.139	*0.020*	0.126	*0.019*	0.134	*0.014*	0.078	*0.011*	0.080	*0.011*
Age Squared	-0.001	*0.000*	-0.001	*0.000*	-0.001	*0.000*	-0.002	*0.000*	-0.001	*0.000*	-0.001	*0.000*
Constant	5.040	*0.452*	3.227	*0.396*	3.598	*0.370*	4.986	*0.007*	2.994	*0.213*	2.879	*0.210*
N	10867						36594					
R-squared	0.336		0.494		0.558		0.097		0.424		0.440	
Variance (Log Y)	1.235		1.235		1.235		1.064		1.064		1.064	
Explained Variance	0.415		0.610		0.688		0.104		0.451		0.468	
Residual Variance	0.820		0.624		0.546		0.960		0.613		0.596	

Table 6. Schooling attainment of children ages 13-17, by schooling of mother
Whites and Non-whites, South Africa and Brazil, 1995

Schooling	Percentage of mothers in schooling group			Mean schooling of children: Non-white			Mean schooling of children: White		
	Non-white	*White*	*Total*	*13*	*15*	*17*	*13*	*15*	*17*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
South Africa									
None	21.8%	0.2%	19.5%	5.18	6.45	7.69	--	--	--
1-3 Years	6.4%	0.1%	5.7%	5.13	6.43	7.59	--	--	--
4 Years	6.3%	0.0%	5.6%	4.97	6.72	8.38	--	--	--
5 Years	6.5%	0.0%	5.8%	5.43	6.57	8.21	--	--	--
6 Years	7.9%	0.2%	7.0%	5.48	6.97	8.26	--	--	--
7 Years	10.8%	0.1%	9.7%	5.68	7.34	8.68	--	--	--
8 Years	12.7%	2.7%	11.6%	5.94	7.61	9.11	--	8.83	9.90
9 Years	5.8%	2.3%	5.4%	6.07	7.95	9.38	--	7.78	9.67
10 Years	8.2%	20.3%	9.5%	6.24	8.10	9.60	6.33	8.20	10.23
11 Years	3.1%	6.6%	3.4%	6.44	7.97	9.85	6.76	8.50	10.21
12 Years	6.4%	41.5%	10.2%	6.64	8.25	9.95	6.61	8.57	10.62
12+Diploma	3.2%	19.5%	4.9%	6.97	8.91	10.08	6.66	8.90	10.71
University	1.0%	6.6%	1.6%	6.79	9.06	10.72	6.56	8.65	10.63
Total	100%	100%	100%	5.72	7.26	8.65	6.56	8.55	10.43
Grades per year				0.82	0.81	0.79	0.94	0.95	0.95
Num Obs	10318	1251	11569	2184	2129	1868	275	260	197
Wtd. Pct.	89.2%	10.8%	100%						
Brazil									
None	31.6%	13.8%	22.7%	2.13	2.90	3.53	2.96	3.98	4.35
1 Year	5.3%	2.8%	4.0%	2.42	3.38	4.13	3.18	4.65	5.27
2 Years	8.7%	7.0%	7.9%	2.76	3.86	4.78	3.59	4.77	5.64
3 Years	11.0%	9.2%	10.1%	3.09	4.20	5.14	4.01	5.02	6.18
4 Years	17.0%	21.9%	19.5%	3.59	4.83	5.99	4.56	5.84	7.12
5 Years	7.1%	7.8%	7.5%	3.73	4.89	5.89	4.33	6.03	7.10
6 Years	2.9%	3.0%	2.9%	3.91	5.20	6.36	4.85	6.30	7.14
7 Years	2.8%	3.4%	3.1%	4.17	5.23	6.64	4.99	6.47	7.20
8 Years	4.8%	8.0%	6.4%	4.33	6.06	6.67	5.08	6.54	8.27
9 Years	0.9%	1.3%	1.1%	4.30	5.55	6.94	5.14	6.72	7.84
10 Years	0.9%	1.8%	1.4%	4.48	5.33	7.18	5.17	7.14	8.11
11 Years	5.0%	10.5%	7.7%	4.88	6.28	8.12	5.51	7.08	8.63
Some Univ.	0.8%	2.9%	1.9%	5.19	6.42	8.01	5.58	7.26	9.24
University	1.2%	6.5%	3.9%	5.47	7.29	8.57	5.81	7.58	9.49
Total	100.0%	100.0%	100.0%	3.17	4.19	5.10	4.50	5.84	6.92
Grades per year				0.45	0.47	0.46	0.64	0.65	0.63
Num Obs	17540	15713	33253	3862	3660	3045	3480	3185	2691
Wtd. Pct.	49.8%	50.2%	100%						

Note: Results not reported for cells with fewer than 5 observations. Grades per year is mean years of schooling completed per year of age since age 6.

