The Effect of Labor Migration and Remittances on Children's Education among Blacks in South Africa

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ABSTRACT

This paper studies the effect of remittances sent home by South African Black labor migrants on children's schooling. We use cross-sectional data from the 1993-1994 Integrated Household Survey and panel data from 2002 and 2003 South African Labor Force Survey. We find that both labor migration and the likelihood of sending remittances home are much more prevalent among Blacks than among other racial groups, and thus restrict our study of the impact of migration and remittances on children's education to Blacks. Receipt of remittances substantially increases the likelihood that children are in school, through three pathways: increased household educational spending, reduced child labor, and mitigation of the negative effect of parental absence due to out-migration. Also, remittances sharply differentiate labor migrant households. Children in households without remittances are disadvantaged compared to recipient households, and in some respect are even worse-off than their counterparts in nonmigrant households, primarily due to the deleterious effect of parental out-migration with no economic compensation. Sensitivity tests using fixed-effect and random-effect modeling show that the effect of labor migration and remittances is robust to unobserved heterogeneity and relatively consistent across subsamples and independent samples over time, although the negative effect of living in households with out-migrants but no remittances is substantially by 2002-2003, due at least in part to relaxed migration policies after the breakdown of *apartheid*. The paper also assesses the social consequences of remittances. We find that remittances help reduce intra-familial gender inequalities as well as inter-familial SES inequalities in schooling.

INTRODUCTION

According to the World Bank (2003), remittances have become a rising source of external funding for developing countries, reaching 80 billion dollars in 2002. An understanding of how migration and remittance flows affect migrants' origin households is thus a core element in the assessment of the consequences of labor migration. When high levels of earnings from migrant workers are remitted to the families they leave behind, the assumption is that out-migration benefits individuals, families, and communities economically. However, very little research examines the social impact of migration and remittances on origin families, and even less explores whether the benefits extend beyond higher levels of consumption to include improved socioeconomic outcomes, such as human capital enhancement. This paper investigates the linkage between migration remittances and children's schooling among Blacks in South Africa, a country with a clear SES hierarchy and distinctive labor migration patterns by race.

Labor migration has long been an integral feature of the South African economy. Given Blacks' disadvantaged socioeconomic position and limited economic opportunities at home (which reflect in part the forced relocation during the *apartheid* period of a substantial fraction of the Black population to marginally productive rural areas [Platzky and Walker 1985]), a large number of Blacks, mostly men, work as temporary labor migrants in mines and cities, leaving their families behind (Mazur 1998; Posel 2001; Tomlinson 1990). A substantial fraction of these labor migrants send remittances back to their families at origin (Cross 2003; Wilson and Ramphele 1989).

While remittances have been found to increase familial financial resources and help improve

levels of consumption in migrants' origin households (Cross 2003), the role of remittances in children's welfare has not been adequately examined. As reviewed later, even the existing evidence on the effect of remittances on children is inconclusive. To remedy this gap in the literature, we study the effect of labor migration and remittances on children's schooling in South Africa. Examining the effects of migration on schooling is critical in South Africa, where stark inequities in educational outcomes are commonplace.

Using a nationally representative cross-sectional sample that covered approximately 9,000 households in South Africa during 1993-1994, we first study the overall effect of labor migration and remittances on children's schooling, and explicitly evaluate various pathways through which remittances may operate. We also conduct sensitivity tests to assess potential bias generated by unmeasured household heterogeneity associated with migration/remittance status as well as with children's schooling. We do this by using another dataset, a longitudinal sample that covered about 30,000 households in 2002 and 2003. The use of the panel data also enables us to evaluate the robustness of the migration and remittances effect across independent samples and over time (a 10-year period). Finally, we assess the implications of remittances for educational inequalities: with respect to within-household disparities, we study whether remittances reduce the gender gap in schooling, on the hypothesis that increased income may lead to less selective household investment; additionally, we evaluate the role of remittances in inter-household educational inequalities based on socioeconomic status.

MIGRATION AND REMITTANCES PATTERNS IN SOUTH AFRICA

South Africa is distinctive not only among the African countries but in the contemporary world because its social and political institutions were organized primarily on the basis of race until 1994. Particularly between 1948 and 1994, an *apartheid* system was legally constructed by the government to ensure the supremacy of the minority White population at the expense of other racial groups, particularly Blacks. As a result, the four official racial groups constitute a clear socioeconomic hierarchy far more unequal than in any other multiracial nation, with Whites on top, Blacks at the bottom, and Asians and Coloreds in between (Treiman et al. 1996; Treiman 2005).

Temporary labor migration, closely following the political geography of *apartheid*, has been an integral feature of the South African economy for more than a century (Mazur 1998; Posel 2001; Tomlinson 1990). A substantial fraction of the indigenous Black population was relegated to scattered rural reserves that contained few natural resources, extremely limited opportunities for nonagricultural employment, and low level of wages for such jobs. Survival for rural Blacks was thus heavily dependent on households successfully devising some method of attachment to employment in urban and White rural areas. Black laborers, mostly men, would find employment on a contract basis to work in mines, in urban industry or on white-owned farms, and the contracts would last from six months to two years (Posel 2001). Employed blacks were allowed to live in urban areas or “locations” (Black settlements near cities and towns, mainly consisting of informal or squatter dwellings). Blacks were considered “guest workers” in White areas and generally were allowed to live there only with proper documentation and without family

members. As a result of such policies, which deterred settlement of Blacks in White areas to maintain racial segregation, most Black labor migration was circular, hardly ever for more than two years and generally for much shorter periods. After that time, migrants returned home, though the likelihood was that in the course of their lives they would migrate several times. But after each trip they returned to their “homeland” (Hanks 1993).

Most Black labor migrants (about 80%) remitted substantial portions of their incomes to their families, which constituted one of the most important sources of income for families left behind (Wilson and Ramphele 1989; Cross 2003). Indeed, in 1993 one in four Black South African households was dependent on remittance income (Carter and May 1999). The provision of remittances also served as a way for migrants to protect themselves economically by establishing a claim on other family members as insurance against their unemployment and for assistance when they retired and returned permanently to their place of origin (Posel 2001). Remittances in cash or in-kind can be viewed as important in helping households overcome scarcities and risks in the local agricultural economy. However, the financial infrastructure for remittances is suboptimal because they are mostly used for consumption purposes, with about 80% of the remittances spent on daily living expenses (Cross 2003; Wilson and Ramphele 1989).

A few studies have examined racial variations in migration and remittances patterns in South Africa (Hanks 1993; Posel 2001), but in general migration patterns for racial groups other than Blacks are not well-understood, presumably because Blacks account for the majority of labor migrants. Since economic position is important in determining one’s capabilities and options, different socioeconomic classes may have qualitatively different migration experiences: in

particular, the migration decision for subordinate classes may represent a survival strategy (Shrestha 1996), but be determined by other motives for those of higher socioeconomic status. In South Africa, Blacks and Whites have higher levels of migration than the other two racial groups, but for different reasons: economic activities, mostly employment related activities, are the most important motive for Black migration, whereas social visits are primary reasons for White migration (Cross 2003; Mazur 1998). In general, migration in South Africa is much higher among rural Blacks and low-income households than among other groups, and it involves males more than females (Cross 2003; Mazur 1998). Also, the likelihood of receiving remittances is greatest among households with the poorest living conditions and thus with the greatest need in socioeconomic terms; in particular, poor rural Blacks households account for the majority of remittance recipients in South Africa (Mazur 1998; Posel 2001).

Relatively few studies have explored internal migration patterns after the 1994 collapse of the *apartheid* regime, and most attention has been devoted to changes in immigration patterns (Africa Today 2001; McDonald 2000). With the lifting of migration restrictions on Blacks after 1994, there was considerable speculation that migration patterns would change substantially. For example, there have been debates as to whether permanent migration has largely replaced circular migration, because the new policies make it possible for labor migrants to move with their families and to settle permanently at their places of employment. Recent evidence casts doubt on the extent to which patterns of migration have fundamentally changed: while there may have been some increase in permanent migration, the circular labor migration stream has continued to be substantial (Posel and Casale 2003, 2006). There are several explanations for the

continuing flow of temporary migration, such as increasing labor market insecurity, rising unemployment, the high cost of urban living, and the limited supply of land and housing (Posel and Casale 2003, 2006).

EDUCATION INEQUALITIES IN SOUTH AFRICA

A central feature of *apartheid* in South Africa was separate and unequal access to education by race. Educational policies, curricula, and pedagogical practices were designed specifically to ensure the political, economic, and social domination of the White population over other racial groups (Constas 1997). Most important for our analysis, almost all Black schools required substantial fees, even at the primary level, which was not true of schools for the other three racial groups (Moll 1996; Maharaj, Kaufman and Richter 2000). For this reason, income available to Black families was a crucial determinant of the ability of their children to attend school. At the end of *apartheid* about 50% of the poor (mostly Blacks and Coloreds) had no education or only incomplete primary education, only 7% had completed secondary or higher education, and the rural poor were worse off than their urban counterparts (Klasen 1997). The cost of education is often reported as the primary reason for not enrolling in school (Case and Deaton 1999).

