2005

Poverty and children's schooling in urban and rural Senegal

Mark R. Montgomery
Population Council

Paul C. Hewett
Population Council

POLICY RESEARCH DIVISION

WORKING PAPERS

Poverty and Children's Schooling in Urban and Rural Senegal

Mark R. Montgomery
Paul C. Hewett

2005 No. 196

Population Council

One Dag Hammarskjold Plaza
New York, New York 10017 USA
www.popcouncil.org
pubinfo@popcouncil.org

ISSN: 1554-8538

Poverty and Children's Schooling in Urban and Rural Senegal

Mark R. Montgomery
Paul C. Hewett

Mark R. Montgomery is Senior Associate, Policy Research Division, and Professor of Economics, State University of New York at Stony Brook. His e-mail address is mmontgomery@popcouncil.org. Paul C. Hewett is Research Associate, Policy Research Division, Population Council. His e-mail address is phewett@popcouncil.org. Funding for this paper was provided by the William and Flora Hewlett Foundation and the Andrew W. Mellon Foundation. An earlier version of the paper was presented at the conference "Social Policies and Human Rights for Children and Women: Achieving and Monitoring the Millennium Development Goals," sponsored by UNICEF and the Graduate Program in International Affairs, New School University, New York, 28–30 April, 2004.

ABSTRACT

This paper presents findings of an investigation into the effects of living-standards and relative poverty on children's schooling in urban and rural areas of Senegal. To measure living standards, we apply a multiple-indicator, multiple-cause (MIMIC) factor-analytic model to a set of proxy variables collected in the 2000 Multiple Indicator Cluster Survey and extract an estimate of the relative standard of living for each household. Using this estimate, we find that in Senegal's urban areas, living standards exert substantial influence on three measures of schooling: Whether a child has ever attended school; whether he or she has completed at least four grades of primary school; and whether he or she is currently enrolled. In rural areas of Senegal, however, the effects are weaker and achieve statistical significance only for the wealthiest fifth of rural households. Two educational inequalities persist with living standards held constant. First, the advantages enjoyed by urban families in Senegal remain considerable: Even the poorest fifth of urban children are more likely than rural children to have attended school, to have completed four years or more of primary education, and to be currently enrolled. Second, gender gaps in schooling are pervasive and are only modestly influenced by standards of living. In both urban and rural areas of Senegal, girls suffer from marked disadvantages relative to boys in all three measures of schooling. In wealthier urban households, girls' disadvantages are smaller, but not completely eliminated. Furthermore, no systematic reduction in female disadvantage is apparent in rural Senegal, even in the uppermost stratum of households. To judge from these findings, in Senegal income growth alone is unlikely to close the schooling gap between urban and rural areas or between boys and girls.

As developing countries continue to urbanize, national debates about poverty increasingly will have to consider its urban as well as its rural manifestations. To date, the urgent needs of rural areas have occupied policy attention to such an extent that urban poverty has gone unrecognized. Yet, as the Panel on Urban Population Dynamics (2003) has shown in its analyses of health, poor urban dwellers often live in conditions that are little better (and are sometimes worse) than those found in the countryside. The question arises whether for the poor, the "urban advantage" in children's schooling might also prove to be elusive. In this paper, we take a closer look at the inequalities that can affect children's schooling in urban and rural settings in order to better understand urban–rural differences. Using data from the 2000 Multiple Indicator Cluster Survey (MICS) for Senegal, we focus on three indicators of schooling: Whether a child has ever attended school, whether he or she has completed at least four grades of primary school, and whether he or she is currently enrolled. Of particular interest in the analysis is whether higher household living standards tend to improve educational opportunities for girls.

Despite decades of academic and policy attention to poverty in developing countries, surprisingly few data sets give educational researchers much purchase on the concept of living standards. Although exceptions exist—notably the World Bank's Living Standards Measurement Surveys—surveys with detailed information on children's schooling have not often gathered comparably detailed data on household incomes and consumption expenditures. The MICS program is no exception to the rule. Users of the MICS are thus left with little alternative but to fashion an index of living standards from the few proxy variables that are included in these surveys, which range from ownership of consumer durables to crude assessments of the quality of housing.

The past decade has seen a lively debate in the literature on the merits of alternative statistical techniques that use such proxies. We explore one of the more promising approaches for distilling the proxies into a living-standards index, termed MIMIC (multiple–indicator,

multiple–cause) models, which are a variant of confirmatory-factor analysis. The MIMIC approach requires that variables serving as indicators of living standards be distinguished from those serving as determinants of living standards. In this way, the method brings a helpful theoretical structure to the estimation of living-standards indexes and imposes a measure of discipline on the empirical results. We apply the approach separately to the urban and rural households of the Senegal survey, and from these sector-specific estimates, we develop urban- and rural-specific rankings of living standards. We explore whether in each setting, relative living standards make a difference to children's schooling.

The paper is organized as follows: The first section situates our analysis in the wider international debate on how best to gauge progress in children's education. The MICS data for Senegal are discussed and descriptive statistics presented on the measures of children's schooling and the explanatory variables used in the multivariate models. In the third section, we provide an overview of the theories and statistical issues that must be confronted in fashioning defensible measures of living standards from the crude raw materials at hand. We summarize our thinking in a multiple-equation system that links living standards to schooling and then present the multivariate results.

MONITORING PROGRESS IN EDUCATION

Since 1990, when the "World Declaration on Education for All" was signed in Jomtien, Thailand, and the "World Summit for Children (WSC)" was staged in New York, efforts to promote children's educational participation and attainment have been given high priority by many international organizations, donors, and governments. The commitment to children's schooling perceptibly deepened over the decade and was reaffirmed at decade's end by the Millennium Development Declaration of 2000, which was followed by a burst of activity defining educational goals and quantifying targets and indicators of progress. The two targets for schooling specified in the Millennium Development Goals (MDGs) are that "by the

year 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling and that by 2005 girls and boys will have equal access to all levels of education" (United Nations 2001: 20). Substantial international research effort is now being directed to this end.[1] The MDG targets single out gender inequities in schooling as meriting special attention; although inequities attributable to poverty are not similarly highlighted, poverty is, of course, the central organizing theme of the Millennium Development Declaration and the goals and targets associated with it.

Broadly speaking, two sources of data are available with which to measure progress toward the schooling targets. UNESCO and UNICEF have long used data collected from national ministries of education, together with the population counts supplied by the United Nations Population Division, to generate gross and net primary enrollment ratios and to form estimates of the likelihood that a child enrolled in grade 1 of primary school will complete four grades of primary and enter grade 5. These aggregate indicators have been used for cross-national comparisons of schooling levels and trends (UNESCO 2002, 2003; UNICEF 2003). As Bruns et al. (2003) have shown, further refinements can be made to measures of primary school completion.[2]

The quality of the aggregate enrollment data collected from national ministries of education is acknowledged to be uneven.[3] When they are compared with estimates from the main alternative data source—schooling data taken from nationally representative, household-level sample surveys—systematic biases are revealed in the aggregate data, with the discrepancies between data sources being particularly significant for countries in sub-Saharan Africa (Lloyd and Hewett 2003; UNESCO 2003). The potential inherent in household-level data is much enhanced by the contributions of two large, internationally comparable survey programs, the Demographic and Health Surveys and the Multiple Indicator Cluster Surveys. These surveys gather information on the current educational status of school-age children as well as (limited) retrospective educational histories. These data, with complementary information on

adult educational attainment, are usually collected in a household questionnaire in which one informed adult (typically the head of the household) answers on behalf of each member.