Table 7. OLS Regressions, Years of schooling per year of age since age six for children ages 13-17 Brazil, 1995 PNAD

Variable	*Regression 1*	*Regression 2*	*Regression 3*	*Regression 4*	*Regression 5*
Constant	0.348 (0.004)	0.347 (0.004)	0.303 (0.004)	0.069 (0.009)	0.189 (0.018)
Age 14	0.018 (0.004)	0.016 (0.004)	0.016 (0.004)	0.011 (0.004)	0.012 (0.004)
Age 15	0.018 (0.004)	0.016 (0.004)	0.018 (0.004)	0.012 (0.004)	0.012 (0.004)
Age 16	0.016 (0.004)	0.012 (0.004)	0.018 (0.004)	0.012 (0.004)	0.012 (0.004)
Age 17	0.020 (0.004)	0.014 (0.004)	0.020 (0.004)	0.010 (0.004)	0.011 (0.004)
Mother's schooling:					
1 year	0.043 (0.007)		0.021 (0.007)	0.015 (0.007)	0.021 (0.007)
2 years	0.105 (0.005)		0.071 (0.005)	0.061 (0.006)	0.057 (0.006)
3 years	0.147 (0.005)		0.101 (0.005)	0.093 (0.005)	0.086 (0.005)
4 years	0.229 (0.004)		0.155 (0.004)	0.135 (0.005)	0.123 (0.005)
5 years	0.232 (0.005)		0.151 (0.006)	0.132 (0.006)	0.131 (0.006)
6 years	0.267 (0.008)		0.172 (0.008)	0.144 (0.009)	0.137 (0.009)
7 years	0.281 (0.008)		0.185 (0.008)	0.163 (0.009)	0.159 (0.008)
8 years	0.310 (0.005)		0.193 (0.006)	0.161 (0.007)	0.161 (0.007)
9 years	0.326 (0.013)		0.205 (0.014)	0.173 (0.014)	0.175 (0.014)
10 years	0.351 (0.011)		0.213 (0.012)	0.178 (0.012)	0.177 (0.012)
11 years	0.375 (0.005)		0.239 (0.006)	0.204 (0.007)	0.222 (0.007)
12 years	0.392 (0.014)		0.245 (0.015)	0.215 (0.015)	0.227 (0.015)
13 years	0.404 (0.019)		0.238 (0.021)	0.206 (0.021)	0.222 (0.021)
14 years	0.406 (0.015)		0.255 (0.016)	0.207 (0.017)	0.217 (0.017)
15 years or more	0.423 (0.007)		0.263 (0.009)	0.218 (0.009)	0.241 (0.009)
Father's schooling:					
1 year		0.090 (0.007)	0.062 (0.007)	0.064 (0.007)	0.055 (0.007)
2 years		0.119 (0.006)	0.078 (0.006)	0.069 (0.006)	0.053 (0.006)
3 years		0.176 (0.005)	0.120 (0.005)	0.108 (0.005)	0.089 (0.005)
4 years		0.248 (0.004)	0.170 (0.004)	0.148 (0.005)	0.120 (0.005)
5 years		0.240 (0.006)	0.150 (0.006)	0.127 (0.006)	0.111 (0.006)
6 years		0.278 (0.009)	0.177 (0.009)	0.141 (0.01)	0.114 (0.009)
7 years		0.297 (0.009)	0.187 (0.009)	0.150 (0.009)	0.124 (0.009)
8 years		0.319 (0.006)	0.197 (0.006)	0.163 (0.007)	0.138 (0.007)
9 years		0.334 (0.015)	0.196 (0.015)	0.161 (0.015)	0.134 (0.015)
10 years		0.335 (0.013)	0.204 (0.013)	0.163 (0.014)	0.146 (0.013)
11 years		0.379 (0.006)	0.226 (0.006)	0.176 (0.007)	0.163 (0.007)
12 years		0.422 (0.019)	0.252 (0.019)	0.190 (0.02)	0.163 (0.02)
13 years		0.390 (0.019)	0.223 (0.02)	0.156 (0.02)	0.122 (0.02)
14 years		0.391 (0.018)	0.226 (0.018)	0.161 (0.019)	0.138 (0.019)
15 years or more		0.427 (0.006)	0.241 (0.008)	0.155 (0.009)	0.135 (0.009)
Male	-0.079 (0.002)	-0.077 (0.003)	-0.077 (0.003)	-0.075 (0.003)	-0.076 (0.003)
White	0.099 (0.003)	0.096 (0.003)	0.080 (0.003)	0.068 (0.003)	0.031 (0.003)
Log Father's Income				0.049 (0.002)	0.035 (0.002)
27 State Dummies	No	No	No	No	Yes
Sample Size	31,969	27,370	26,686	23,363	23,363
R-squared	0.355	0.366	0.415	0.440	0.472

Notes: Standard errors in parentheses. Omitted categories: Age 13, 0 years schooling. All regressions except Regression 1 are conditioned on father's presence in household.