While racial inequalities in school funding and in fees required were reduced after the end of *apartheid* in 1994, they were not completely eliminated (Ladd and Fiske 2004; Maharaj et al. 2000; Nkabinde 1997). This is partly because the education system has continued to be a fee-based system, which replaced racial inequalities to those based on class. Since most Blacks are socioeconomically disadvantaged, this reinforces the historical advantages of Whites; indeed,

a significant proportion of Blacks have not benefited from the policies of post-*apartheid* South Africa (Fiske and Ladd 2003). Inequalities in schooling continued to be substantial, even during the period studied here.

THE IMPACT OF MIGRATION REMITTANCES ON SCHOOLING: EVIDENCE FROM DEVELOPING COUNTRIES

While millions of households in developing countries receive remittances from migrant workers, until recently there has been little evidence as to whether the benefits of such transfers extend beyond increased levels of consumption. In particular, relatively little is known about the extent to which remittances lead to improved socioeconomic outcomes resulting from "productive" investments such as investments in human capital enhancement. Labor migration and remittances may have contradictory influences on children's educational progress (Booth 1995; Hanson and Woodruff 2003; Kandel 2003). Increased household income through remittances may ease family budget constraints, and thus allow parents both to purchase more schooling and to reduce their need for paid or unpaid child labor. On the other hand, the out-migration of wage earners may place greater demands on children to assist in supporting the household through both paid and unpaid labor, especially when migrants fail to remit enough earnings. Further, the disruption of family life and the loss of parental attention and discipline resulting from the absence of a parent may hinder children's performance in school. Given these possibilities, a crucial question arises: how exactly do migration and remittances affect children's education back home?

A number of studies have shown that remitted earnings from labor migrants positively affect various household outcomes, including children's schooling (Bryant 2005; Curran et al. 2004;

Jones 1995; Lu 2005; Morooka 2004; Taylor 1987) and also that remittances help reduce obligatory child labor (Kandel and Kao 2001). In contrast, other studies find no apparent impact of migration and remittances on schooling (Kandel 2003). Mboya and Nesengani (1999) suggest that parental absence due to work has a deleterious effect on children's school performance. By contrast, Battistella and Conaco (1998), Bryant (2005), and Kandel and Kao (2001) find a positive relationship between migration and children's grades, which implies that the social costs can be largely offset by an increased ability to purchase education-related goods. Finally, a few studies suggest that remittances help to close the gender gap by raising the educational opportunities of girls to a level closer to that of boys (Curran et al. 2004; Morooka 2004), although the empirical support for this claim is weak. Most of the studies just cited are based on small samples from specific communities or regions, and have been largely descriptive. Thus, both the robustness and the generalizability of the conclusions are open to doubt.

A few studies address the potential endogeneity of household migration and remittance behavior and schooling outcomes—in particular, the possibility that unobserved characteristics of households may affect both schooling and remittances and thereby bias the results. Cox and Ureta (2003) and Yang (2004) argue that, respectively in El Salvador and the Philippines, migration has not been driven primarily by economic reasons but is motivated by factors such as political reasons and exchange rate shocks during the Asian economic crisis. They thus treat remittances as close to randomly assigned monetary transfers, and find that the recipient households use remittances to make crucial investments for the future, leading to increased levels of schooling.

Hanson and Woodruff (2003) treat household migration behavior as endogenous and use as instruments the interaction between historical state migration patterns and household characteristics. They show that in Mexico children in migrant households complete significantly more years of schooling than those in nonmigrant households. In contrast, Borraz (2005) suggests a positive but small effect of remittances on schooling only for children living in small cities and with mothers with a very low level of education, using as instruments the historical migration rate and geographic distance from origin to destination.

RESEARCH QUESTIONS AND ANALYTIC STRATEGY

The central research question we ask is: How do labor migration and remittances affect Black children's education in South Africa? This is a crucial question given the long-standing significance of migration and the increasing importance of education as a way of achieving individual upward mobility and societal development under and after *apartheid*. However, it has not been adequately investigated in empirical studies. As discussed in the previous section, most existing studies are limited in the following ways: they often rely on small and non-representative samples; they usually use a single measure of migration or remittance status, and thus confound the impact of labor migration with that of remittances even though migration does not necessarily leads to remittances; they mainly study the effect of migration and remittances on a single human capital outcome without examining the mechanisms producing the relationship; and they often leave potential biases unaddressed or addressed in unconvincing ways.

The present study seeks to bridge these gaps using two nationally representative samples (one cross-sectional and one longitudinal). Specifically, we distinguish different migration and remittances conditions, examine various mechanisms by which migration and/or remittances affect educational outcomes, and conduct sensitivity tests that address potential biases to confirm the effects of migration in a robust way. Finally, we explore the implications of migration and remittances for intra-household and inter-household inequalities. We focus on labor migration to the exclusion of migration for other reasons, since labor migration accounts for the majority of out-migration in South Africa and is the principal way remittances are generated.

By What Mechanisms Do Migration and Remittances Affect Children's Schooling?

Using the cross-sectional data, we first examine the overall effect of migration and remittances, by comparing the enrollment status of children from families in different migration and remittance conditions. We create a three-category typology: households without labor migrants (NM hereafter), those with labor migrants but receiving no remittances (MNR), and those receiving remittances (MR). This measure has rarely been used in earlier studies but it is crucial because it takes into account situations where migrants do not remit income, which constitute about 20% of the Black migrant households in South Africa (Posel 2001).

In general, children in MR households are expected to be educationally advantaged relative to children in other households due to the increased household income available. Additionally, MNR and MR households tend to differ in a variety of ways and thus experience distinct socioeconomic conditions: while MR households receive additional income, which may compensate for the shortage of adult labor and the absence of one or both parents, MNR

households tend to suffer from corresponding disadvantages but without offsetting economic compensation. We thus expect to see significant advantages of children in MR households as opposed to all other households, and significant disadvantages of children in MNR households, possibly even compared to their counterparts in NM households.

We next disaggregate the overall effect into three hypothesized mechanisms by which migration and remittances may affect children's schooling. We first posit a positive effect of migration remittances on children's schooling through increasing educational spending. Increased household income through remittances enables parents to invest more in human capital acquisition by their children—that is, in their children's schooling. In MNR households, by contrast, educational spending is not likely to increase and may even decrease due to reduced household income resulting from labor out-migration that is not offset by remittances. Under such circumstances, household income is less likely to be invested in children's schooling. To evaluate these possibilities, we model household educational expenditure by household migration and remittance status.

The second mechanism by which migration and remittances may affect children's education is through its impact on the demand for child labor. The household may experience labor shortages due to the out-migration of one or more adult members, and children may be pressed to take up the slack. However, receipt of remittances may offset the loss of labor by providing additional income and by making it possible to purchase goods and services that otherwise would have to be provided by family members. This in turn should enhance children's schooling by increasing the likelihood of enrollment and permitting children to devote more time to their

studies. The association between child labor and schooling is well established and families' reliance on child labor is often blamed for low levels of educational participation in developing countries (Bequele and Myers 1995; UNICEF 1993). In MNR households, however, the opportunity costs of keeping children in school or permitting full time school attendance tend to be substantial due to the shortage of household labor without countervailing economic compensation. It is probable that in such households, children are particularly unlikely to be exempt from work. This, in turn, exerts a negative impact on their schooling. This hypothesis is examined by modeling child labor participation as a function of household migration/remittance status. We expect that the effect depends on whether households receive remittances that offset the detrimental impact of the loss of adult labor.

The third mechanism is through the social costs of parental absence due to migration. Reduced levels of parental attention and discipline due to the out-migration of parents may have a detrimental effect on children's education, in particular on school performance and other related education outcomes such as enrollment. The negative association between parental absence and children's outcomes has been well documented in the developed as well as the developing world (Buchmann and Hannum 2001; Haveman and Wolfe 1995), although there is little evidence regarding the specific effect of parental absence due to labor migration. The central question is whether the negative impact of parental absence can be offset by receipt of remittances, which can lead to increases in spending on education-related goods as well as a reduction in the work time of the other parent or other adults in the household so that more time and attention can be devoted to the child. To test this mechanism, we model children's

enrollment status on parental migration/remittance status. We expect that children in MR household are protected from the deleterious effects of parental absence, whereas their counterparts in MNR households are not.

What Are the Consequences of Remittances for Intra- and Inter-household Inequalities?

Our final analysis concerns the consequences of remittances for both intra- and inter-household inequalities among Blacks. First, we expect the gender gap in school enrollment to be smaller in households with remittances than in other households. Among South African Blacks, as among other impoverished populations, the opportunity costs of schooling are larger for males than for females because the value of male labor is greater. Thus, we expect boys to be less likely to remain in school than girls. Among households with remittances, however, we expect this effect to become less important since such households can afford to keep their sons as well as their daughters in school (Curran et al. 2004; Morooka 2004).

Remittances may also reduce inter-household inequalities in children's school enrollment. Specifically, as also suggested by Duflo in her study of child health (2000), we expect the effect of remittances to be greatest in low income households. In high income households, most children are already in school, even among Blacks (Nkabinde 1997); but for economically marginal families remittances can tip the balance as to whether the family can afford to keep a child in school. The result is that non-remittance family income should have a smaller effect on school enrollment in families with remittances than in families lacking remittances. We expect a similar result for residential status. Urban children are more likely to attend school than are rural children (Maharaj et al. 2000). But remittances may make school enrollment possible for rural

children who otherwise would have no means of paying school fees, especially since many rural South African Blacks eke out a living through subsistence agriculture and are only marginally engaged in the money economy. Thus we expect the effect of remittances to be to reduce the urban-rural gap in school enrollment.