The survey-based sources have one decided advantage: They permit an exploration of linkages between children's education and household poverty or living standards, an area that cannot be explored with aggregate measures. If full retrospective schooling histories were gathered for each child, and if these reports were of good quality, household data would provide the basis for estimates of the primary school completion rate and other measures addressed in the Millennium Development Goals. By tracking changes in primary school completion rates across age cohorts, household data could also provide an accurate assessment of trends in schooling.

The MICS program, which provides the data for our analyses, was specifically developed to monitor the World Summit for Children goals. It incorporates more than 75 indicators covering a range of critical statistics for developing countries, including information related to child survival and health, child labor, education, and access to basic public services such as potable water and sanitation.[4]

SCHOOLING DATA AND MODEL SPECIFICATION

The Senegalese schooling system is formally structured along the lines seen in much of Francophone West Africa. Primary schooling consists of six grades, and students are meant to enroll in primary grade 1 at the age of seven. A student who enrolls at this age and advances without repetition or dropping out will complete the full course of primary schooling at age 12. Completion of primary school is marked by the award of the CFEE (Certificat de Fin d'Etudes élémentaires). Middle schooling takes one of two forms: a first cycle of secondary training lasting for four grades and ending with the bestowal of the BEPC (Brevet de Fin d'Etudes de Premier Cycle) at age 16 or a three-year program of technical secondary education leading to the CAP (Certificat d'Aptitude Professionelle). Vocational programs that

entail four grades are also offered in the system. Those students holding a BEPC may proceed to a second cycle of secondary schooling, lasting for three grades and ending at age 19 with the award of a Baccalauréat or Baccalauréat Technique diploma. Alternatively, they may pursue a vocational secondary program, which may involve as few as two or as many as four grades depending on the program chosen. Access to university schooling and similar training (for example, the Ecole normale supérieure) requires the Baccalauréat or its equivalent.

Schooling measures

The questions that were used to construct our schooling indicators are displayed in Table 1, together with the ages of respondents about whom such information was gathered in the MICS survey. Given that late entry and frequent grade repetition are characteristic of Senegalese primary schooling, children often are found in primary school well beyond age 12, the official age for primary completion. More than 40 percent of children aged 13–19 who were enrolled in school were still attending primary school; even among the 18-year-olds who were enrolled, 13 percent were attending primary school, as were 6 percent of 19-year-olds. Evidently, primary school completion rates framed in terms of official age ranges can substantially underestimate the proportion of children who eventually will complete their primary education.

Mindful of the potential mismatches between children's ages and the official age ranges, we define three summary measures of schooling: (1) whether children aged 10–19 at the time of the survey had ever attended school; (2) the completion of four or more years of schooling among those aged 15–19 at the time of the survey; and (3) current enrollment among those aged 7–12. For the first two, we selected the age ranges with two objectives in mind: The child should be old enough to have had the opportunity to achieve the specified level of schooling, given the likelihood of late entry and repetition, but should not be so old as to render the experience of only historical interest. The Senegal survey was fielded in

Table 1 Survey questions defining children's schooling, Senegal, 2000

Measure	**Asked of those in age range**
Ever attended	
Has (name) ever attended school?	5+
Completed four or more years	
What is the highest level of school (name) attended?[a]	5+
What is the highest grade completed at this level?	
Current attendance	
Is (name) currently attending school[b]	5–17

[a] Senegal has made efforts to improve literacy through a system of informal schooling. We have treated grades completed in the informal system as being equivalent to grades of formal primary schooling.

[b] An additional question in the education module asks "During the current school year, did (name) attend school?" This question is intended to identify students who may have been on vacation or out of school because of illness at the time of the interview, but who are, nonetheless, currently attending. Those responding "yes" to this question could be classified as currently attending school (UNESCO 2003). However, this approach would misclassify students who dropped out during the current school year. In the case of Senegal, about 10 percent of children aged 7–12 were reported to be not "currently attending" school but to have attended at some point during the year. We have chosen not to use the additional question.

2000; therefore, primary school completion rates for those aged 20–24 refer mainly to the educational experiences of students who had passed through primary school some seven to 12 years earlier, that is, in the late 1980s and early 1990s. Such data would shed little light on recent trends.

For the ever-attendance measure of schooling, a minimum of ten years of age seemed to us to be sufficient to take account of late starting ages, and age 15 appeared adequate for measuring the number who had completed four or more years of schooling. Unless life-table methods are applied to handle right-censoring (we have not applied such methods here), a reduction in the minimum age for these indicators would yield underestimates of the proportion of children who eventually attend and complete four years of school. Our focus on completion of grade four is motivated by the importance of basic literacy and numeracy skills, which

are probably acquired by that grade, and by the need to provide estimates that are not too far removed in time from the survey date.

Table 2 provides a descriptive overview of the three indicators by age, urban–rural residence, and gender. For the ever-attended measure, an upward time trend is evident, with greater proportions of younger than older children having attended school. This trend is more pronounced for girls, who have recorded nearly twice the improvement of boys in each location. As can be seen in the enrollment figures for younger children, as age increases, the proportion of children enrolled declines faster in rural than urban areas, especially for girls. Interestingly, the urban–rural gap is less evident in figures on current enrollment for children aged 7–9 than for older children. At ages ten and older, the urban–rural gap in enrollment and attendance is enormous for both boys and girls. A wide urban–rural gap is also evident in the proportion completing four or more grades, with the urban percentage being about double that of the rural. A recent decline in educational attainment for the youngest boys is suggested, leading to a reduction of the attainment gap between boys and girls in urban areas; this trend has been observed elsewhere in sub-Saharan Africa (Lloyd and Hewett 2003). Taken together, these patterns hint that the retention of students, rather than access to schooling as such, may now be the determining factor in the urban–rural schooling gap.

Explanatory variables

Table 3 provides means of the explanatory covariates in the estimation sample for each education indicator, separately for urban and rural areas. Here, we focus on the education and literacy of adults in the household. Some 60 percent of urban children live in households in which adult men have at least a primary school education, and 44 percent of children live in households with adult women who have at least primary school attainment. For rural areas, however, children are at a distinct disadvantage in their household human capital, with only 24 percent of children living with adult men and 10 percent living with adult women

Table 2 Percentage of children by indicators of schooling, residence, and sex, Senegal 2000

	Ever attended				Completed four or more years				Currently enrolled			
	Urban		Rural		Urban		Rural		Urban		Rural	
Age	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
7	–	–	–	–	–	–	–	–	88.7	87.4	87.6	84.4
8	–	–	–	–	–	–	–	–	87.7	86.9	86.3	84.2
9	–	–	–	–	–	–	–	–	89.0	76.3	84.8	79.9
10	86.9	79.5	55.4	46.8	–	–	–	–	71.9	66.6	44.4	36.8
11	83.5	83.4	66.3	49.3	–	–	–	–	67.9	67.6	57.9	41.0
12	89.0	77.7	57.7	45.9	–	–	–	–	69.8	58.3	43.3	31.1
13	85.8	73.7	58.2	46.3	–	–	–	–	–	–	–	–
14	86.9	72.2	54.8	37.7	–	–	–	–	–	–	–	–
15	78.5	76.0	54.2	36.6	69.4	66.9	34.6	23.9	–	–	–	–
16	84.8	72.5	49.0	32.6	72.7	62.8	37.8	19.2	–	–	–	–
17	79.7	76.6	45.7	29.2	73.5	67.5	30.7	18.4	–	–	–	–
18	83.2	66.5	43.9	26.9	75.3	52.3	36.7	16.9	–	–	–	–
19	83.1	71.0	49.4	31.1	78.0	62.8	33.7	20.3	–	–	–	–
All	84.4	74.9	54.4	39.6	73.7	62.5	30.6	19.7	78.0	73.1	62.2	50.9
Number of children	2,385	2,581	4,511	4,572	1,071	1,191	1,734	1,813	1,409	1,387	2,571	2,530

