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Intergenerational mobility in education: Is Africa different?

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Abstract

This study analyzes the intergenerational transmission of education in nine Sub-Saharan African countries, using nationally representative household survey data on parents of adult individuals. It provides the levels and trends of intergenerational persistence of years of schooling over 50 years, and it also ranks the nine countries relative to other nations. There is a declining cohort trend in the intergenerational persistence of education, particularly after the 1960s. Nevertheless, the education of parents remains a strong determinant of the educational outcomes of children. The analysis also documents country heterogeneity (intergenerational educational mobility varies significantly across countries) and a marked gender effect: daughter's education attainment is more correlated with her parents' education than that of sons. From a policy perspective, our result points to the importance of targeted redistributive policies and the expansion of secondary education to improve mobility.

KEYWORDS

education, gender, intergenerational mobility, Sub-Saharan Africa

JEL CLASSIFICATION

I24; I28; O55

1 | INTRODUCTION

Since the mid-1990s, Sub-Saharan Africa (SSA) has exhibited a remarkable resurgence of growth. Between 2000 and 2012, the region experienced a 3% per capita annual gross domestic product (GDP) growth rate (Thorbecke, 2013). At present, the middle class accounts for roughly one-third of the region's population and it is expanding rapidly. If trends continue, the total consumer expenditure of Africa in 2012 is expected to double by 2020 (Signé, 2018). The region's growth boom, however, has been accompanied by a rise in income inequality in several countries (Fosu, 2015). For example, from a sample of 90 countries, 16% of the ultra-high-net-worth individuals—individuals whose net worth is more than USD 30 million—are in Africa (Knight, 2015).[1]

Abbreviations: GDP, gross domestic product; IGE, intergenerational elasticity; ISCED, International Standard Classification of Education; LEAP, Livelihood Empowerment Against Poverty Program; LSMS, Living Standards Measurement Study; OLS, ordinary least squares; SSA, Sub-Saharan Africa.

The rise in inequality becomes a policy concern when it is an outcome of inequality of opportunity for individuals with different initial circumstance; when children from poor families, with ability and talent, are unable to move beyond their parents' economic position through effort and choices (Daude & Robano, 2015; Ferreira & Gignoux, 2011). Intergenerational persistence in socioeconomic status is the main mechanism through which inequality of opportunities perpetuates in a society. For example, social mobility may differ based on gender, race, ethnicity, or place of birth, suggesting differential access to opportunities. Recently, equality of opportunity is considered as a key condition for a society to achieve an acceptable level of equity: in its strongest form, equality of opportunity is the most relevant policy aspect; not inequalities of outcomes per se (Ferreira & Gignoux, 2011). Higher inequality of opportunity may result in higher inequality and affect public attitudes toward social objectives such as growth and poverty alleviation (Corak, 2013; Ferreira & Gignoux, 2011). Because of this, the extent to which socioeconomic outcome is transmitted from one generation to the next has long been of interest among economists and policy makers.

Although understanding intergenerational mobility is important for policy, economic analysis of intergenerational mobility in developing countries is only in its infancy due to lack of appropriate data. In particular, intergenerational mobility studies on SSA are scarce. The current study aims to fill this gap by taking advantage of recent nationally representative data that provide information on the social origin of adult individuals for a sample of nine African countries using education as an indicator of socioeconomic status.

Using education has a number of advantages. First, education is an important driver of labor market participation, and hence income since more years of schooling is strongly correlated with income (Barro & Lee, 2013). Second, schooling is an outcome where it seems reasonable to assume respondents can reliably report on their parents; measurement error in retrospective educational attainment of parents' is a lesser concern compared to income, wealth or consumption. Third, data restrictions, especially in developing countries, are much less stringent, retrospective information of parents' education being more widely available recently.[2] Finally, bias due to life cycle effects is lesser compared to that of income, as people tend to complete schooling at a relatively early stage of life.[3]

Drawing on nationally representative survey data, the study analyzes the trends, levels and pattern of intergenerational mobility of education attainment in Comoros, Ghana, Guinea, Madagascar, Malawi, Nigeria, Rwanda, Tanzania, and Uganda over 50 years by gender. Relying on two widely used measures of intergenerational persistence: the intergenerational elasticity (IGE) and the partial correlation coefficient, we provide estimates for 10 successive 5-year birth cohorts in each country.