To evaluate whether within- and between-household inequalities in school enrollment are reduced in remittance households, we model children's enrollment as a function of child-level and household-level predictors, separately for remittance and non-remittance households.[1]

DATA, VARIABLES AND METHODS

The Cross-Sectional Data (PSLSD)

The cross-sectional data are from the 1993-94 Project for Statistics on Living Standards and Development (PSLSD), also referred to as the Integrated Household Survey. This is a nationally representative sample that covered approximately 9,000 households.[2] It was sponsored by the World Bank as one of the Bank's cross-national Living Standards Measurement Study (LSMS) survey projects. The survey was based on a two-stage sampling design, and included detailed information on individuals' demographic and socioeconomic characteristics, migration status, and also household income and expenditures. The survey contains information on the highest level of education for all household members and current enrollment status of each household

[1] We combine NM and MNR households for parsimony since the focus is on the implications of remittances. As we will see later, NM and MNR households are relatively similar to each other while both differ substantially from recipient households.

[2] Coverage included the nominally independent TVBC states that were reintegrated into South Africa proper after the end of *apartheid* in 1994.

member age 6-24. The survey includes information that can be used to derive the migration status of each household member. Specifically, it includes an indicator of whether each household member has been absent any time during the previous 12 months, where household members include all those living in the household at least 15 days in the past year. Although in the early 1990s most labor migrants returned home at least once a year, some stayed away longer (Posel 2001). These individuals will be missed by the survey. For those who were or had been away, the reason for the absence was recorded, which enables us to distinguish labor migrants from other kinds of migrants. The data also include a module on remittances: whether the household had received remittances either in money or in-kind from other household members, and the amount of remittances received in the previous 12 months.

Although the PSLSD collected comprehensive information on labor migration and remittances, the data are less than optimal for our purposes. Because the sender of remittances is not identifiable, it is impossible to determine which labor migrant remitted what income to which household member. The characteristics and conditions of the remitter at destination are also unknown. Additionally, no information on how remittances were spent is available, thereby precluding direct analysis of whether remittances were spent on children's education. However, this limitation is not of great consequence for our purposes since even if remittances are not directly spent on education they help reduce household resource constraints and thus make more resources available for allocation to education.

The Panel Data (LFS)

To conduct sensitivity tests via fixed-effect (FE) and random-effect (RE) models (described

below), a second data set is used. The data are from the South Africa Labor Force Survey (LFS), a semi-annual rotating national probability panel survey initiated in February 2000 that focuses on a variety of issues related to labor market behavior (Statistics South Africa 2004). The survey encompasses about 100,000 individuals residing in about 30,000 households. Since 20% of the sample is replaced each round, about 60,000 individuals residing in about 18,000 households is available for comparisons one year (two rounds) apart. The LFS is not as comprehensive as the PSLSD. Thus we are restricted to analyzing the overall effect of migration and remittances on children's enrollment but cannot separately consider the three mechanisms described above. The data set contains information on the highest educational level and school enrollment status of each household member. Starting from the September 2002 wave, a section collecting data on migrant workers is available. Migrants are defined as persons separated from the household for more than five days a week on average over the past four weeks. Remittances, both in money and in goods, sent back to the household over the previous 12 months are also recorded. However, labor migrants cannot be linked to individuals in the household roster. Hence, the relationship of migrants to children, and to other members of the households, is not identifiable. We use the September 2002 and September 2003 waves to estimate repeated-measure FE and RE models, as a way of detecting and purging unobserved heterogeneity. The details are described below.

Variables and Methods Using the PSLSD

Variables.

Using the PSLSD, we first study the overall effect of migration and remittances on children's

schooling. We restrict the sample to children age 7-18 and treat the individual child as the unit of analysis. Although the typical school starting age in South Africa is six, it is not uncommon for Black children to delay their school beginning to age seven (Anderson 2000). We limit our analysis to primary and secondary school enrollment because tertiary education tends to depend less on family resources and more on external support (Nkabinde 1997). We consider both primary and secondary school enrollment because for Blacks even primary school enrollment is problematic (Ladd and Fiske 2004).

The outcome variable is children's current enrollment status, coded 1 if the child is currently enrolled or, if not currently enrolled, has completed secondary education or more, and coded 0 otherwise. We include as covariates socio-demographic variables such as age and gender because they are known to be related to schooling in South Africa as in other parts of the world (Anderson 2000; Buchmann and Hannum 2001.). Age is coded as a continuous variable ranging from 7 to 18; gender is coded as a binary variable (male = 1; female = 0). Because parental presence is an indicator both of family material resources and of the attention parents can devote to each child, both of which affect schooling, we distinguish between families where both parents are present, only the mother is present, only the father is present, and neither parent is present, using information from the household roster. In addition, we examine the effect of the number of school-age children (age 6-22) in the household, since this may reflect the level of competition for educational resources among children in the household (Lu 2005).

We incorporate the following household attributes. The key predictor is household

migration/remittance status.[3] We create a three-category variable combining information on whether a household reported any household member absent for economic-related reasons (which in theory could be both internal and international migrants, but in the case of Blacks are almost entirely internal migrants [McDonald 2000]) and whether the household received any remittances during the last year. Specifically, we differentiate NM, MNR, and MR households, as described earlier in this paper. In-kind as well as monetary remittances are considered because although in-kind transfers generally cannot be used to pay school fees, they help to relieve economic pressure and thus to free monetary resources for schooling. In both this data set and the panel data set, more than 90% of the households that received in-kind remittances also received monetary remittances. We conducted sensitivity analysis treating only money transfers as remittances, and the results were highly consistent with those we report here. The use of this trichotomous measure is crucial in that it distinguishes between migrant households with and without remittances, which may experience drastically different economic circumstances with different implications for children's education.

A rural-urban distinction is made because, for Blacks, living in a rural area of South Africa almost guarantees limited educational opportunities and resources. We include the highest level

[3] Temporal ambiguity, which arises when migration/remittance status and enrollment are measured at the same point in time, is not a major problem in our cross-sectional analysis and even less so in our panel analysis. This is because children's enrollment is measured subsequent to migration: the migration and remittances questions refer to the household's experience in the past year, whereas school enrollment refers to the time of the interview. Given that increased income associated with remittances is likely to have a relatively immediate impact on primary and secondary school enrollment (although not on attainment), we think the period between the migration measure and the schooling measure is sufficiently long to permit us to observe effects of remittances if there are any. Indeed, a longer lag would be more problematic.

of education attained by any household member 25 and older. This variable is included since parental education is known to strongly affect the educational attainment of offspring (Shavit and Blossfeld 1993; Treiman and Yip 1989); better educated parents are more committed to education, tend to encourage their children to perform well in school, and provide the kind of home atmosphere that is conducive to educational success. However, since parental education is not available when parents are absent, we take the education of the most educated adult in the household as a proxy for parental education. The restriction to those 25 and older avoids the complication of autocorrelation that arises when the focal child's education is the highest in the household and is thus included on both sides of the equation. We collapse this variable into four categories: no schooling, primary schooling, some secondary schooling, and completed secondary schooling or more.[4]

In addition, we include household income, which is a strong determinant of educational spending and thus of school enrollment. This variable is created using information on total annual household income (excluding remittances). We take the natural log of this covariate to reduce the potential influence of outliers. Finally, we include a dichotomous variable indicating whether the household is female-headed, since earlier studies show that, net of other factors, female headship leads to positive child outcomes because women are more likely then men to spend money on children (Buchmann 2000).

[4] The advantage of this measure is that it permits the effect of education to be nonlinear. However, we also explored a years-of-schooling measure, which produced similar results.

Methods.

The total number of Black children age 7 to 18 in our sample is 10,132. We drop 91 cases with missing responses on enrollment status, and 182 cases with missing values on one or more covariates (mostly household income). This results in a sample of 9,859 cases. We first estimate models predicting the gross effect of migration and remittances on school enrollment. In the current analysis and most of what follows (except for analysis of the determinants of household educational expenditures), we use the child as the unit of analysis. A possible alternative would be to use the household as the unit of analysis and study the proportion of school-age children enrolled in school. Doing so, however, would not permit examining the effects of child-specific characteristics such as gender, age, and parental presence; nor would it allow us to study one of the pathways—the impact of parental migration and remittance status. We thus prefer to treat the child as the unit of analysis. However, we also carried out sensitivity analyses using the household as the unit of analysis; results are very similar to those we report using the child as the unit of analysis, especially with respect to the effect of migration and remittances.