– = Not applicable

Table 3 Means of explanatory variables (estimation sample) for educational indicators, by residence, Senegal, 2000

	Ever attended		Completed four or more years		Currently enrolled	
Variable	**Urban**	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**
Child characteristic						
Female	0.52	0.50	0.54	0.51	0.50	0.48
Age	14.30	13.84	16.94	16.77	9.63	9.90
Educational attainment of adults in household						
Men						
Primary	0.29	0.18	0.29	0.18	0.30	0.21
Middle	0.15	0.04	0.16	0.04	0.16	0.05
Secondary+	0.15	0.02	0.15	0.02	0.15	0.02
Literate	0.59	0.33	0.60	0.32	0.60	0.36
Women						
Primary	0.28	0.09	0.27	0.08	0.28	0.11
Middle	0.10	0.01	0.11	0.01	0.11	0.01
Secondary+	0.05	0.43^{-2}	0.06	0.38^{-2}	0.05	0.53^{-2}
Literate	0.34	0.08	0.37	0.08	0.34	0.09

who have primary or more schooling. Table 3 also suggests that greater educational gender equality exists within urban households, with (for example) approximately equal proportions of men and women who have attained a primary school education. In rural areas, where adults are already disadvantaged in terms of educational attainment, the adult women in the sample are far less likely than the men to have had any schooling. The table also indicates that the proportion of children living with literate adults is low in rural Senegal, where about 70 percent of households lack a literate adult man and 90 percent a literate adult woman. Although higher adult literacy rates are evident in urban areas, particularly for men, even there some two-thirds of children live in households lacking a literate adult woman.

STATISTICAL APPROACH: THE MIMIC MODEL

It may be useful to preview our MIMIC approach by situating it among the various strategies that have been applied to the problem of measuring living standards with collec-

Figure 1 Classification of approaches to measuring living standards

	Nonstatistical approaches	**Statistical approaches**
Loosely structured	Counts of all durables owned	Principal components or factor analysis of durables alone
Tightly structured	Judgment-based weighted indexes of durables	MIMIC specifications

tions of proxy variables. Figure 1 presents one scheme for doing so in which we distinguish highly structured and less-structured approaches and also draw a distinction between statistical approaches and those that rely solely on the judgment of the investigator. In separating determinants from indicators, the MIMIC approach brings more structure to bear on the problem than do the comparatively unstructured principal components and simple factor-analytic methods. Judgment-based approaches, however, in which detailed knowledge of local conditions is applied to form weights for each consumer durable or indicator, are also highly structured, and they also bring outside information to bear on the problem of defining living standards.

The specifications to be explored here take the form of equation systems in which a given schooling variable, denoted by Y, is the main object of interest. As discussed above, in our application Y represents one of three measures of schooling. For the schooling models, we write the main structural equation in latent-variable form as

$$Y^* = W'\theta + f\delta + \varepsilon \tag{1}$$

with the observed dependent variable $Y = 1$ if $Y^* \geq 0$ and $Y = 0$ otherwise. The determinants of Y^* include a vector of explanatory variables W and an unobservable factor f that we take to represent the household's standard of living. Another unobservable, ε, serves as the disturbance term of this structural equation.

We posit a model of the factor f such that $f = X'\gamma + u$, the value of f being determined by a set of exogenous variables X and a disturbance u. Although f is not observed, its probable level is signaled through the values taken by $\{Z_k\}$, a set of K indicator variables. These are binary indicators in our application, and the convention is to represent them in terms of latent propensities Z_k^*, with $Z_k = 1$ when $Z_k^* \geq 0$ and $Z_k = 0$ otherwise. We write each such propensity as $Z_k^* = \alpha_k + \beta_k f + v_k$, and, upon substituting for f, obtain K latent–indicator equations,

$$\begin{aligned} Z_1^* &= \alpha_1 + X'\gamma + u + v_1 \\ Z_2^* &= \alpha_2 + \beta_2 \cdot X'\gamma + \beta_2 u + v_2 \\ &\vdots \\ Z_K^* &= \alpha_K + \beta_K \cdot X'\gamma + \beta_K u + v_K. \end{aligned} \tag{2}$$

In this set of equations, the β_k parameters show how the unobserved factor f takes expression through each indicator.[5] Whether f is interpretable as a living-standards index depends on the signs that are exhibited by these parameters.

The full equation system thus comprises the schooling equation (1) and equations (2) for the living-standards indicators. In setting out the model in this way, with latent factors embedded in structural equations, we follow an approach that has been recommended by several researchers (notably Sahn and Stifel 2000; McDade and Adair 2001; Tandon et al. 2002; Ferguson et al. 2003). Filmer and Pritchett (1999, 2001) have developed an alternative approach based on the method of principal components. Although useful in descriptive analyses and easy to apply, this method is perhaps best viewed as a data-reduction procedure whose main virtue is the ease with which the researcher can collapse multiple indicators into a single index. The principal components approach is otherwise limited, specifically by not separating cleanly the determinants of living standards from the indicators of living standards,

and it lacks a firm theoretical and statistical foundation. As a result, the method is not readily generalizable to structural, multiple-equation models such as ours (Montgomery et al. 2000).

For this paper, we take a two-step approach to estimating the full system. Assuming that the disturbances are normally distributed, we estimate the parameters α, β, and γ of the indicator equations (2) by the method of maximum likelihood, using routines that we have written for this purpose. An estimate $\hat{f} = \mathrm{E}[f|X,Z]$ of the factor is derived from these indicator equations alone. The predicted $\hat{f}$ is then inserted into the structural equation (1) just as if it were another observed covariate. Conventional statistical methods are applied to estimate the parameters θ and δ of the structural model.[6]

Modeling the living-standards factor

With the living-standards factor specified as $f = X'\gamma + u$, how should the X variables of this equation be chosen and what relation, if any, should they bear to the W variables that enter the main schooling equation? How are the X variables, posited as determinants of living standards, to be distinguished from the $\{Z_k\}$ variables that serve as indicators of living standards? In Table 4 we present our classification scheme and give descriptive statistics on the indicators and determinants.

As Montgomery et al. (2000) note, little consensus is evident in the literature about how best to define and model the living-standards measures found in surveys such as those fielded by the MICS program, which lack data on consumption expenditures and incomes. With proper consumption data lacking, we think it reasonable to define the set of living-standards indicators $\{Z_k\}$ in terms of the consumer durables and housing-quality items for which data are gathered. Using these indicators, we construct what McDade and Adair (2001) have termed a "relative affluence" measure of living standards. The indicators available for Senegal include ownership of a car, refrigerator, television, telephone, and radio; a cooker; a motorcycle or bicycle; and two measures of housing quality: uncrowded sleeping conditions,

Table 4 Unweighted means of indicators and determinants of household living standards, by urban and rural residence, Senegal 2000.