The paper contributes to the existing literature in several ways. First, the study extends the existing evidence by creating comparable recent estimates for nine SSA countries, nationally and by gender.[4] There is clear policy value in knowing how intergenerational mobility varies across countries and over time. The existing empirical evidence is skewed toward high-income economies; much less is known about mobility in the developing world particularly in Africa. There has also been no study that has examined mobility of women in Africa. It has not been entirely clear whether there are differences in mobility between sons and daughters. Second, by closely following the methodology of the two closest antecedents studies in developing countries Hertz et al. (2007) and Azam and Bhatt (2015), we are able to rank countries in terms of intergenerational educational mobility.[5] Third, unlike other studies in developing countries, the estimates presented in this study do not suffer from selection bias caused by imposing coresidence to construct children and parents' pairs. Using a sample of children living at home with their parents can bias intergenerational persistence downward (Mazumder, 2005). The current study addresses this issue using a nationally representative data that collect information on education attainment of adult individuals and their parents regardless of whether parents are alive or not, if alive, reside in the same household.[6]

The main results of the study are the following. Comparing the highest educational attainment, both measures (the IGE and the partial correlation coefficient) accord in pointing out the importance of parental education in determining educational attainment of children in all the countries. We find a declining cohort trend in the estimated IGE in all the countries, particularly after the 1960s. This implies greater education mobility for more recent birth cohorts. The declining trend after the 1960s coincides with the drastic changes in educational systems and a huge investment in human capital accumulation in the region after independence. We note country heterogeneity: Nigeria, Guinea, Ghana, and Uganda experienced the highest intergenerational mobility, and Comoros and Madagascar the lowest. However, the decline in the intergenerational education persistence is strongest in the lower tail of the education distribution suggesting higher education is available for children from well-educated parents than their worse-off peers. Moreover, daughter's education attainment is more correlated with her parents' education than that of sons.

In line with the findings of Hertz et al. (2007) for 42 countries and Azam and Bhatt (2015) for India, we also find that partial correlation coefficient between parents and child's schooling has been increasing or remains constant across

cohorts, mainly driven by an educational inequality of the parents' generation. This is not a surprising result in our context since correlation coefficient provides an absolute measure after cleansed from a possible changes of education attainment due to education system reforms which increase the average schooling and reduce variance. From a policy perspective, our result points out the demand for targeted redistributive policies and expansion of secondary education that can improve intergenerational mobility in the countries considered.

The rest of the paper is structured as follows. Section 2 places the study in the existing literature. Section 3 presents the analytical framework. Section 4 describes the data, while Section 5 presents the results. Section 6 discusses determinants of mobility. Section 7 offers concluding remarks and potential policy implications.

2 | RELATED LITERATURE

Intergenerational mobility refers to the ability of children to climb higher than their parents on the socioeconomic status ladder when they become adults. Although the literature has widely focused on income, several socioeconomic outcomes such as education, social class, health, or occupation can be used to study intergenerational mobility in a society (Bhalotra & Rawlings, 2011; Causa & Johansson, 2011; Ferreira et al., 2012). The literature on intergenerational mobility in education, occupation, and income is broad and extensive in developed countries.[7]

Recent contributions on education mobility in developed countries include Ranasinghe (2015), Johnston et al. (2014), Checchi et al. (2013), and Cobb-Clark and Nguyen (2010). Hertz et al. (2007) extend the analysis of intergenerational educational mobility to 42 countries, including 19 developing countries, among which three are SSA countries (Ethiopia, Ghana, and South Africa), and present trends over 50 years. They find that the intergenerational regression coefficient has fallen over time, implying a high degree of intergenerational education mobility, but the correlation in educational attainment between children and their parents' remained unchanged over the period. They also document considerable regional differences, with Nordic and Latin American countries displaying the lowest and the highest intergenerational education mobility, respectively.

Daude and Robano (2015) study education mobility in 18 Latin American countries and confirm the finding of Hertz et al. (2007), Latin American countries have the highest intergenerational education persistence. Hnatkovska et al. (2013) study education and occupation mobility in India by caste. They conclude that structural changes in India have coincided with a breaking down of caste-based barriers to socioeconomic mobility. Azam and Bhatt (2015) examine the intergenerational transmission of education in India and report a decline in educational persistence between fathers and sons over the last 45 years. In contrast, Emran and Shilpi (2015) find that India shows greater intergenerational education persistence than Latin America and that educational mobility remained unchanged between 1991 and 2006.