Because child-level observations are likely to be clustered at the household level (the 10,132 children reside in 4,119 households), we adopt a multi-level framework, which also helps adjust for the overrepresentation of children from large families.[5] A household random-intercept logit model can be formulated at the child level as:

[5] The observations may be also clustered at the community level. However, from exploratory analysis we concluded that such clustering is less influential than clustering at the household level. For parsimony, we correct standard errors for clustering of children only at the household level using random-intercept logit models. Sensitivity analysis shows that results are consistent when we also adjust for clustering at the community level.

$$Logit(Enroll_{ij}) = \beta_{0j} + \beta_1 X_{ij} \quad (1)$$

where the left-hand side is the logit of enrollment in primary and secondary school for the i th child in the j th household; X_{ij} is a vector of child-level covariates such as age, gender and parental presence; β_{0j} is a random-intercept for household j determined by household-level covariates Z_j (such as migration and remittances status, household income, and highest level of education, etc.); β_1 is a vector of coefficients associated with child-level convariates X_{ij}; γ_{00} is the constant; and δ_{0j} is the unique effect of household j on the intercept, conditional on Z_j. Therefore, at the household-level:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} Z_j + \delta_{0j} \quad (2)$$

Using the multilevel framework just described, we then analyze the three specific mechanisms connecting migration and remittances to enrollment in school. We first consider household educational expenditures. Because our data do not distinguish expenditures for each child, we conduct this analysis at the household-level and utilize linear random-intercept modeling that adjusts for clustering at the community-level. We restrict the analytic sample to households with children age 7-18. The outcome variable is the total amount spent by the household on education in the previous year, which we measure by summing 14 education spending items—school fees, books, etc. We take the natural log of the sum and treat this variable as continuous. We include a similar set of household-level predictors as in the model for the overall effect. The total number of eligible households is 4,119. We drop 16 households with missing responses on the covariates, resulting in a sample of 4,103 Black households.

To study the effect of migration/remittances on child labor, we again treat the child as the

unit of analysis, using random-intercept logit modeling at the household level. The data on child labor are limited because the survey collected work-related information only for children age 16 and older. We thus use a different age restriction, children age 16 to 22 living at home, to preserve enough cases for analysis. This is, of course, suboptimal, but it is the only way we can analyze this particular intermediate mechanism. The outcome variable is a binary indicator of whether the child currently participates in any paid or unpaid labor. It is coded 1 if the child has a regular job, or did any casual, temporary, or other kind of work in the past month; and is coded 0 otherwise. The percentage of Black children engaged in paid labor is particularly low, which may reflect high levels of Black unemployment in South Africa (Central Statistical Services 1997). The final sample is 4,897, after dropping 80 cases with missing responses on the predictors.

The third mechanism we consider is the role of remittances in offsetting the deleterious effect of parental absence. We do this by replacing the household migration/remittance variable with variables indicating parental migration/remittance status, which allows us to contrast the likelihood of school enrollment for households with and without remittances under two conditions—when one or both parents had gone out for work and when neither parent had gone out. We create the necessary variables by combining information on the migration and remittance status of each individual with the individual's relationship to the focal child derived from the household roster.[6] We distinguish 1) NM households; 2) MR households in which both parents

[6] In some situations where it is difficult to identify children's parents in the household roster, we use non-coresidence with the mother and father (which is directly available in the data) as a proxy for out-migration of parents. This strategy has been shown to be fairly accurate in South Africa (Maluccio, Thomas and Haddad 2003).

are present; 3) MR households in which at least one parent migrated; 4) MNR households in which both parents are present; and 5) MNR households in which at least one parent migrated. The random-intercept logit model is estimated on a sample of 9,859 Black children.

Finally, we evaluate the implications of the effect of migration and remittances on within- and between-household educational inequalities using the PSLSD. This is accomplished by predicting children's school enrollment from a series of individual- and household-level predictors, stratified by dichotomous household remittances status (NM and MNR households combined). We restrict the sample to children age 7-18, and study school enrollment without further differentiating the intervening mechanisms. Here again household random-intercept logit models are utilized.

Variables and Methods Using the LFS

Variables.

We next conduct sensitivity tests using the September 2002 and September 2003 panels of the LFS. The outcome variable is school enrollment, defined the same way as in PSLSD. The migration and remittances status variable is also created in the same way as in the PSLSD, by combining information on whether the household sent out labor migrants and received remittances (in money or in goods). Other predictors include gender, age, place of residence, logged annual household income (excluding remittances), highest level of education for adults 25 and older, the number of school-aged children in the household (age 6-22), and the gender of the household head. These covariates are defined in such a way as to be comparable to those used in the PSLSD analysis. Because the survey did not record relationship codes among

household members, we do not include variables indicating parental presence.

Methods: FE and RE models.

The cross-sectional results may be biased by unobserved aspects of the household that affect migration and the availability of remittances as well as children's schooling. For example, households with high levels of human capital generally have more educated members, who might also be more likely to migrate and to earn more, thus remitting more income back home. At the same time, highly-educated households would also be more likely to enroll their children in school, for the reasons discussed above. If we do not observe all aspects of household human capital, remittances would appear to be positively related to the likelihood of being enrolled in school. Yet, this does not necessarily mean that remittances cause enrollment; rather, both are caused by an underlying third factor, the household educational environment. Also, any sort of socioeconomic shock external or internal to the household, such as an economic crisis, crop failure, layoff, or natural disaster, may be an impetus for migration and subsequent remittances, and may also have a negative impact on children's schooling. In this case, we are likely to observe a negative yet biased effect of migration and remittances on enrollment.

To address potential unobserved heterogeneity, we use two waves of the LFS to estimate repeated-measure fixed-effect (FE hereafter) models, which absorb the influence of endogenous individual, household, and community characteristics that are fixed over time.[7] FE models can

[7] FE models rely on the assumption that the endogenous household attributes are constant over time, which may not be correct; thus FE models cannot resolve all aspects of bias. We also sought to use an instrumental variable (IV) approach, which does not rely on such an assumption. This method, however, cannot be applied in the analysis since the necessary instruments, such as job regularity that predicts remittances status but is not directly related to children's schooling,

also relatively easily incorporate unobserved heterogeneity with respect to both household migration and remittance status. The essence of the FE method is to use each individual as his or her own control, which is accomplished by making comparisons within individuals (hence the need for at least two measurements), and then averaging the over-time differences observed for each individual across all individuals in the sample. The FE model can be formulated as below:

$$\log(\frac{p_{it}}{1-p_{it}}) = \mu_t + \beta X_{it} + \gamma Z_i + \alpha_i \quad (3)$$

Where p_{it} is the probability that the child is currently enrolled; X_{it} is a column vector of variables that vary both across individuals and over time, including migration and remittance status; Z_i is a column vector of individual characteristics that are constant over time, such as gender; μ_t is an intercept that is allowed to vary with time; β and γ are row vectors of coefficients; and α_i represents unobserved differences between individuals that are constant over time and not accounted for by Z_i—these are regarded as fixed parameters, one per person. This approach drops individuals who do not vary over time in the outcome (here enrollment), which leaves us with individuals whose outcomes change from 0 to 1 and from 1 to 0. The basic idea is to cancel out the individual-specific parameter α_i, which will also drop other constant characteristics Z_i, by differencing Eq. 3 across waves, and using maximum likelihood to estimate a logistic regression with difference scores as the predictors:

$$\log(\frac{\Pr(y_{i1}=0, y_{i2}=1)}{\Pr(y_{i1}=1, y_{i2}=0)}) = \log(\frac{p_{i2}}{1-p_{i2}}) - \log(\frac{p_{i1}}{1-p_{i1}}) = (\mu_2 - \mu_1) + \beta(X_{i2} - X_{i1}) \quad (4)$$

We also estimate corresponding repeated-measure random-effect (RE) models (which are

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are not available in the data. See the additional discussion below.

equivalent to the household random-intercept models described above, with clustering of households replaced by clustering of individual observations). The RE approach assumes that there is no bias due to endogeneity. By comparing results from FE and RE models we can form conclusions as to the likelihood that unobserved heterogeneity affects the RE estimates: if results for corresponding models are consistent, unobserved heterogeneity is quite unlikely to account for the observed effect; but if the results for corresponding models differ substantially, it is probable that unobserved heterogeneity is biasing our RE results.

However, since only within-individual variance contributes to FE models, individuals that do not vary in observed outcomes over time are deleted from the analysis. To compare results from FE and RE models is most appropriate when they are based on exactly the same cases. We thus estimate an additional set of RE models restricted to the same observations as are retained in the FE model and compare corresponding coefficients based on the Hausman specification test (Hausman 1978). If results are consistent across the FE and RE models, we can then study the RE models, which are more efficient. We also replicate the RE analysis in the full sample to study whether the observed migration effect in the restricted sample can be generalized to the full sample.

FE models are used to purge unmeasured heterogeneity. However, we cannot rule out the possibility that in some cases the same factors jointly determine migration and remittances, on the one hand, and children's education on the other. In other words, migration and remittances may reflect endogenous family strategies: household members may choose to migrate and remit income in order to allow children to go to school, which leads to a feedback effect of education

on migration and remittance behavior. An instrumental variable (IV) approach would help handle this aspect of endogeneity. However, as mentioned earlier, suitable instruments proved impossible to find in our data. An additional reason for eschewing an IV analysis is that the endogenous variable is nominal, which would require separate instruments for migration and remittance status and complicated and as yet poorly developed algorithms to estimate IV models with nominal endogenous variables.

Methods: modeling missing data.