Indicator/Determinant	Urban	Rural
Indicator		
Own car	0.091	0.040
Own refrigerator	0.349	0.028
Own television	0.522	0.081
Own telephone	0.235	[a]
Own radio	0.883	0.768
Own cooker	0.068	[a]
Own motorcycle or bicycle	0.077	[a]
Uncrowded sleeping conditions[b]	0.542	0.532
Finished floor	0.830	0.309
Determinant		
Electricity	0.692	0.087
Own home or land	0.727	0.927
Have cultivatable land	0.183	0.861
Own plow	0.047	0.513
Own handcart	0.047	0.417
Own sewing machine	0.117	0.037
Female-headed household	0.303	0.092
Age of household head (years)	52.577	51.380
No adult man resides in household	0.114	0.051
Average years of schooling, adult men	4.724	1.327
Proportion literate, adult men	[c]	0.301
Average years of schooling, adult women	3.053	0.485
Proportion literate, adult women	0.332	0.072
Dakar	0.422	[c]
Kaolack	0.058	[c]
Saint Louis	0.079	[c]
Thies	0.139	[c]
Ziguinchor	0.122	[c]
(Number of households in sample)	(2185)	(3885)

[a] Too few households possess the item for it to be included in the rural specification.

[b] Household members per sleeping room are fewer than the (weighted) median for sector of residence.

[c] Not included in specification.

and having finished (that is, nondirt) floors. So few households in rural Senegal own cookers, telephones, and either motorcycles or bicycles that these indicators were excluded from the rural analysis.

Producer durables are deliberately excluded from the $\{Z_k\}$ set of indicators, because while they may help determine final consumption, they are not themselves measures of that consumption. They are a means to an end, or, in other words, producer durables are better viewed as inputs in household-production functions than as measures of the consumption drawn from household production. By this logic, producer-durable variables should be included among the X covariates. Some publicly provided services can also be viewed as enabling factors, or inputs, into consumption—notably, the provision of electricity—and we have, therefore, included electricity in the X living-standards determinants. Other producer durables are also included—possession of a house or land, owning cultivatable land, and having a plow, handcart, or sewing machine. Although city size may be only a distant proxy for the many other factors that determine consumption—among them, access to multiple income-earning possibilities and heterogeneous labor and product markets—we include dummy variables for Dakar and several other Senegalese cities in the set of determinants to account for such effects.

It is not unreasonable to liken adult education to a producer durable, education being a type of longlasting trait that produces a lifetime stream of income and consumption; on these grounds, we include the age of the household head and measures of educational attainment for all adults in the household in our specification of the X determinants. In doing so, we are mindful of the dual roles played by education in demographic behavior (Montgomery et al. 2000). Education is both a determinant of living standards and a conceptually separable influence on behavior via its links to social confidence, to the ability to process information, and to the breadth and nature of individual social networks. In short, measures of education belong with the W variables of the schooling equations as well as with the set of X variables

that act as determinants of living standards. Model identification is not threatened by variables that are common to both X and W, but we hope to strengthen the empirical basis for estimation by using a summary measure of education (average years) for adult men and women in the living-standards model and a more detailed specification, involving levels of adult schooling, in the children's schooling models. The sex of the household head is included among the determinants of living standards, as is a dummy variable indicating whether adult men are present in the household. When no adult men are present, the adult education variables for men are "zeroed out." The same approach could be followed for adult women, but it is so rare for Senegalese households to lack adult women that there is little point in doing so.

Estimates of urban and rural living standards

Table 5 summarizes the estimated $\hat{\beta}_k$ factor loadings on the indicators of living standards, and also presents the $\hat{\gamma}$ estimates on the determinants. As can be seen in the table, the $\hat{\beta}_k$ coefficients are always positive, and (with one exception) they are statistically significant. This finding is encouraging, in that it supports the interpretation of the factor as an expression of the household's standard of living. The table also presents a summary of $\hat{\gamma}$, the effects of the X determinants. These effects are very much in line with expectations. In both urban and rural areas, the provision of electricity is positively associated with living standards, as anticipated given its role as a key input. Likewise, the adult education variables are strongly and positively associated with living standards in urban and rural areas; and, consistent with age profiles of productivity, we find that urban living standards increase with the head's age up to about age 63 and decrease thereafter. No important nonlinearities in age could be detected in the rural models, as discussed in the notes to the table.

Among the producer durables, ownership of a home or land is positively associated with living standards in the urban model, but does not achieve significance in the rural model. Oddly, however, for rural households possession of cultivatable land is negatively associated

Table 5 Estimates of the indicator and determinants coefficients of the MIMIC living-standards model, by urban and rural residence, Senegal, 2000

	Urban		Rural	
Variable	**Coefficient**	**$\|Z\|$ value**	**Coefficient**	**$\|Z\|$ value**
Coefficients $\hat{\beta}_k$ of the indicators				
Own refrigerator	1.948	14.767	2.465	9.137
Own television	1.975	14.914	2.683	9.935
Own telephone	1.754	14.185	–	–
Own radio	0.950	11.579	1.490	8.805
Own cooker	2.292	14.712	–	–
Own motorcycle or bicycle	2.288	14.217	–	–
Uncrowded sleeping conditions	0.353	7.184	0.120	1.771
Finished floor	0.670	10.475	1.827	10.026
Coefficients $\hat{\gamma}$ of the determinants				
Electricity	0.799	13.817	0.701	9.860
Own home or land	0.159	5.990	0.029	0.958
Has cultivatable land	−0.006	0.221	−0.152	5.578
Own plow	−0.026	0.441	0.020	0.934
Own handcart	0.216	4.389	0.152	6.052
Own sewing machine	0.245	8.240	0.164	3.868
Female-headed household	0.022	0.873	0.076	1.945
Age of household head (years)[a]	0.021	5.352	-0.053^{-2}	0.158
Age of household head, squared	-0.017^{-2}	5.119	0.001^{-2}	0.433
No adult man in household	0.023	0.597	−0.018	0.357
Average years of schooling, adult men	0.024	8.376	0.023	5.051
Proportion literate, adult men	–	–	0.057	2.633
Average years of schooling, adult women	0.027	6.069	0.017	2.126
Proportion literate, adult women	0.107	2.926	0.150	2.749
Dakar	0.100	2.890	–	–
Kaolack	−0.044	0.883	–	–
Saint Louis	0.084	1.746	–	–
Thies	0.071	1.684	–	–
Ziguinchor	−0.036	0.927	–	–
ρ	0.170	7.595	0.080	5.047

Note: For specification of variables, see text and notes for Table 4.