Table 8. OLS Regressions, Years of schooling per year of age since age six for children ages 13-17 South Africa, 1995 October Household Survey

Variable	*Regression 1*	*Regression 2*	*Regression 3*	*Regression 4*	*Regression 5*
Constant	0.755 (0.006)	0.745 (0.007)	0.739 (0.008)	0.369 (0.028)	0.397 (0.03)
Age 14	0.001 (0.006)	-0.004 (0.007)	-0.005 (0.007)	-0.003 (0.008)	-0.005 (0.008)
Age 15	-0.005 (0.006)	-0.011 (0.007)	-0.009 (0.007)	-0.016 (0.008)	-0.016 (0.008)
Age 16	-0.004 (0.006)	-0.008 (0.007)	-0.005 (0.007)	-0.014 (0.009)	-0.015 (0.008)
Age 17	-0.022 (0.006)	-0.028 (0.007)	-0.027 (0.007)	-0.038 (0.009)	-0.037 (0.009)
Mother's schooling:					
1-3 years	-0.007 (0.009)		-0.017 (0.012)	-0.026 (0.015)	-0.017 (0.014)
4 years	0.021 (0.009)		-0.005 (0.012)	-0.009 (0.014)	0.000 (0.014)
5 years	0.027 (0.009)		0.003 (0.012)	0.010 (0.015)	0.019 (0.015)
6 years	0.056 (0.009)		0.042 (0.011)	0.032 (0.014)	0.042 (0.014)
7 years	0.083 (0.008)		0.041 (0.011)	0.039 (0.013)	0.054 (0.013)
8 years	0.120 (0.007)		0.070 (0.011)	0.061 (0.013)	0.075 (0.013)
9 years	0.153 (0.009)		0.094 (0.013)	0.091 (0.016)	0.104 (0.016)
10 years	0.166 (0.008)		0.097 (0.012)	0.080 (0.014)	0.095 (0.014)
11 years	0.174 (0.012)		0.086 (0.015)	0.071 (0.018)	0.086 (0.018)
12-14 years	0.212 (0.007)		0.116 (0.012)	0.096 (0.015)	0.112 (0.015)
15 years or more	0.222 (0.016)		0.118 (0.022)	0.097 (0.025)	0.113 (0.024)
Father's schooling:					
1-3 years		0.020 (0.011)	0.014 (0.011)	0.045 (0.014)	0.048 (0.014)
4 years		0.033 (0.012)	0.017 (0.012)	0.039 (0.015)	0.036 (0.015)
5 years		0.053 (0.012)	0.035 (0.012)	0.036 (0.015)	0.033 (0.015)
6 years		0.085 (0.011)	0.053 (0.012)	0.057 (0.014)	0.058 (0.014)
7 years		0.115 (0.01)	0.074 (0.011)	0.075 (0.014)	0.076 (0.014)
8 years		0.144 (0.009)	0.090 (0.011)	0.070 (0.013)	0.069 (0.013)
9 years		0.159 (0.012)	0.096 (0.013)	0.067 (0.016)	0.069 (0.016)
10 years		0.188 (0.009)	0.113 (0.012)	0.086 (0.014)	0.084 (0.014)
11 years		0.208 (0.013)	0.136 (0.015)	0.106 (0.018)	0.099 (0.018)
12-14 years		0.223 (0.008)	0.130 (0.012)	0.085 (0.015)	0.079 (0.015)
15 years or more		0.251 (0.013)	0.149 (0.017)	0.078 (0.02)	0.074 (0.02)
Male	-0.047 (0.004)	-0.041 (0.005)	-0.038 (0.005)	-0.031 (0.005)	-0.030 (0.005)
White	0.025 (0.007)	0.018 (0.008)	0.001 (0.008)	-0.040 (0.009)	-0.025 (0.01)
Log Father's Income				0.055 (0.004)	0.048 (0.004)
9 Province Dummies	No	No	No	No	Yes
Sample Size	11,759	8050	7672	5171	5171
R-squared	0.146	0.169	0.185	0.226	0.246

Notes: Standard errors in parentheses. Omitted categories: Age 13, 0 years schooling. All regressions except Regression 1 are conditioned on father's presence in household.