Because more than 30% of the LFS data are missing information on household income, simply omitting cases with missing data is likely to lead to substantial bias. Hence, we employ multiple imputation to fill in the missing income data and to combine estimates from each imputed data set (Little and Rubin 2002; Royston 2004, 2005a, 2005b). We do not impute values missing on other covariates such as gender, age, and female headship because they all together account for less than 1% of the total cases. These cases are simply dropped from the analysis. To carry out the multiple imputation procedure, we first estimated regression equations predicting income,[8]

[8] Although our analytic sample is a sample of children, we carry out the imputation of income using the full sample of individuals in the data set to obtain more accurate estimates. Also, because the observations are not independent but are clustered within individuals over time, we estimate separate imputation models for each wave. This procedure avoids the complication of dealing with correlation within individuals over time, which thus far has not been addressed by the developers of multiple imputation methods. Our approach has the additional advantage of allowing different imputation equations for each wave and thus reflects any between-wave variation in the determinants of income or of missingness on income. However, we also experimented with an approach that builds in dependence among the observations over time, allowing variables in the first wave to be used as predictors for income in the second wave. Doing this is somewhat problematic because income measured at the first wave also has many missing values. As it happens, both methods yield very similar results with respect to the substantive model.

and then we drew repeatedly from the predicted distribution of the missing values to obtain five complete imputed data sets. Next, FE and RE models were estimated using each imputed data set. The coefficients were averaged over the five completed (imputed) data sets, and the standard errors were estimated using Eq. (5), which gives the formula for the standard error of a coefficient, *b*, based on *M* imputations:

$$SE(b) = \sqrt{\sum \frac{SE^2(b_m)}{M} + (\frac{M+1}{M})\sum \frac{(b_m - \bar{b})^2}{M-1}} \quad (5)$$

That is, the standard error is estimated as the average of the standard errors based on each imputation (the left hand term), which captures the uncertainty in the estimate within each imputation, plus a component for the variation in the estimated coefficients across imputations, which captures the uncertainty introduced by the imputation procedure. This approach yields unbiased estimates of variables in the FE and RE model, under the assumption that the data are missing at random (MAR). In the present case, the assumption is that, net of the predictors in the imputation model, missingness on income is uncorrelated with the actual level of income. The predictors contain all variables later included in the FE and RE models, plus variables we conjecture are related either to the missingness of income or to the level of income or both. The additional variables include race, the main source of income in the household, and the number of employed adults in the household. Although there is no formal test for MAR and the assumption may not perfectly hold, we have confidence in the accuracy of our estimates in the FE and RE models both because we think we have done a good job in imputing income and because multiple imputation estimates have been shown to be robust to errors in the assumed missingness

mechanism (Graham et al. 1997).

The FE and RE models to study primary and secondary school enrollment are limited to Black children who were age 7-18 in September 2002 (the date of our first wave) and were interviewed in both waves; our analytic sample has 12,043 cases. As before, we code "enrollment" as 1 if the individual either was in school or had completed secondary schooling; and 0 otherwise. (We also carried out similar analysis restricting the sample to children age 7-17 in 2002 and thus 8-18 in 2003 to avoid confusing dropout at the secondary-level with completion of secondary school. This gives qualitatively the same results, with very little quantitative change.) We first estimate and contrast (using the Hausman specification test) corresponding FE and RE models using the 2,408 cases available for the FE model—that is, omitting 9,635 children whose enrollment status was invariant across the two waves. To compare the same method across subsamples, we estimate a corresponding RE model using the full sample. We also compare the results from the RE and FE models with those from the corresponding model for the cross-sectional data.

RESULTS

Descriptive Statistics Using the PSLSD

Table 1 presents statistics on migration and remittances by race and place in South Africa. About 30% of all households sent out labor migrants and, of these, about 80% received remittances in the year previous to the interview. Black households have by far the highest propensity to send out labor migrants; more than 35% of Black households have had someone go out for work in

the past year, compared to fewer than 20% of households for each of the other racial groups. Black households with labor migrants are also much more likely to receive remittances: 85% of Black households, 76% of Coloured households, 60% of Indian households, and 34% of White households. Among Blacks, rural households are far more likely than urban households to have migrants and to receive remittances. These findings are consistent with previous studies showing higher rates of migration and remittances for Blacks than for other groups and, among Blacks, high rates for rural households (Carter and May 1999). Overall, 87% of all labor migrant households and 90% of all households receiving remittances are Black. For this reason, and because labor migration and remittances clearly represent a survival strategy for Blacks but reflect a more diverse mix of motivations for others, we restrict the remaining analysis to Blacks.

Table 2 shows variations in child and household characteristics by migration/remittance status. Interestingly, the zero-order differences in enrollment rates are not very large, with children in MNR households only somewhat less likely to enroll than children in NM and MR households. As we will see, the small zero-order differences are misleading and result from differences between the three groups with respect to the various determinants of school enrollment. Also, contrary to our expectations, children in NM households are more likely to work than the children of migrants although, as expected, children in MNR households are more likely to work than children in MR households. But the likelihood of child labor is strikingly low for all three groups—by contrast, 32% of Whites report participating in paid or unpaid labor. This may result from the very high unemployment rate in the Black population (Treiman 2005). Children in migrant households (MNR and MR) are less likely to live with both parents, and

such households are more likely to be female-headed and to have more school-age children, although again the differences are relatively small. There are, however, striking differences in non-remittance income, with the mean for MR households less than half that of NM households, and MNR households falling in between. This pattern is consistent with the claim that economically-deprived households tend to use migration as a survival strategy. Consistent with this, educational spending is lowest in remittance households and highest in NM households. To a large degree these patterns reflect the fact that most migrants are from rural areas. Whereas 55% of Black NM households are rural, this is true of 86% of NMR and 80% of MR households. Thus, when we study the effects of migration and remittances our results will be driven largely by the circumstances of rural economically deprived households sending members to seek jobs in urban areas or White farms.

We can see this clearly from a multinomial logistic regression predicting household migration/remittance status for Blacks, shown in Table 3. Net of other factors, rural residence strongly increases the likelihood that a household will send out migrants, and even more that the migrants will fail to return remittances. The higher the level of education in the household, the greater the likelihood of sending out migrants and especially of sending out migrants who return remittances; presumably this reflects some combination of increased knowledge about alternative possibilities and judgments about the potential earning power of out-migrants. By contrast, household income has a negative effect on the likelihood of migration. Poorer households have greater incentives to send out migrants and are especially likely to be recipients of remittances, presumably due to their critical need for external resources. Other important determinants

include the dependency ratio (the ratio of the number of household members under age 15 or age 65 or older to the total number of household members, including out-migrants) and the involvement of household members in agricultural production. In sum, MNR and MR households are especially likely to be rural and engaged in (subsistence) agriculture, with low income, but with at least some educated members, and to have many children and/or old people.

The Gross Effect of Migration and Remittances on Children's Enrollment

The first column in Table 4 presents a random-intercept logit model of school enrollment for Blacks. Consider first our central hypothesis—that, net of other factors, the likelihood of school enrollment depends on migration/remittance status. This hypothesis is strongly supported. Net of other factors, the odds of school enrollment for children in MR households are about 30% higher than for children in NM households (precisely, $1.29=e^{.254}$) while the odds of school enrollment for children in MNR households are about 40% lower than for children in NM households (precisely, $.59=e^{-.528}$). Thus, net of other determinants of enrollment, households where labor migrants send remittances back to their families are substantially more likely to keep their children in school compared to household without labor migrants and, most especially, to households with labor migrants but no remittances.

Now consider the other factors affecting enrollment. Somewhat surprisingly, there is no difference in the likelihood of school attendance by age, net of other factors. Also, there is only a marginally significant effect of gender (boys being less likely to be enrolled), which is consistent with several studies showing that, among Blacks, there is little gender difference in schooling, especially at the elementary and secondary level (Case and Deaton 1999; Klasen 1997). Parental

presence turns out to be a crucial determinant of enrollment, presumably because family structure often shapes the availability of educational resources (including parental time and attention, which are not captured by other variables in the model). Children are most likely to attend school when both parents are present, and least likely to do so when neither parent is present; but what really matters is the presence of both parents since children in such households are much more likely to be enrolled than children with either one or both parents absent. As expected, household income, the educational level of adults in the household, and urban residence are all positively associated with the likelihood of enrollment. The number of school-age children does not exert any impact, presumably due to the mediating effect of Black extended family arrangements that partly alleviate the negative effect of resource competition (Lu 2005). Net of other factors, living in a female-headed family enhances children's schooling, which is consistent with previous studies showing a positive effect of female-headship on child well-being in developing countries (Buchmann 2000).

Three Mechanisms Creating the Migration-Remittance Effect

Models that test the three mechanisms by which migration and remittances affect school enrollment are presented in the last three columns in Table 4. The effect of migration and remittances on household educational expenditures is shown in the second column. Remittances clearly matter: net of other factors, MR households spend significantly more on their children's education than do other households. By contrast, MNR households appear to allocate fewer resources to educational expenses than do NM households, although the difference is not significant. Note that although MR education expenditures are actually lower than for

either of the other two groups (Table 2), their household incomes are far lower, so the correct inference is that they spend a significantly higher fraction of household income on educational expenditures than do other households. Other factors operate as expected. Urban residence, household education and income, and number of school-age children are all positively related to household educational spending.