– = Not applicable

[a] According to the urban estimates, the positive effect of the head's age on household living standards is greatest at age 63. The rural estimates including the square of age differ little from a simple linear specification, with the effect of an additional year of age on living standards being positive for heads aged 27 and older.

with living standards. Almost all rural households in Senegal (some 93 percent) possess either land or a house, and almost all (86 percent) have cultivatable land. Therefore, the negative sign on cultivatable land may be an indication that nonfarm rural households are better off than households directly dependent on agriculture. Other producer durables—possession of a handcart and sewing machine—are positively and significantly associated with living standards in both urban and rural settings. The city-specific dummy variables show weak effects overall, but the estimates suggest that with other things held equal, living standards are generally higher in Dakar by comparison with Senegal's secondary cities. No statistically discernible difference is found between living in a small city, such as Kaolack, and living in Senegal's towns, which serve as the omitted category in this analysis. On the whole, the results presented in Table 5 provide good statistical support for the proposition that the proxy variables collected in the Senegal MICS can be interpreted as indicators of the household's standard of living.

MULTIVARIATE RESULTS FOR CHILDREN'S SCHOOLING

The predicted living-standards factors $\hat{f}$ derived from the MIMIC model are grouped into quintiles specific to urban and rural areas, and these quintiles provide the basis for much of the multivariate analysis to follow. Figure 2 depicts the children's school-outcomes measures by living-standards quintile for urban and rural households, without controls for any other explanatory variables. The bivariate associations shown here are strongly suggestive of living-standards effects on schooling. The urban gradients are especially clear, although in rural areas the largest differences seem to be between the households in the uppermost quintile of rural living standards and all other rural households. Is this interpretation sustained when controls are introduced for a host of explanatory variables?

Figure 3 depicts the net association between living-standards quintile and schooling outcome, with the predictions based on the estimated models shown in Tables 6 and 7 under

Figure 2 Percentage of children who have ever attended school, completed four or more grades, or are currently enrolled, by urban and rural residence and quintile of household living standards, Senegal, 2000

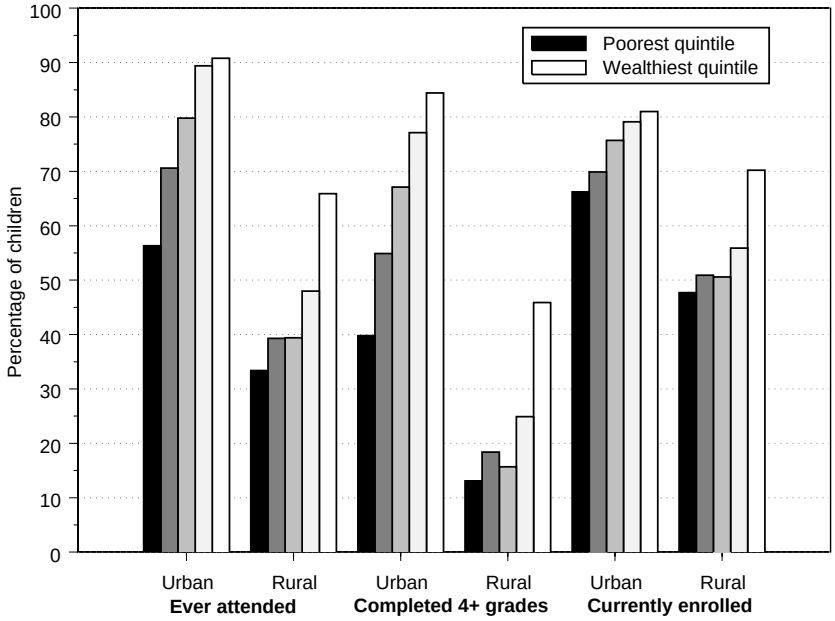
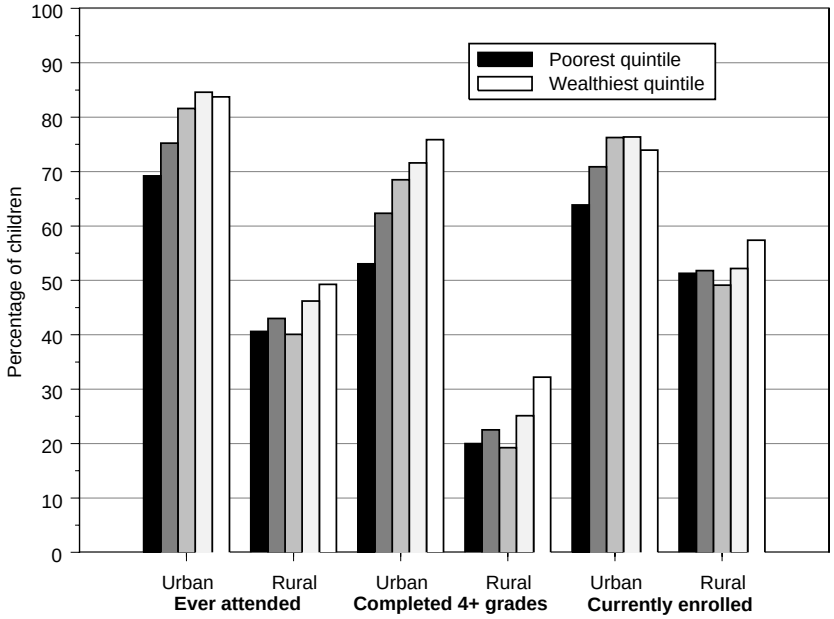


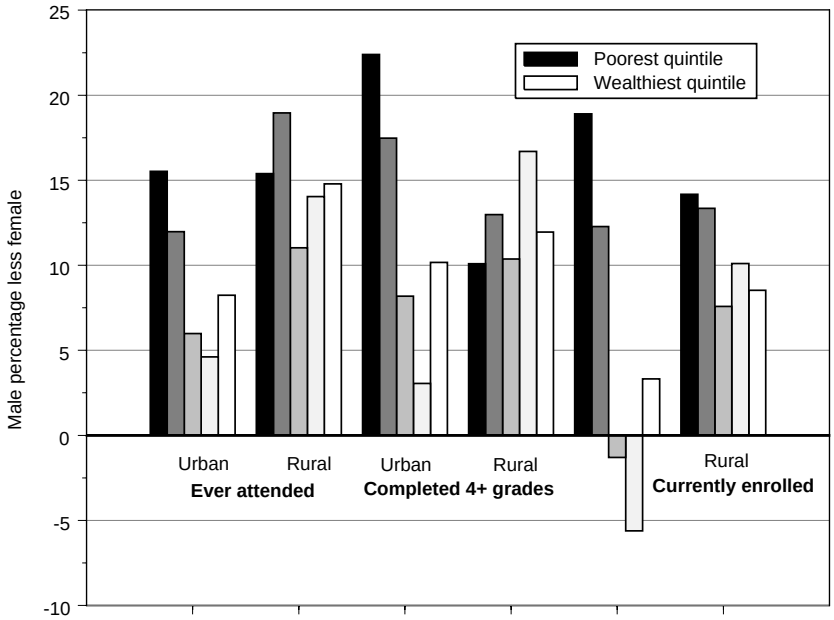
Figure 3 Predicted percentages of children who have ever attended school, completed four or more grades, or are currently enrolled, by urban and rural residence and quintile of household living standards. Based on results from Model 1 (Tables 6 and 7), Senegal, 2000.



the heading "Model 1," in which living-standards quintiles are included but interactions of the quintiles with the sex of the child are not. The predicted values summarized in the figure were produced by assigning an age to each child (to remove this source of variation) and then, in sequence, assigning each household to a living-standards quintile and taking the average of the predicted probabilities (allowing the household's other covariates to vary). Hence, this figure should be viewed as a depiction of the substantive strength of the living-standards effects. Large effects are evident in urban areas, with differences on the order of 15 percentage points in attendance, 23 points in the completion of four or more years of schooling, and 10 points in current enrollment. In rural areas, however, it is less obvious that differences by living-standards quintile are of similar substantive importance. Apart from the uppermost quintile of "wealthy" rural households, in which children are significantly more likely than their counterparts in the lowest quintile to attend and complete four or more grades, few statistically significant differences emerge. Comparisons of predicted urban and rural schooling across quintiles show that an urban advantage exists even for the poorest urban households.