Figure 1. Mean, Standard Deviation, and Coefficient of Variation in Years of Schooling Ages 21-65, South Africa and Brazil, 1995 (3-year moving averages)

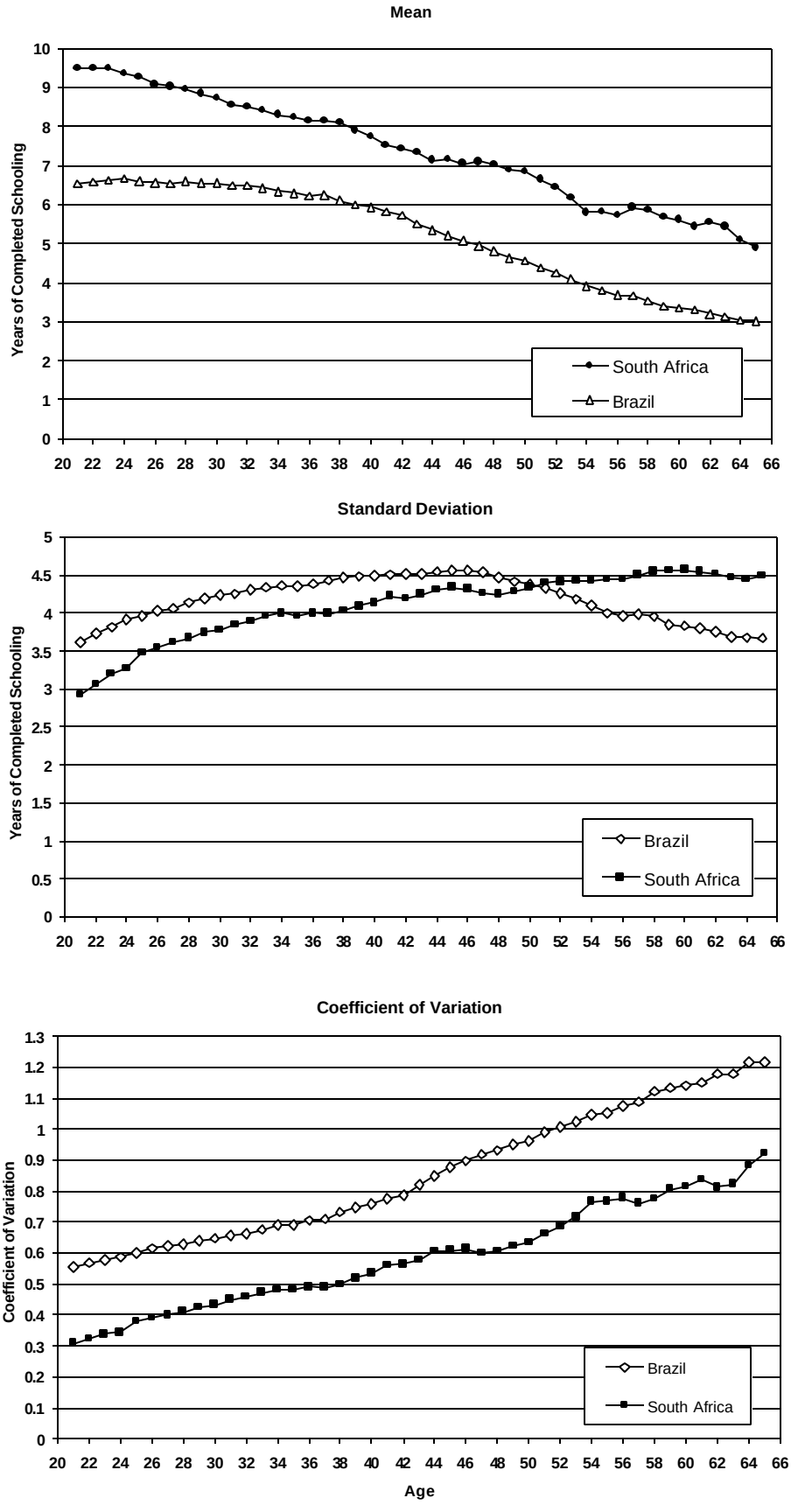
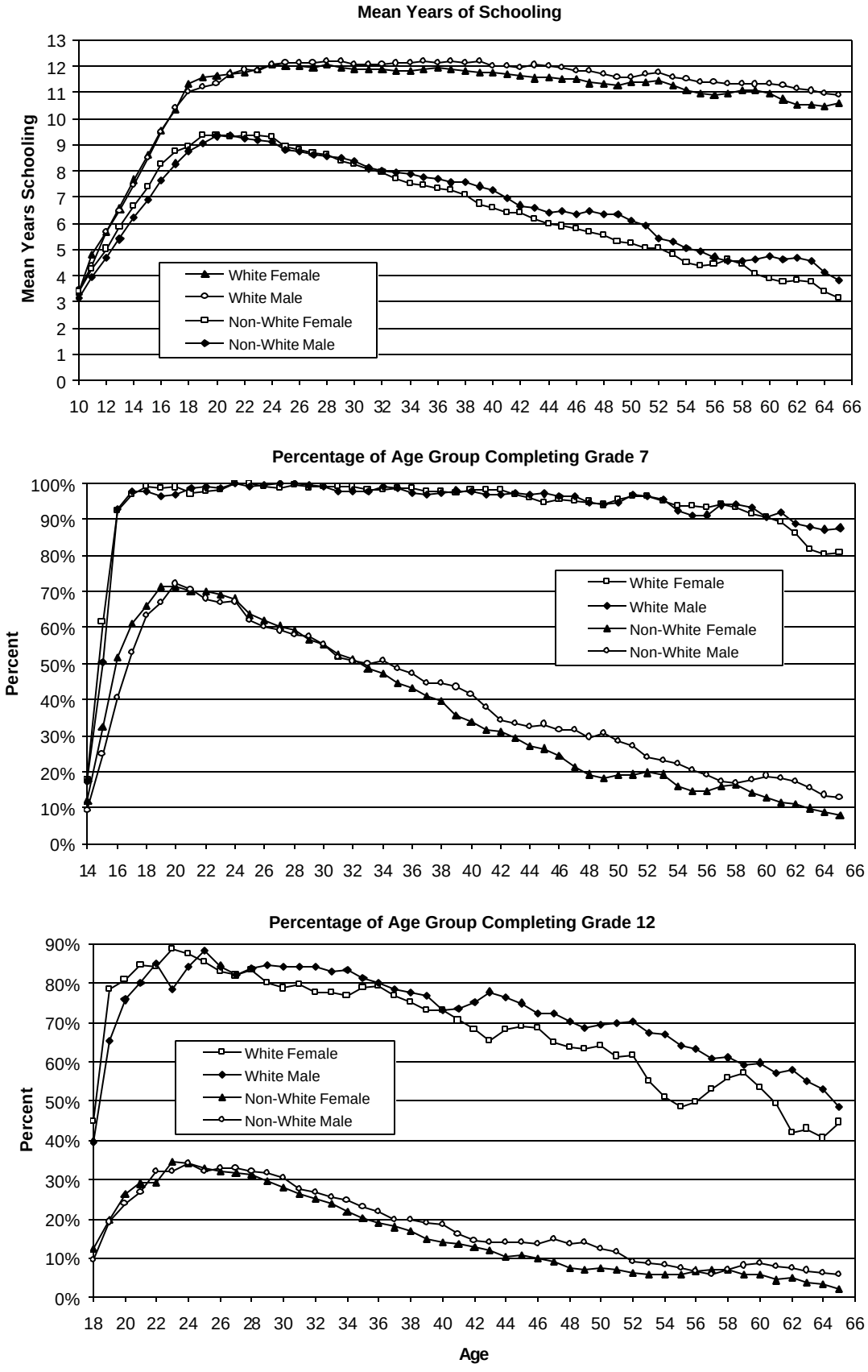
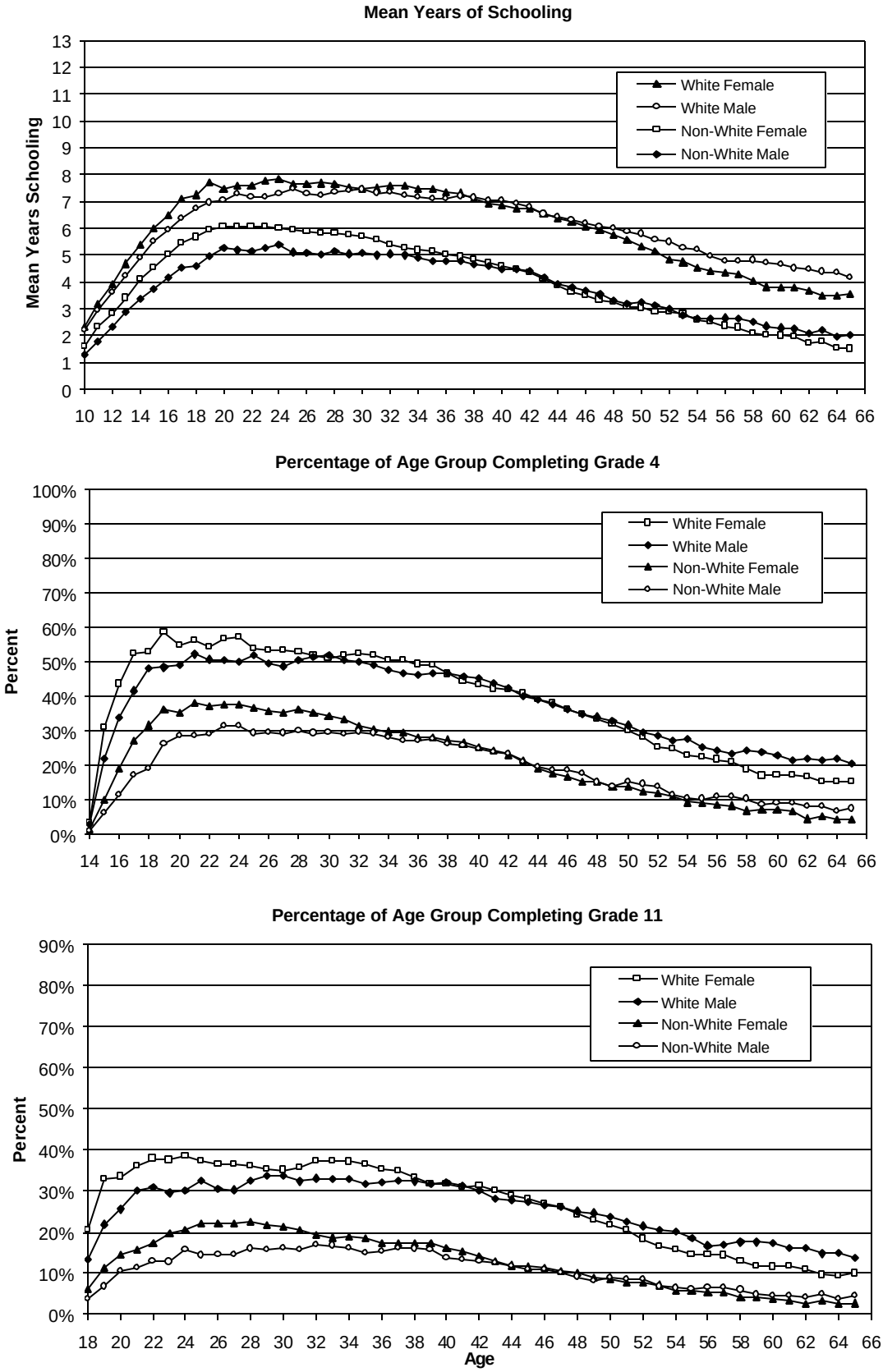