In the third column, we study how migration and remittances affect enrollment through their impact on child labor participation. Again it is remittances that matter. Net of other factors, the odds of child labor are far lower in MR households than in other households, which suggests that remittances offset the increased need for child labor resulting from the absence of adult household members.[9] Interestingly, there is essentially no difference in the likelihood of child employment in NM and MNR households.[10] Other factors behave as expected: older children, boys, and children not living with both parents are more likely to work. In households with high educational levels, children are likely to be exempt from work. Higher household income, however, predicts an increased probability of child labor. This, however, might be due to the feedback effect of child labor on household income, which we are unable to measure. Despite this possibility, we include the income variable because it serves as an important control.

[9] We also carried out sensitivity analysis, replacing the discrete migration status variable with a continuous measure indicating the amount of remittances to study its overall effect on enrollment and its effect through the first two pathways (educational spending and child labor). The amount of remittances is positively related to children's enrollment and household educational spending, and negatively associated with child labor. Thus, the substantive conclusion is the same whether remittances is represented by a dichotomous or continuous variable. However, we prefer the dichotomous measure because we suspect that remittances are not very accurately reported and to avoid having to deal with the left-censorship of remittances at zero.

[10] We conducted another sensitivity analysis using a continuous measure of child labor, hours worked per week, which tells essentially the same story and thus is not further described.

Female-headship also tends to free children from work, which again is consistent with previous studies that document the advantages to children of living in female-headed families. Having more children in the household turns out to decrease the likelihood of any given child working, presumably because children can substitute labor for each other at various points in the school career of each child.

Finally, we consider the possibility that remittances offset the deleterious effect of parental migration on children's enrollment (Table 4, column 4). We conclude that they do. In households in which one or both parents was a labor migrant, children were about twice as likely to be enrolled in remittance than in non-remittance households (precisely, $2.15 = e^{(.054-(-.712))}$). Note, however, that we observe a similar effect of remittances for households in which neither parent was a migrant; for such households, as well, remittances essentially double the odds of enrollment (precisely, $2.22 = e^{(.427-(-.372))}$). Thus, the most reasonable conclusion is that both parental presence and remittances enhance the likelihood of school enrollment, but that remittances are more important (because within remittance categories, the odds of enrollment for those with parents present are, respectively, 1.40 and 1.45 those with parents absent). Finally, we note that when parents are present, remittances increase the likelihood of enrollment relative to children in non-migrant households and when parents are absent remittances offset the disadvantage of parental absence relative to non-migrant households.

In sum, remittances positively contribute to Black children's schooling, through increasing educational expenditure, reducing child labor, and offsetting the negative effect of parental absence due to labor migration. Although previous studies show that a large proportion of

remittances is spent on consumption, our findings suggest that Black households do allocate more resources for children's schooling when they receive remittances, either by spending remittances directly on education or by making more educational resources available due to the enhanced total household revenues. MNR households are significantly worse-off than MR households—with reduced educational spending, increased child labor, and a lack of compensation for the detrimental effect of parental absence. All of these lead to an overall negative effect on children's enrollment. However, MNR households are similar to NM households with respect to educational expenditures and child labor. Thus, the overall negative effect of MNR households on enrollments is largely attributable to the detrimental effect of parental absence without income compensation.

Descriptive Statistics Using the LFS

Table 5 presents descriptive statistics regarding household migrant and remittances status from the LFS. Results are shown only for the 2002 wave since very similar patterns are observed in the 2003 wave. Race and place differences in 2002 are quite similar to those we observed in Table 1 for 1993. However, the proportion of households with migrants, and especially households receiving remittances, is substantially smaller in the 2002 data than in the 1993 data.

At least for Blacks, these differences may reflect true changes in migration patterns as a result of the abolition of residential restrictions for Blacks at the end of *apartheid*, which made it possible for Blacks to move as families and to live permanently in urban destinations. Hence, although Black circular migration remains substantial, the permanent resettlement of people has increased (Posel and Casale 2003), and such migration flows are not captured in the LFS. In

addition, the proportion of Black migrant households receiving remittances declined from 84% to 71%, which may reflect a great propensity of those who migrate for work to take at least some family members with them. Finally, since remaining in urban areas has become possible, migrants may be more prone than previously develop new and permanent ties in their destination places, which increasingly crowds out remittances to households of origin even when such households continue to exist.

These conjectures are extremely difficult to examine in a direct way, given the lack of comprehensive national data on internal migration in recent years.[11] As suggested by Posel (2003), over the years the quality and quantity of information on migration has declined in official South African household surveys. Between 1993 and 2002, national household surveys became more restrictive with respect to the definition of the household, and less sensitive to residential histories and the links between absent migrants and households of origin. Evidence consistent with the possibility of a methods effect rather than a true change is that migration rates not only for Blacks but for other racial groups are lower in Table 5 than in Table 1, even though there is no basis in South African history for expecting such a change. However, evidence of a true change in Black migration patterns can be found in the observation that in Table 1, 36% of the Black sample is urban whereas this percentage has increased to 50% by 2002, while at the same time the percentage urban among Whites dropped from 92% to 87%. Since both samples are representative national probability samples covering the same population ("greater" or

[11] We explored the 1999 survey, *Internal Migration in South Africa* (University of Pretoria 1999), a national probability sample of about 10,000 South African Blacks, but decided that issues of data comparability made that survey unsuitable for comparisons with our data.

post-*apartheid* South Africa), we conclude that at least the 1993-2003 changes in migration and remittance status for Blacks are consistent with differences in the data sets.

Table 6 presents descriptive statistics from the 2002 LFS for a selected set of variables (the 2003 LFS coefficients are very similar and therefore are not shown). The patterns are similar to those in Table 2 based on the PSLSD, although distinctions among the three categories are much more muted. There is little difference across household types in the likelihood of school enrollment. But MR households tend to have lower incomes, lower education, to be more likely to be rural, and to have more school age children and a far greater probability of being female-headed than other households. Note that the level of educational attainment is much higher than in the PSLSD. This improvement reflects the effect of the investment of the post-*apartheid* South African government in increasing the level of Black educational attainment (Nkabinde 1997) and is very large considering that schooling is generally restricted to the young. Migration has continued to be a largely rural phenomenon (with 79% of NMR households and 78% of MR households rural, down only slightly from 1993-94 (86% and 80%, respectively).

The Robustness of the Migration and Remittances Effect

To check for potential unobserved heterogeneity, we use the panel LFS data and compare corresponding FE and RE models, as shown in the first two columns in Table 7. These two models give very similar results. The effect of migration/remittance status is highly consistent across RE and FE models: children in MR household are most likely to be enrolled in school, whereas children in MNR households are not distinguishable from those from NM households. We use a Hausman specification test to examine the effect of migration and remittances across

these two models. The test contrasts the differences in estimates between FE and RE models based on the χ^2 distribution. The Hausman test yields a χ^2 of 0.87 with a p-value of 0.65, which can be taken as strong evidence that the effect of migration and remittances across the two model is consistent. Hence, the effect of migration and remittances is unlikely to be contaminated by unobserved heterogeneity[12]. The same conclusion can be drawn by comparing the effect of migration/remittance status in the models: since the effects are not smaller in the FE model than in the RE mode—in fact, they are larger—we conclude that there is no evidence of unobserved heterogeneity with respect to the effect of migration. It thus is appropriate to study a full sample RE model.

The full-sample RE model is shown in the third column. The effect of migration/remittance status remains highly similar to the effects for the FE model, with a Hausman test of 1.53 ($p<0.47$). However, there are differences in the effects of other predictors. Place of residence, household educational level, and household income all have expected effects on children's enrollment, which (with the exception of a small income effect) are not evident using the restricted-sample. Because differences between the full and restricted sample RE models are due to children whose enrollment status is stable over time, the significant impact of household socioeconomic status observed in the full sample RE model is largely driven by this group of children. This result demonstrates the critical role of socioeconomic conditions on school

[12] Because the power of the FE model relies on sufficient variation in independent variables, we also examine the variability in the predictors across two waves. Results show that there is generally adequate variation in the predictors. For example, about 25% of the cases experienced changes in household migration/remittance status.

enrollment. By contrast, for children who experienced changes in school enrollment, only the receipt of remittances has a robust positive effect. This indicates that changes in schooling status largely result from changes in remittance status: when households start to receive remittances, children are more likely to enroll in school; when households are no longer recipients, the risk of dropping out of school becomes high. Overall, although the effects of other predictors appear to vary across samples, the impact of migration and remittances remains highly consistent across the three models.

We finally contrast the full sample RE model based on the LFS with the overall effect model based on the PSLSD in Table 4 to assess the effect of migration/remittance status over time. The effects of household socioeconomic status are more or less the same. However, a few discrepancies emerge. First, males start to exceed females in school enrollment. This may result from new gender inequalities in employment and earnings resulting from increasing employment opportunities for Blacks in the post-*apartheid* era (Budlender 2000). That is, returns to education may have increased for Black males more than for Black females, so that investing in male education became relatively more profitable than it had been during the *apartheid* regime.