In the models for attendance and completion of four grades shown in Tables 6 and 7, adult education exerts a significant positive influence on children's schooling, and the effects are of substantive importance. Curiously, however, the adult education variables make little difference to current enrollments in urban areas, although the education coefficients have the expected positive sign. In rural areas, the education of adult men is a statistically significant determinant of school enrollment. With levels of adult education controlled, adult literacy makes no significant contribution to schooling outcomes in either urban or rural Senegal. The city-specific variables included in the urban models are difficult to interpret; they suggest that residence in Ziguinchor is associated with a greater likelihood of school attendance, completion of four grades, and current enrollment. Finally, as would be expected for much of Francophone West Africa, with other things held constant, girls are substantially less likely

Figure 4 Predicted male–female differences in percentages ever attending school, completing four or more grades, and being currently enrolled, by urban and rural residence and quintile of household living standards. Based on results from Model 2 (Tables 6 and 7), Senegal, 2000.



than boys to attend school, complete four grades of primary education, and be currently enrolled.

In the columns of the tables headed "Model 2," we explore whether educational opportunities for girls are appreciably greater in wealthier households. Some evidence emerges to this effect—it is not always of statistical significance—in urban Senegal, but we see little indication that higher standards of living differentially improve the lot of girls in rural areas of the country. Figure 4 depicts the multivariate findings in terms of male–female differences in the predicted percentage ever attending school, completing four or more grades, and being currently enrolled. For urban Senegal, a reduction in the extent of male advantage can be discerned as we move from lower to higher living-standards quintiles, although the highest quintile exhibits a greater male advantage than the next-highest. The general pattern, however, is one of reduced male advantage. Interestingly, for current enrollment, greater levels are seen for urban girls than for boys in two of the quintiles. In the rural areas of Senegal,

however, the differences are erratic and, in any case, these differences do not attain statistical significance.

Table 6 Educational participation and attainment, probit estimates for urban areas, Senegal, 2000

	Ever attended school				Completed 4 or more years				Currently enrolled			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Variable	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$
Living-standards quintile												
Second quintile	0.212	2.006	0.175	1.179	0.269	2.089	0.215	1.324	0.206	1.594	0.130	0.771
Third quintile	0.468	4.858	0.326	2.345	0.459	3.817	0.256	1.535	0.380	2.938	0.086	0.534
Fourth quintile	0.605	5.520	0.450	3.376	0.559	4.535	0.283	2.074	0.384	2.998	0.026	0.168
Fifth quintile	0.565	4.616	0.501	2.961	0.707	5.406	0.568	3.335	0.303	2.154	0.087	0.522
Second quintile · female			0.073	0.536			0.116	0.649			0.159	0.756
Third quintile · female			0.256	1.883			0.379	1.885			0.585	3.566
Fourth quintile · female			0.291	2.133			0.536	2.825			0.734	3.687
Fifth quintile · female			0.124	0.857			0.268	1.324			0.432	2.685
Other variables												
Child is female	−0.383	8.311	−0.518	6.238	−0.370	5.830	−0.638	4.529	−0.160	3.041	−0.540	4.552
Child's age	−0.037	0.046	−0.075	0.091	15.133	1.015	14.568	0.979	9.330	4.044	9.458	4.070
Child's age, squared	-0.119^{-2}	0.021	0.153^{-2}	0.027	−0.900	1.023	−0.865	0.985	−1.016	4.180	−1.028	4.196
Child's age, cubed	0.311^{-4}	0.024	-0.321^{-4}	0.024	0.018	1.029	0.017	0.989	0.035	4.215	0.036	4.221
Men's education												
Primary	0.558	5.926	0.558	5.975	0.456	4.072	0.453	4.125	0.187	1.439	0.198	1.521
Middle	0.760	5.218	0.755	5.186	0.534	3.349	0.525	3.306	0.344	1.800	0.344	1.793
Secondary+	0.770	5.070	0.765	5.053	0.690	4.362	0.677	4.321	0.406	2.068	0.404	2.062
Literate	−0.104	1.040	−0.102	1.029	0.013	0.119	0.021	0.184	−0.108	0.914	−0.108	0.918
Women's education												
Primary	0.939	7.182	0.939	7.231	0.572	4.403	0.570	4.416	0.168	1.140	0.170	1.163
Middle	1.062	5.324	1.066	5.386	1.191	5.032	1.197	5.145	0.313	1.532	0.314	1.526
Secondary+	0.917	3.431	0.920	3.448	0.750	2.730	0.751	2.715	0.117	0.441	0.119	0.442
Literate	−0.041	0.341	−0.149	0.395	−0.125	0.827	−0.130	0.859	−0.003	0.016	−0.017	0.105
Dakar	−0.012	0.105	−0.012	0.102	−0.007	0.057	0.002	0.013	−0.417	3.006	−0.419	3.035
Kaolack	0.255	1.388	0.261	1.419	0.201	0.922	0.215	0.957	0.468	3.151	0.477	3.090
Saint Louis	0.051	0.322	0.054	0.341	0.332	1.629	0.350	1.731	0.259	1.713	0.258	1.755
Thies	−0.144	1.001	−0.143	0.993	−0.107	0.604	−0.106	0.592	−0.215	1.320	−0.212	1.306
Ziguinchor	0.459	2.983	0.459	2.989	0.547	3.482	0.551	3.535	0.563	3.923	0.557	3.956
Constant	0.753	0.198	0.998	0.259	−84.756	1.010	−81.556	0.973	−26.639	3.717	−26.886	3.724

Table 7 Educational participation and attainment, probit estimates for rural areas, Senegal, 2000