Figure 2. Schooling by Age and Sex, Whites and Non-Whites, South Africa 1995



Note: Three-year weighted moving averages plotted above age 25.

Figure 3. Schooling by Age and Sex, Whites and Non-Whites, Brazil 1995



Note: Three-year weighted moving averages plotted above age 25.

Figure 4. Mean Log Monthly Earnings by Years of Schooling
Males Age 30-49 with Positive Earnings, South Africa and Brazil, 1995

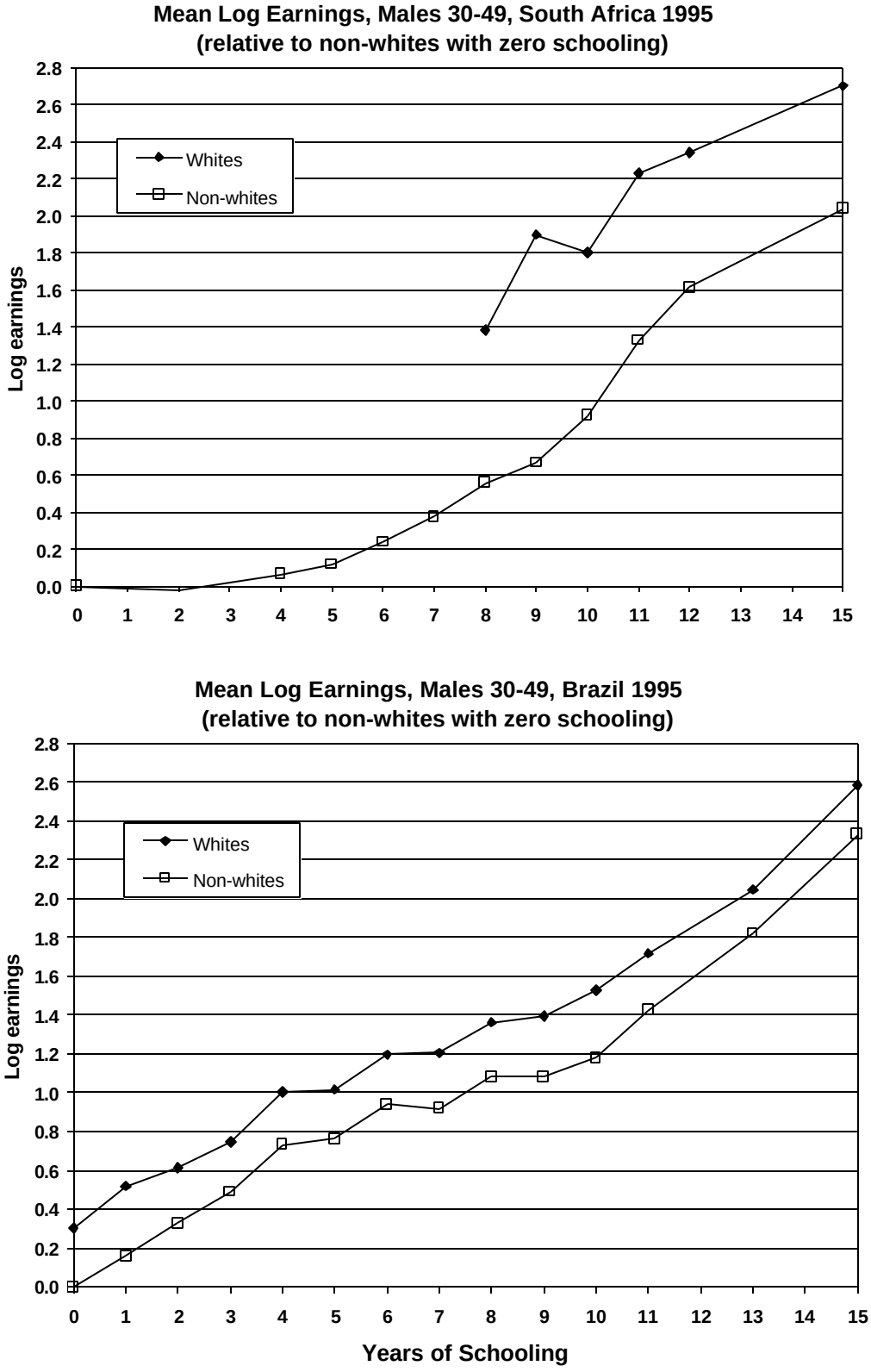
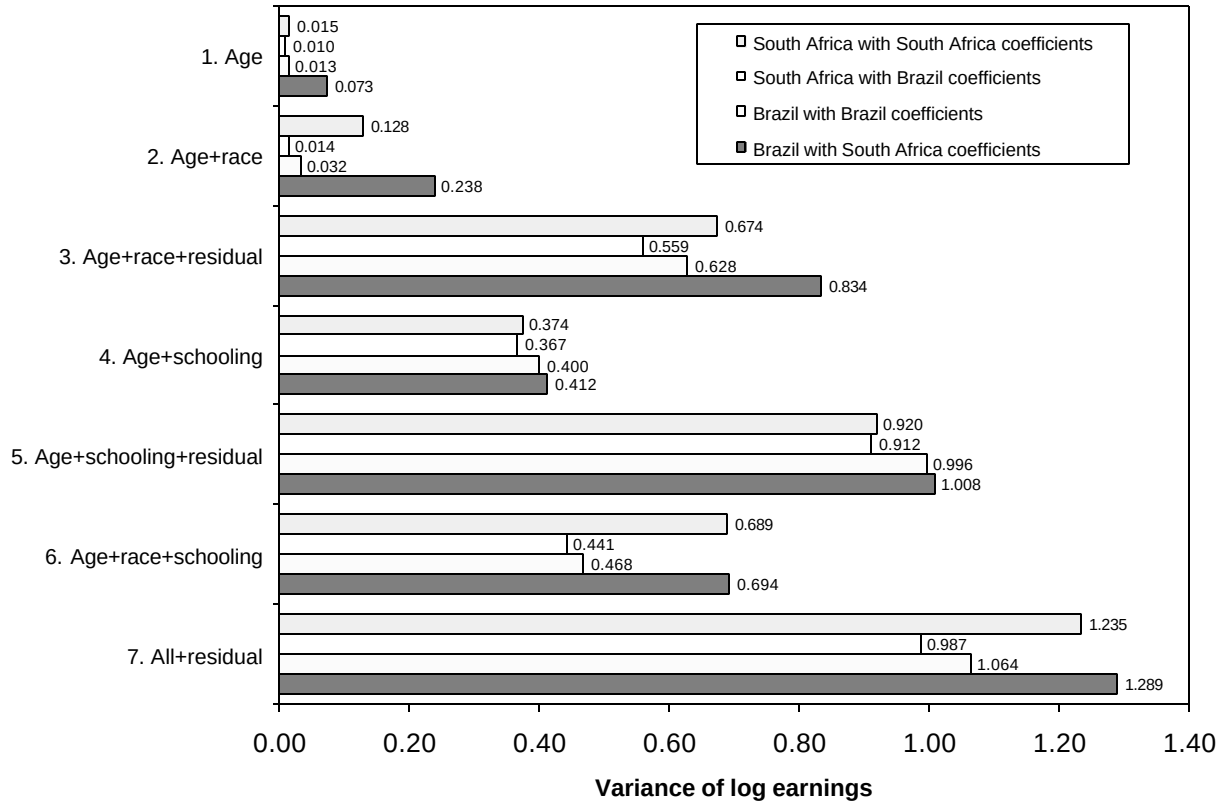


Figure 5. Simulated Variance of Log Earnings for Males 30-49, South Africa and Brazil.
(Based on distribution of age, race, and schooling, and coefficients from Regressions 3 and 6 in Table 5)



Note: Simulations for each group use coefficients for variables shown, with all other coefficients set to zero. Residual variance is from same country as coefficients.