Importantly, while the positive effect of remittances persists over time, the negative effect of being in MNR households relative to NM households disappears in the LFS sample. Although we cannot rule out the possibility that this variation may be due to differences between two data sets, there are several reasons for suspecting that it reflects changing circumstances in post-*apartheid* South Africa. As we saw in our analysis of the PSLSD, the disadvantage in school enrollment for children in MNR households resulted mainly from the labor out-migration of

parents with no economic compensation. We conjecture that the negative influence of parental absence, shown in Table 4, has diminished over time due to changes in migration patterns associated with relaxed migration regulations affecting Blacks. Migrants are now more likely than before to become permanent residents in their places of destinations. Moreover, even when they do not permanently relocate, they may be more likely to take family members with them to the place of employment. Thus, the number of MNR households with migrant parents may have decreased; that is, the out-migrants in MNR households may increasingly consist of extended family members. Unfortunately, the LFS does not permit a direct test of our conjecture because migrants are not linked to other household members, which means that we cannot distinguish parental migration from the migration of other family members. In addition, neither the PSLSD nor the LFS provide information on whether migrants move with other members of the household. We hence use the proxy of whether children or spouses of migrants are present in the household[13]. In the 1993 PSLSD, among married migrants, in 30% of households the migrants' children or spouse are not in the left-behind households, which indicates that they are likely to have moved together. This percentage increases to more than 40% in the 2002 LFS. The increase is even larger when considering only MNR households—from 37% to more than 65%. These results lend support to our claim that migrants increasingly move with family members.

In addition, it is likely that, as residential restrictions and regulations regarding contract

[13] In the LFS, although migrants are not linked to individual household members, there is a general question asking about whether migrants' children and spouse are in the left-behind household. We construct a measure indicating that either the spouse or the children of a migrant lives in the household.

labor have been relaxed (Posel and Casale 2003), labor migrants are able to locate their families closer to where they work and to return home more frequently than during the *apartheid* era. Insofar as this is true, migrants will be able to maintain closer contact with their children, and this presumably has become even more convenient with advances in transportation and communication technologies, particularly the availability of cell phones (Case and Deaton 2006). No data are available, however, to test this conjecture.

Implications of Remittances for Intra- and Inter-household Inequalities

For our final analysis, in which we examine whether remittances help reduce within- and between-household inequalities, we return to the PSLSD. Because we are interested in contrasting households with and without remittances, we combine NM and MNR households. We first estimate a single model that includes a distinction between remittance and non-remittance households and interactions between this dichotomy and all other variables in the model. Because the interaction terms between remittance status and all other predictors are collectively significant at the 0.05 level, we conclude that the determinants of school enrollment differ for the two types of households. We thus estimate separate models for remittance and non-remittance households. The results are shown in Table 8.

Substantial differences between the two household types emerge. Almost all predictors that have a significant impact on enrollment in non-recipient households are no longer significant in recipient households. Specifically, males tend to be disadvantaged in non-recipient but not in recipient households. This finding suggests that increased income from remittances reduces the opportunity costs of male schooling. With respect to household attributes, the advantages of

urban residence, higher income, presence of parents, and female headship in non-recipient households become insignificant in recipient households. This is presumably because the disadvantages faced by rural and poor households as well as by households where parents are absent are largely offset by additional income from migrants. As a result, reduced resource constraints in recipient households enable a larger number of children to attend school, and family socioeconomic status becomes less critical in determining children's educational opportunities. However, the effect of the household educational environment continues to be strong. This reinforces the more or less universal finding that family human capital and cultural capital play a central role in shaping children's schooling independent of economic resources.

Overall, the above results document the crucial role of remittances in reducing within- and between-household inequalities—which they do by improving the circumstances of children in deprived households that are in the greatest need of income transfers.

SUMMARY AND DISCUSSION

Remittances, the money that migrants send back to their families of origin, are one of the most consequential impacts of migration for migrant-sending communities. This paper examines the role of migration and remittances on children's education in South Africa, a nation with a long history of labor migration by its Black majority. Going beyond previous studies, we first examine the overall effect of migration and remittances, and then disaggregate the effect via different pathways. We then assess the robustness of our results via FE and RE modeling, and finally study the implications for within- and between-household inequalities.

Because preliminary analysis showed that the effect of migration and remittances is largely restricted to the Black population, we focused our analysis on Blacks, who now constitute nearly 80% of the South African population. We showed that, net of other factors, children in recipient households are much more likely to be enrolled in school than their counterparts in other households. Examining the mechanisms by which this outcome is realized, we identified three important pathways: the positive effect of remittances results from increased household educational spending, reduced child labor, and mitigation of the negative effect of parental absence due to out-migration. By contrast, children in households with out-migrants but no remittances (MNR households) are disadvantaged with respect to school enrollment, and in some respects are even worse-off than their counterparts in nonmigrant households. This negative effect is mainly confined to MNR households with absent parents, since with respect to educational spending and child labor MNR households are quite similar to NM households.

FE and RE modeling suggests that the effect of migration and remittances is robust to unobserved heterogeneity. This effect of migration/remittances is also relatively consistent across subsamples and across independent samples over time, although the negative impact of living in an MNR household was much reduced by 2002-2003. We offer several conjectures and some evidence that this is the result of changing residential regulations and migration patterns resulting from the collapse of *apartheid.*

Finally, we showed that remittances help reduce within-household gender inequalities and between-household SES inequalities: remittances lead to an increase in the likelihood of enrollment for males, rural children, children from poor households, and children whose parents

are absent, thus essentially eliminating the effects of these household characteristics. However, the positive effect of the household educational environment continues to be strong, suggesting the central importance of human capital and cultural capital.

The findings of this paper contribute to our understanding of the social impact of migration. But, of course, there is still more to be done. Because so much of our data pertains to households rather than to individuals, we have had to rely on indirect inference to reach many of our conclusions. What is needed to definitively pin down the way remittances function are panel data that provide information about the characteristics of migrants in both their origin and destination places, that provide migration and remittance histories for all individuals in each household, and that identify who is remitting income to whom and how these remittances are spent. Labor migration continues to be important in South Africa, as well as in many other parts of the world, and thus it is well worth investing in improved data on this topic.

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Table 1. Household Migration and Remittances Status by Race and Place, PSLSD 1993. (N=8,809)[a]

Percentage	No migrants	Migrants, no remittances	Remittances	*N*
Overall	70.2%	6.0%	23.8%	8,809
Blacks				
Overall	65.0	5.6	29.4	6,494
Rural	55.9	7.5	36.7	4,173
Urban	81.4	2.2	16.3	2,312
Coloreds				
Overall	82.2	2.2	16.3	690
Rural	88.9	6.7	4.4	45
Urban	81.7	4.0	14.3	645
Indians				
Overall	83.7	6.6	9.7	258
Rural	100.0	0.0	0.0	2
Urban	83.6	6.6	9.8	256
Whites				
Overall	86.5	8.9	4.6	1,367
Rural	93.8	1.8	4.5	112
Urban	85.9	9.5	4.6	1,255

[a] All three χ^2 tests of migration status by race (overall, and separately for rural and urban households) are significant at the .001 level.

Table 2. Percentages and Means of Selected Dependent and Independent Variables in the Analysis by Household Migration and Remittances Status for Blacks, PSLSD 1993. (Standard deviations in parentheses)

	NM [a]	MNR	MR
Child-level			
Currently enrolled (age 7-18)	90.1**	84.9	91.0
Parental presence (age 7-18)			
Both present	52.7**	42.9	48.9
Mother present	27.7	35.3	30.9
Father present	3.4	5.1	2.5
None of parent present	16.1	16.7	17.7
N	5,401	569	4,071
Participating in paid/unpaid labor (age 16-22)	10.7**	7.3	4.5
N	2,825	276	1,876
HH-level			
Highest level of education in HH			
No school	17.1*	13.8	15.9
Primary school	32.9	38.6	32.8
Some secondary school	33.7	29.8	33.1
Completed secondary school or more	16.3	17.9	18.2
Urban	44.8**	14.3	19.8
Mean and standard deviation of annual HH income (excluding remittances)	13699** (20473)	10784 (11717)	6303 (15623)
N (for income due to missingness)	4,172	360	1,869
Female-head HH	28.4**	30.0	32.4
Total number of school age children (6-22)	1.8** (1.9)	2.3 (2.2)	3.0 (2.1)
Mean and standard deviation of annual educational spending	378 (1316)	356 (1537)	342 (968)
N	4,221	363	1,910

[a] NM, MNR and MR respectively refer to households without migrants, households with migrants but not remittances and household with remittances.

* χ^2 tests and t-test by migration and remittances status significant at <0.1 level

** χ^2 tests and t-test by migration and remittances status significant at <0.05 level (mostly significant at <0.001 level; we do not make further distinctions).

Table 3. Multinomial Logit Model of Household Migration and Remittances Status on Household Characteristics for Blacks, PSLSD 1993 [N=6,401]. (Standard errors in parentheses)

Independent variables	MNR[a]	MR
Urban (ref. rural)	-1.535***	-0.822***
	(0.335)	(0.148)
Highest adult education in HH		
(ref. no school)		
Primary school	0.499**	0.318**
	(0.159)	(0.115)
Some secondary school	0.544*	0.730***
	(0.216)	(0.129)
Completed secondary and more	0.863*	1.341***
	(0.356)	(0.158)
Total HH annual income (log)	-0.201*	-0.608***
(excluding remittances)	(0.092)	(0.035)
Female-head HH (ref. Male-head HH)	0.179	0.108
	(0.200)	(0.092)
Dependence ratio	-0.973	1.015***
	(0.737)	(0.203)
HH involves in agricultural production	0.829***	1.011***
(ref. no agri. Production)	(0.216)	(0.135)
Constant	-0.610	3.453***
	(0.482)	(0.290)

Note: Robust standard errors that correct for clustering at the community-level are estimated.