	Ever attended school				Completed 4 or more years				Currently enrolled			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
Variable	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$	**Coefficient**	$\|Z\|$
Living-standards quintile												
Second quintile	0.072	1.103	0.118	1.421	0.101	1.027	0.136	1.060	0.0132	0.150	0.004	0.036
Third quintile	−0.017	−0.229	−0.080	−0.864	−0.032	−0.313	−0.021	−0.169	−0.060	−0.678	−0.145	−1.475
Fourth quintile	0.168	2.075	0.141	1.436	0.199	1.776	0.284	2.076	0.024	0.264	−0.028	−0.251
Fifth quintile	0.258	2.837	0.240	2.162	0.438	3.346	0.413	2.804	0.166	1.612	0.093	0.772
Second quintile · female			−0.100	−1.026			−0.083	−0.472			0.023	0.169
Third quintile · female			0.132	1.287			−0.023	−0.126			0.179	1.575
Fourth quintile · female			0.057	0.558			−0.185	−0.989			0.111	0.860
Fifth quintile · female			0.039	0.329			0.042	0.244			0.151	1.201
Other variables												
Child is female	−0.434	−11.649	−0.466	−6.031	−0.467	−8.260	−0.418	−3.146	−0.284	−6.682	−0.384	−4.094
Child's age	1.748	3.584	1.745	3.579	−10.494	−0.926	−10.424	−0.914	10.223	5.382	10.221	5.377
Child's age, squared	−0.127	−3.650	−0.127	−3.644	0.596	0.893	0.592	0.881	−1.164	−5.821	−1.165	−5.820
Child's age, cubed	0.289^{-2}	3.567	0.288^{-2}	3.561	−0.011	−0.862	−0.011	−0.850	0.042	6.077	0.0420	6.079
Men's education												
Primary	0.925	11.230	0.925	11.224	0.812	7.919	0.817	7.980	0.620	5.604	0.620	5.584
Middle	1.234	7.280	1.230	7.263	1.326	6.818	1.324	6.823	1.081	5.890	1.083	5.896
Secondary+	1.239	5.900	1.239	5.877	1.421	4.843	1.419	4.844	1.519	6.012	1.510	5.981
Literate	0.861	6.528	0.859	6.518	0.460	3.133	0.463	3.174	0.651	3.962	0.649	3.969
Women's education												
Primary	1.968	4.040	1.969	4.028	1.696	3.211	1.739	3.216	0.449	1.000	0.462	1.029
Middle	5.801	7.114	5.814	7.024	3.937	4.138	3.933	4.208	−0.116	−0.192	−0.100	−0.164
Secondary+	0.094	1.376	0.092	1.355	0.028	0.300	0.025	0.266	−0.017	−0.215	−0.017	−0.215
Literate	0.124	0.906	0.124	0.909	0.005	0.027	−0.004	−0.020	−0.130	−0.953	−0.130	−0.952
Constant	−7.857	−3.530	−7.827	−3.516	60.424	0.945	60.022	0.933	−27.837	−4.716	−27.773	−4.695

CONCLUSIONS

This paper investigates the effects of living standards and relative poverty on children's schooling in urban and rural areas of Senegal. We applied a highly structured statistical method—the multiple-indicator, multiple-cause (MIMIC) factor-analytic model—to urban and rural households, using data gathered in Senegal's Multiple Indicator Cluster Survey. The model performs in a sensible fashion, yielding factor scores that are interpretable as relative measures of living standards and coefficient estimates for the determinants of living standards that generally have the expected signs and statistical significance.

Do household living standards matter to children's education? We find that living standards have substantial influence on three measures of schooling: whether a child has ever attended school; whether he or she has completed at least four grades of primary education; and whether he or she is currently enrolled. In urban areas of Senegal, households in the second through fifth quintiles of the living-standards distribution are clearly distinguishable from the poorest urban households (those in the first quintile) in these three dimensions of schooling. The estimated effects of urban living standards are large. For example, three-fourths of children in the wealthiest urban quintile are predicted to complete four or more grades of primary school, by comparison with only about half of the children in the poorest quintile. In rural areas of Senegal, however, the effects are less systematic: Only the households in the uppermost (fifth) quintile of living standards can be distinguished statistically from other households. Furthermore, a marked urban advantage in schooling is apparent. When controls are introduced for other explanatory factors, including levels of adult education, urban children in the poorest quintile are found to be much more likely than rural children to have ever attended school, to have completed four years or more of primary school, and to be currently enrolled. Where schooling is concerned, a marked urban advantage exists.

But why should household living standards, an important influence on children's schooling in the cities and towns of Senegal, not exert comparable force in the country's rural areas? We cannot give a definitive answer, but wonder whether the result stems from the use of relative rather than absolute measures of living standards. Recall that the MICS data allow us to rank household living standards only in relative terms. Perhaps in rural Senegal, households in the first to fourth quintiles simply lack the discretionary income needed to support their children's schooling. If this interpretation is correct, then our results would suggest that only rural households in the top quintile are likely to have enough of the necessary resources in hand.

The urban advantage in children's schooling also merits comment. No one would be surprised to see a marked urban advantage in secondary or even middle school, because urban households have easier access to these levels of schooling than do most rural households. At the primary level, however, the urban advantage is not obviously explicable in terms of access as such: Primary schools are found in or near most Senegalese rural villages. Even so, the absence of middle and secondary schools from rural areas may lead rural parents to conclude that their children have little real opportunity to progress beyond the primary level. With the educational horizons of rural parents so limited, they may question whether primary schooling alone can offer a sufficient return to justify significant commitments of parental time and money. Educational ambitions for children may be further undermined by the opportunity costs of schooling in rural settings, that is, by the loss of valuable child labor.

In both urban and rural areas of Senegal, girls suffer from disadvantages relative to boys in all three of the schooling measures that we examined. The empirical findings suggest that the disadvantages facing girls are eased to some degree in urban households with higher standards of living, but no systematic evidence emerges to this effect in rural Senegal. Even in urban Senegal, however, a male advantage persists in the wealthiest quintile of households.

NOTES

1 A similarly-worded WSC goal for education is "universal access to basic education and achievement of primary education by at least 80 percent of primary school-age children... with emphasis on reducing the current disparities between boys and girls."

2 Bruns et al. (2003) have devised a primary completion rate (PCR), which represents "the total number of students successfully completing (or graduating from) the last year of primary school in a given year, divided by the total number of children of official graduation age." Unlike the UNESCO indicators, which rely on beginning-of-year enrollment data, the PCR requires end-of-year enrollments. This information is less commonly collected by the national ministries of education; indeed, only 13 of 38 sub-Saharan African countries could provide the necessary data for direct calculation of the PCR. Senegal is one of the 25 countries for which the PCR cannot be calculated. Where the preferred data are lacking, however, a "proxy" primary completion rate can be generated.

3 The quality of age-specific population data used in these indicators can also be questioned, particularly for countries with no recent or reliable national population census (Bruns et al. 2003).

4 The precise form of the indicators, and survey questions related to them, are determined by the national statistical office of each participating country. Hence, the survey modules included in the MICS vary from one country to the next.

5 Note that no β_1 coefficient appears in the first of the indicator equations: It has been normalized to unity. Further normalizations are also required. In latent-variables models such as these, the sizes of the variances σ_u^2 and $\sigma_{v_k}^2$ are not identifiable. For the indicator equations, we apply the normalization rule $\beta_k^2\sigma_u^2 + \sigma_{v_k}^2 = 1$ so that the variance of $\beta_k u + v_k$ equals unity in each equation.

6 As in other two-step models with "generated regressors," the standard errors of the estimators $\hat{\theta}$ and $\hat{\delta}$ should be corrected for the use of an estimated $\hat{f}$ in the second step. We employ robust standard errors, which should adequately address this and other sources of heteroskedasticity. See Montgomery and Hewett (2004) for a fuller account of statistical issues and estimation techniques.

REFERENCES

Bruns, B., Mingat, A., and Rakotomalala, R. (2003). *A Chance for Every Child: Achieving Universal Primary Education By 2015*. The World Bank, Washington, D.C.

Ferguson, B. D., Tandon, A., Gakidou, E., and Murray, C. J. L. (2003). Estimating permanent income using indicator variables. Global Programme on Evidence for Health Policy Discussion Paper no. 42. World Health Organization, Geneva.

Filmer, D. and Pritchett, L. (1999). The effect of household wealth on educational attainment: Evidence from 35 countries. *Population and Development Review*, 25(1):85–120.