Figure 6. Years of Schooling by Schooling of Mother, Children Ages 13 and 17 South Africa, 1995 October Household Survey, and Brazil, 1995 PNAD

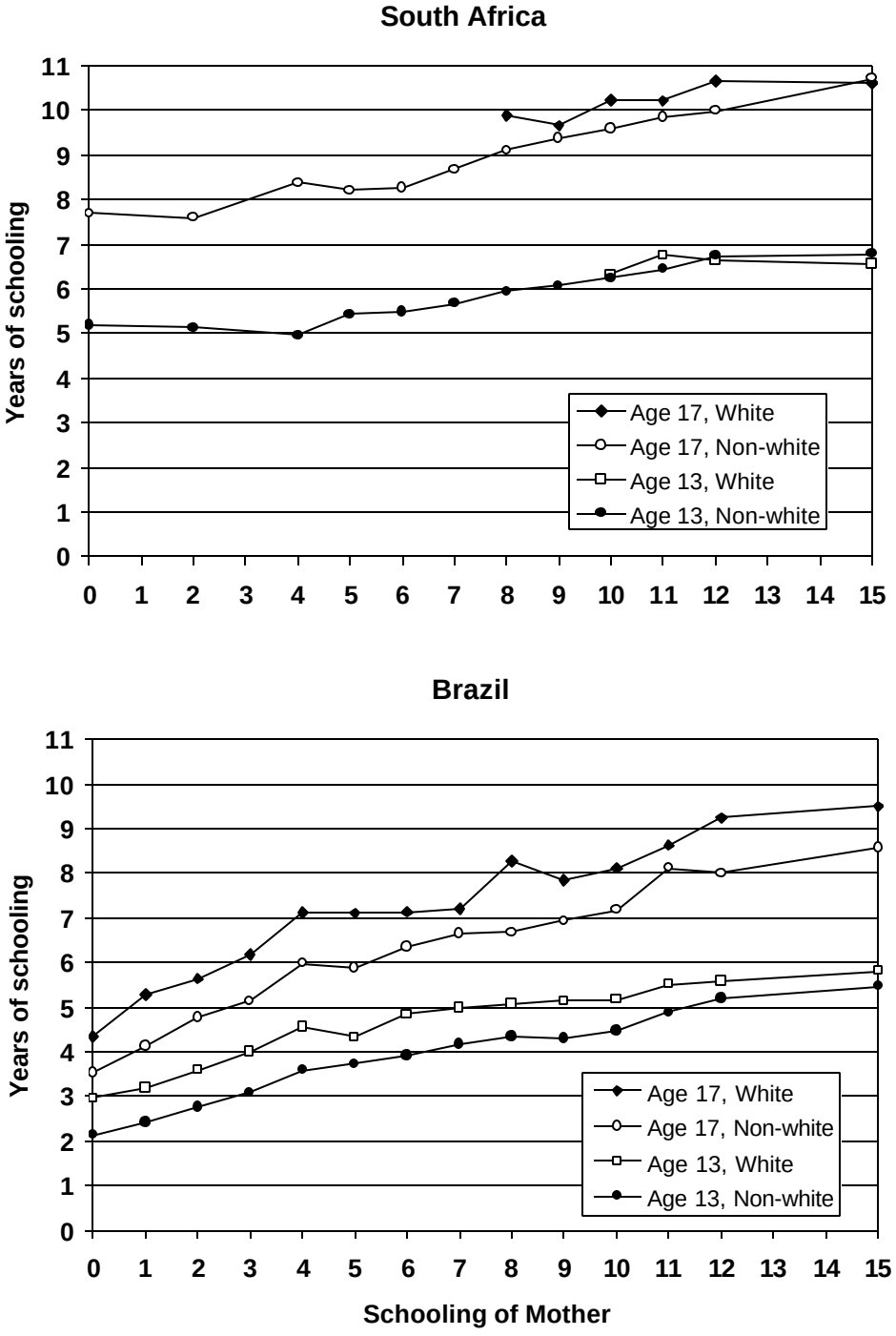


Figure 7. Predicted values for children's schooling attainment by schooling of mother and father, South Africa and Brazil, 1995

(Predicted for non-white age 14 female, holding spouse's schooling constant at 4 years)