[a] The reference category is Black households without migrants (NM).

* p<0.05, ** p<0.01, *** p<0.001.

Table 4. Random-intercept Logit Models of The Overall Effect of Migration and Remittances Status on Current School Enrollment, and the Effect through Three Pathways for Blacks (Educational Spending, Child Labor Participation, and Parental Migration Status), PSLSE 1993. (Standard errors in parentheses)

Independent variables	School Enrollment (Children age 7-18)	Educational Spending (log) (HHs with children age 7-18)	Child Labor (Children age 16-22)	Enrollment on Parental Migration Status (Children age 7-18)
Child-level				
Age	0.007		0.343***	0.006
	(0.012)		(0.034)	(0.011)
Male (ref. female)	-0.160		0.478***	-0.159
	(0.082)		(0.125)	(0.083)
Parental presence (ref. both parents present)				
Only mother present	-0.563***		0.598**	
	(0.137)		(0.225)	
Only father present	-0.557*		0.087	
	(0.251)		(0.350)	
None of parents present	-0.740***		0.878***	
	(0.132)		(0.166)	
Household-level				
Household migration and remittances status (ref. no migrants)				
Having migrants, no remittances	-0.528**	-0.182	-0.152	
	(0.196)	(0.123)	(0.289)	
Having remittances	0.254*	0.185**	-1.590***	
	(0.112)	(0.067)	(0.192)	
Parental migration and remittances status (ref. no migrants)				
Parent migrated, no remittances				-0.712**
				(0.245)
Parent present, no remittances				-0.372

				(0.281)
Parent migrated, having remittances				0.054
				(0.136)
Parent present, having remittances				0.427**
				(0.139)
Urban residence (ref. rural)	0.488***	0.748***	-0.115	0.471***
	(0.128)	(0.123)	(0.146)	(0.128)
Highest adult education in HH (ref. no school)				
Primary school	0.472**	0.241**	-0.681***	0.514***
	(0.136)	(0.089)	(0.176)	(0.135)
Some secondary school	1.181***	0.598***	-1.409***	1.220***
	(0.148)	(0.092)	(0.192)	(0.147)
Completed secondary and more	1.867***	0.987***	-1.994***	1.878***
	(0.195)	(0.105)	(0.236)	(0.194)
Total HH annual income (log)	0.040	0.097***	0.475***	0.036
(excluding remittances)	(0.032)	(0.017)	(0.064)	(0.032)
Total number of school-aged children (6-22)	0.018	0.295***	-0.082*	0.022
	(0.026)	(0.015)	(0.033)	(0.026)
Female-head HH (ref. Male-head HH)	0.374**	-0.026	-0.573**	0.099
	(0.131)	(0.059)	(0.191)	(0.112)
Constant	1.837***	2.245***	-11.527***	1.615***
	(0.277)	(0.180)	(0.813)	(0.275)
% of variance explained between clusters	39.3***	18.0***	23.0***	39.3***
	(0.017)	(0.019)	(0.026)	(0.017)
Log-likelihood	-2858.7	-8157.1	-1148.9	-2872.9
N	9,859	4,103	4,897	9,859

Note: The analyses take into account the clustering at the household-level (except for the educational spending model, which is conducted at the household-level and takes account of clustering at the community-level).

* p<0.05, ** p<0.01, *** p<0.001.

Table 5. Household Migration and Remittances Status by Race and Place, LFS 2002. (N=26,474)[a]

Percentage	No migrants	Migrants, no remittances	Remittances	*N*
Overall	81.8%	5.3%	12.8%	26,474
Blacks				
Overall	77.3	6.6	16.1	20,135
Rural	64.2	10.5	25.3	9,999
Urban	90.3	2.8	7.0	10,136
Coloreds				
Overall	93.5	1.8	4.6	2,739
Rural	92.3	1.8	5.9	779
Urban	94.0	1.8	4.1	1,960
Indians				
Overall	96.7	1.3	2.0	604
Rural	92.9	7.1	0.0	14
Urban	96.8	1.2	2.0	590
Whites				
Overall	98.5	0.8	0.7	2,968
Rural	96.6	2.6	0.8	379
Urban	98.7	0.5	0.7	2,589

[a] All three χ^2 tests of migration status by race (overall, and separately for rural and urban households) are significant at the .001 level.

Table 6. Percentages and Means of Selected Dependent and Independent Variables in the Analysis by Household Migration and Remittances Status for Blacks, LFS 2002. (Standard deviations in parentheses)

	NM	MNR	MR
Child-level			
Currently enrolled (age 7-18)	93.8**	93.1	94.4
N	15,309	2,289	6,331
HH-level			
Highest level of education in HH			
No school	5.0**	4.7	2.0
Primary school	20.9	23.9	20.1
Some secondary school	42.1	48.2	55.4
Completed secondary school or more	31.9	23.2	22.6
Urban	58.8**	21.1	21.8
Annual HH income (excluding remittances)	32589**	33573	31261
	(37910)	(33665)	(27028)
Female-head HH	64.0**	45.6%	29.9%
Total number of school age children (6-22)	1.4**	2.2	2.6
	(1.6)	(1.8)	(1.9)
N	15,571	1,333	3,231

* χ^2 tests and t-test by migration and remittances status significant at <0.1 level

** χ^2 tests and t-test by migration and remittances status significant at <0.05 level (mostly significant at <0.001 level; we do not make further distinctions).

Table 7. Fixed-effect and Random-effect Logit Models of Children's Enrollment on Migration and Remittances Status and Control Variables, Black Children Age 7-18 in 2002, LFS 2002/2003. (Standard errors in parentheses)

Independent variables	Fixed-Effect	Random-effect (restricted sample)	Random-effect (full sample)
Child-level			
Age	-0.028***	-0.018***	-0.061***
	(0.006)	(0.005)	(0.003)
Male (ref. female)		0.173*	0.209***
		(0.085)	(0.047)
Household-level			
Household migration and remittances status (ref. no migrants)			
Having migrants, no remittances	0.188	0.171	0.013
	(0.163)	(0.145)	(0.081)
Having remittances	0.407**	0.320**	0.365***
	(0.145)	(0.110)	(0.063)
Urban residence (ref. rural)		0.003	0.300***
		(0.098)	(0.055)
Highest adult education in HH (ref. no school)			
Primary school	-0.577	-0.338	2.409***
	(0.742)	(0.660)	(0.326)
Some secondary school	-0.447	-0.352	2.898***
	(0.751)	(0.657)	(0.325)
Completed secondary and more	0.063	-0.129	3.474***
	(0.760)	(0.660)	(0.328)
Total HH annual income (log)	0.029*	0.025†	0.046***
(excluding remittances)	(0.015)	(0.014)	(0.008)
Total number of school-aged children (6-22)	0.071	0.001	0.069***
	(0.044)	(0.021)	(0.013)
Female-head household	-0.189	-0.115	0.011
	(0.141)	(0.090)	(0.050)
Year is 2003	-1.743***	-3.654***	-1.489***
	(.068)	(0.088)	(0.052)
Constant	---	2.100**	0.314
		(0.670)	(0.328)
% of variance explained between individuals	---	1.0	23.8
		(0.2)	(0.011)
Log-likelihood	-913.4	-1867.7	-8084.7
N	4,862	4,862	24,070
	(2,431 children)	(2,431 children)	(12,035 children)

† p<0.1, * p<0.05, ** p<0.01, *** p<0.001.

Table 8. Random-intercept Logit Model of Current Enrollment Status by Household Remittances Status, Black Children age 7-18, PSLSD 1993

	Children in HHs without remittances		Children in HHs with remittances	
Independent variables	Coefficient	Std. error	Coefficient	Std. error
Child-level				
Age	0.012	0.015	-0.001	0.018
Male (ref. female)	-0.197*	0.095	-0.091	0.130
Parental presence (ref. both parents present)				
Only mother present	-0.742***	0.185	-0.341	0.198
Only father present	-0.833**	0.299	-0.043	0.454
None of parents present	-0.942***	0.169	-0.385	0.208
Household-level				
Highest adult education in HH (ref. no school)				
Primary school	0.317	0.174	0.664**	0.205
Some secondary school	1.041***	0.192	1.281***	0.224
Completed secondary and more	1.736***	0.253	1.856***	0.295
Urban residence (ref. rural)	0.515**	0.149	0.468	0.246
Total HH annual income (log)	0.128**	0.051	-0.007	0.039
(excluding remittances)				
Female-head HH (ref. Male-head HH)	0.570**	0.175	0.140	0.192
Total number of school-aged children (6-22)	-0.001	0.033	0.034	0.040
Constant	1.420***	0.396	2.120***	0.408
% of variance explained between HHs	39.9***	0.021	33.8***	0.026
Log-likelihood	-1759.0		-1099.8	
N	5,865		3,994	

.* p<0.05, ** p<0.01, *** p<0.001.