Filmer, D. and Pritchett, L. (2001). Estimating wealth effects without expenditure data—or tears: An application to educational enrollments in states of India. *Demography*, 38(1):115–132.

Lloyd, C. B. and Hewett, P. C. (2003). Primary schooling in sub-Saharan Africa: Recent trends and current challenges. Policy Research Division Working Paper no. 176, Population Council.

McDade, T. W. and Adair, L. S. (2001). Defining the 'urban' in urbanization and health: A factor analysis approach. *Social Science and Medicine*, 53(1):55–70.

Montgomery, M. R., Gragnolati, M., Burke, K. A., and Paredes, E. (2000). Measuring living standards with proxy variables. *Demography*, 37(2):155–174.

Montgomery, M. R. and Hewett, P. C. (2004). Urban poverty and health in developing countries: Household and neighborhood effects. Policy Research Division Working Paper no. 184, New York: Population Council.

Panel on Urban Population Dynamics (2003). *Cities Transformed: Demographic Change and Its Implications in the Developing World*. National Academies Press, Washington, DC. Montgomery, M. R., Stren, R., Cohen, B., and Reed, H., editors.

Sahn, D. E. and Stifel, D. C. (2000). Poverty comparisons over time and across countries in Africa. *World Development*, 28(12):2123–2155.

Tandon, A., Gakidou, E., Murray, C. J. L., and Ferguson, B. (2002). Cross-population comparability and PPPs: Using micro-data on indicators of consumer durables. Evidence and Information for Policy Cluster draft paper. World Health Organization, Geneva.

UNESCO (2002). *Education for All: Is the World on Track? EFA Global Monitoring Report 2002*. UNESCO Publishing, Paris.

UNESCO (2003). *Education for All Global Monitoring Report 2003/4: Gender and Education for All: the Leap to Equality*. UNESCO Publishing, Paris.

UNICEF (2003). *The State of the World's Children 2004 – Girls' Education and Development*.

United Nations (2001). *Road Map Towards the Implementation of the United Nations Millennium Declaration. Report of the Secretary-General*. United Nations Department of Public Information, New York.

POLICY RESEARCH DIVISION WORKING PAPERS

If still in print, single copies of up to three working papers from 1989 through 2003 are available free of charge.

Beginning with the 2004 issues, working papers are no longer available in print format. Instead they are distributed electronically. As each new paper is completed subscribers are notified by e-mail and a link to the paper is provided.

To subscribe to the Policy Research Division working paper e-mail notification list, or to obtain back issues from 1989 to 2003, please send your request to prdwp@popcouncil.org.

PDFs of recent issues are available at www.popcouncil.org/publications/wp/prd/rdwplist.html

2005

196 Mark R. Montgomery and Paul C. Hewett, "Poverty and children's schooling in urban and rural Senegal."

2004

195 Luciana Suran, Sajeda Amin, Lopita Huq, and Kobita Chowdury, "Does dowry improve life for brides? A test of the bequest theory of dowry in rural Bangadesh."

194 Barbara S. Mensch, Monica J. Grant, Mary P. Sebastian, Paul C. Hewett, and Dale Huntington. "The effect of a livelihoods intervention in an urban slum in India: Do vocational counseling and training alter the attitudes and behavior of adolescent girls?"

193 Amanda Ritchie, Cynthia B. Lloyd, and Monica Grant. "Gender differences in time use among adolescents in developing countries: Implications of rising school enrollment rates."

192 John Bongaarts. "Long-range trends in adult mortality: Models and projection methods."

191 John Koku Awoonor-Williams, Ellie S. Feinglass, Rachel Tobey, Maya N. Vaughan-Smith, Frank K. Nyonator, Tanya C. Jones, and James F. Phillips, "Bridging the gap between evidence-based innovation and national health-sector reform in Ghana."

190 Kelly Hallman, "Socioeconomic disadvantage and unsafe sexual behaviors among young women and men in South Africa."

189 Toshiko Kaneda, Zachary Zimmer, and Zhe Tang, "Differentials in life expectancy and active life expectancy by socioeconomic status among older adults in Beijing."

188 Cynthia B. Lloyd and Monica J. Grant, "Growing up in Pakistan: The separate experiences of males and females."

* No longer available as a printed publication. Download electronic file from Web site only.

187 Zachary Zimmer, Xianghua Fang, Toshiko Kaneda, Zhe Tang, and Julia Kwong. “Trends and transitions in children’s coresidence with older adults in Beijing municipality.”

186 Sajeda Amin and Alaka M. Basu. “Popular perceptions of emerging influences on mortality and longevity in Bangladesh and West Bengal.”

185 John Bongaarts. “Population aging and the rising cost of public pensions.”

184 Mark R. Montgomery and Paul C. Hewett. “Urban poverty and health in developing countries: Household and neighborhood effects.

2003

183 Agnes R. Quisumbing and Kelly Hallman. “Marriage in transition: Evidence on age, education, and assets from six developing countries.”

182 Paul C. Hewett, Barbara S. Mensch, and Annabel S. Erulkar, “Consistency in the reporting of sexual behavior among adolescent girls in Kenya: A comparison of interviewing methods.”

181 Zachary Zimmer, Linda G. Martin, and Hui-Sheng Lin, “Determinants of old-age mortality in Taiwan.”

180 Frank K. Nyonator, J. Koku Awoonor-Williams, James F. Phillips, Tanya C. Jones, and Robert A. Miller, “The Ghana Community-based Health Planning and Services Initiative: Fostering evidence-based organizational change and development in a resource-constrained setting.”

179 John Bongaarts and Griffith Feeney, “Estimating mean lifetime.”

178 Elizabeth F. Jackson, Patricia Akweongo, Evelyn Sakeah, Abraham Hodgson, Rofina Asuru, and James F. Phillips, “Women’s denial of having experienced female genital cutting in northern Ghana: Explanatory factors and consequences for analysis of survey data.”

177 John Bongaarts, “Completing the fertility transition in the developing world: The role of educational differences and fertility preferences.”

176 Cynthia B. Lloyd and Paul C. Hewett, “Primary schooling in sub-Saharan Africa: Recent trends and current challenges.”

175 James F. Phillips, Tanya C. Jones, Frank K. Nyonator, and Shruti Ravikumar, “Evidence-based development of health and family planning programs in Bangladesh and Ghana.”

174 Geoffrey McNicoll, “Population and development: An introductory view.”

* No longer available as a printed publication. Download electronic file from Web site only.

173 Paul Demeny, “Population policy: A concise summary.”

172 Zachary Zimmer, Napaporn Chayovan, Hui-Sheng Lin, and Josefina Natividad, “How indicators of socioeconomic status relate to physical functioning of older adults in three Asian societies.”

171 Sajeda Amin and Nagah H. Al-Bassusi, “Wage work and marriage: Perspectives of Egyptian working women.”

170 Ravai Marindo, Steve Pearson, and John B. Casterline, “Condom use and abstinence among unmarried young people in Zimbabwe: Which strategy, whose agenda?”

169 Zachary Zimmer and Julia Dayton, “The living arrangements of older adults in sub-Saharan Africa in a time of HIV/AIDS.”

168 Paul C. Hewett, Annabel S. Erulkar, and Barbara S. Mensch, “The feasibility of computer-assisted survey interviewing in Africa: Experience from two rural districts in Kenya.”

* No longer available as a printed publication. Download electronic file from Web site only.