With the exception of South Africa, studies on the intergenerational transmission of education in Africa are few. The only cross-country study on intergenerational education mobility that includes other African countries is Hertz et al. (2007). Using old survey data from Ethiopia (1994), Ghana (1998), and South Africa (1998), the authors present evidence of lower educational persistence in African countries compared with Latin American countries.

3 | ANALYTICAL FRAMEWORK

3.1 | Channels of education mobility

There are several rationales on how parental educational background affects children's education. Educational decisions on children are determined by parental preference and credit constraints (Becker & Tomes, 1979). These theoretical arguments identify many possible channels through which parental education affects children's education. Parents affect their children through innate ability, which has an impact on educational attainment (Becker & Tomes, 1979). The nutrition and health status of a mother during pregnancy also has a vital role on a child's initial health endowments and, hence, outcomes in adulthood, including education (Currie, 2009, 2011). For instance, a positive relationship between maternal education and a child's birth weight, which is a strong predictor of health outcomes in adulthood, is found in many studies (Currie & Moretti, 2003).

The abilities of parents affect their own income and education outcomes, which determine the quality and quantity of investment in children, thereby affecting the educational attainment of the children (Becker & Tomes, 1979). First,

well-educated parents generally earn higher incomes, which may increase the investment in a child's education by relaxing resource constraints. Second, higher educational attainment may improve the productivity of parents in child development, thus enhancing activities that may positively affect the educational attainment of children. Finally, parental education directly influences the schooling of children through the choice of school, with an expectation that more able families send their children to more well-endowed schools.

Patterns of educational intergenerational persistence may also relate to certain channels that directly arise from the structure of society and access to available opportunities in a given society. For instance, the observation that certain groups of a society not perusing in education or engaged in the same occupation as their parents or as their social class such as race or gender might be due to the transmission of preference and skills, but also due to the importance of social networks or direct nepotism (Munshi, 2011; Zuberi, 2003).

In this study, we are not trying to investigate the channels through which intergenerational educational correlations emerge. Our objective is to correlate the educational attainment of parents and their children and present comparisons of trends in intergenerational educational im(mobility) over time.

3.2 | Estimation strategies

The measurement of the degree to which family educational background affects the educational attainment of children has been accomplished in different ways (Ferreira et al., 2012 for detail discussion). The most common measures are *intergenerational correlation* and *intergenerational elasticity*. The standard ordinary least squares (OLS) regression model that relates educational attainment transmission from parents to children allows an estimation of these measures:

$$E_{ij} = \alpha + \beta EP_i + \varepsilon_{ij}, \tag{1}$$

where $i = 1, ..., I$ indexes families and $j = 1, ..., J$ children; E_{ij} denotes years of schooling of a child j in a family i; EP_i is the parental years of schooling in a family i; and β is the intergenerational regression coefficient, which is the parameter of interest; ε is a mean zero error term that is independently and identically distributed across generations and individuals.

Equation (1) allows the quantification of the importance of parental educational attainment on children's years of schooling using two measures. The first measure is IGE ($\hat{\beta}$). IGE shows the relationship between each additional year of schooling of the parents and their children. $\hat{\beta}$ measures intergenerational persistence, and $1-\hat{\beta}$ is a measure of intergenerational mobility. Higher-value IGE indicates higher intergenerational persistence and, hence, lower mobility.

Estimations are carried out on 5-year birth cohorts in each country. $\hat{\beta}$ is the estimated IGE of each of 5-year birth cohort. Comparing $\hat{\beta}$ across birth cohorts in each country measures how intergenerational education persistence has evolved over time in each countries. The only additional right-side variables that are generally included are age and age squared in order to take account of cohort effects. Other covariates are generally not included in Equation (1), because the goal is to obtain a summary measure of all the factors related to education that are transmitted over generations.[8]

The intergenerational education correlation between E_{ij} and EP_i is an alternative measure of intergenerational persistence that has also been widely used in the literature. The correlation coefficient ($\hat{\rho}$) quantifies how much of the observed dispersion in children's education is explained by parental education. A higher value in the correlation coefficient also implies lower intergenerational mobility and higher intergenerational education persistence. IGE equals the correlation coefficient between parent and child education weighted by the ratio of the standard deviations of education across generations. Thus the two measures, the correlation and the elasticity, will be equal provided that the standard deviation of years of schooling is the same across generations. The relationship between the two measures is as follows:

$$\begin{aligned} \hat{\beta} &= \frac{\sigma_{pc}}{\sigma_p^2} = \rho_{pc}\frac{\sigma_c}{\sigma_p} \\ \rho_{pc} &= \beta\frac{\sigma^p}{\sigma^c} \end{aligned} \tag{2}$$

where σ^p and σ^c are the standard deviations of years of schooling of parents and children in each 5-year birth cohort; σ_{pc} is the covariance between the years of schooling of parents and children; and ρ_{pc} is the correlation between the schooling of parents and children. An estimate of ρ that equals to 1 implies perfect intergenerational immobility, that is, child

educational attainment is entirely influenced by the educational background of parents, while a ρ close to zero indicates a perfectly mobile society in which parental education has only limited or no effect on children's educational attainment.

A decrease (increase) in IGE ($\hat{\beta}$) may arise because of either a decrease (increase) in intergenerational correlation ($\hat{\rho}$) or a decrease (increase) in the inequality of education across generations ($\frac{\sigma_c}{\sigma_p}$). Thus, the main difference between IGE $\left(\hat{\beta}\right)$ and the correlation coefficient ($\hat{\rho}$) is that the former factors out the cross-sectional inequality of education across generations and, hence, provides a relative measure of intergenerational mobility. In contrast, the estimated elasticity ($\hat{\beta}$) provides an absolute measure of intergenerational persistence that is not affected by education policy changes in a country, for instance, the expansion of compulsory free primary education, and this reduces the possible variation in the measure. Hence, a change in the inequality of education across the generation of parents and children will cause the two measures to evolve differently over time. Checchi et al. (2013) argue that a change in $\hat{\rho}$ captures not only a change in the parent–child education correlation, but also other events in the education system, such as the expansion of compulsory primary education. Suppose educational attainment of children in a household is given as follows:

$$E_{ij} = \mu + a_i + b_{ij}, \tag{3}$$

where $i = 1, \cdots, I$ indexes families and $j = 1, \cdots, J$ children; E_{ij} is the years of schooling of a child j in a family i; μ is the population mean; a_i is a family component common to all children in a household i; and b_{ij} is the individual specific component for a child that captures $i's$ deviation from the family component. Because the individual component (b_{ij}) is orthogonal to the family component (a_i), one can express the family component as follows:

$$a_i = \beta EP_i + z_i, \tag{4}$$

where z_i denotes family factors that are orthogonal to parental schooling. From Equation (4), it follows that

$$\begin{aligned} \rho_c &= \frac{\sigma_p^2}{\sigma_{pc}^2} = \beta^2 \frac{\sigma_{pc}^2}{\sigma_c^2} + \frac{\sigma_z^2}{\sigma_c^2} \\ &= \rho^2 + \text{family factors orthogonal to parental schooling} \end{aligned} \tag{5}$$

Equation (5) is widely known in the literature; it shows that the square of intergenerational correlation provides an estimate of the share of total variance in the educational attainment of children that can be explained by parental educational attainment only (Solon, 1999). As discussed above, $\hat{\beta}$ is affected by the relative variance of education in the two generations. Therefore, any change in the relative variance may lead to different ρ and β trend in a same society. For instance, Hertz et al. (2007) document that β fell over time (implying more mobility); yet, the correlation between children's and parents' educational attainment remained constant for half a century (implying no change in mobility). For this reason, it is a common practice to report both measures of educational persistence (Azam & Bhatt, 2015; Checchi et al., 2013; Hertz et al., 2007; Ranasinghe, 2015).

In this study, we follow the same tradition and report both measures, IGE $(\hat{\beta})$ and the correlation coefficient $(\hat{\rho})$, across 5-year birth cohorts in all the countries. Both measures can be easily extended to analyze different aspects of intergenerational mobility, such as mobility by place of birth, gender, caste, and other socioeconomic status (Azam & Bhatt, 2015; Hnatkovska et al., 2013; Ranasinghe, 2015).[9] With the objective of assessing a gender difference in intergenerational education persistence, we also estimate the parameters in Equation (1) and Equation (2) for daughters and sons separately.

The analysis is further strengthen by looking at changes in children's highest educational attainment conditional on parent's education. We defined three categories of education for both children's and parents' generations: no schooling, primary and secondary and above.[10] We model the effect of parents' highest levels of education on children highest level of schooling, across 5-year birth cohorts. Let y be an ordered response taking on values 0, 1, 2 denoting children highest level of education (0 = no schooling, 1 = primary, 2 = secondary and above). The latent specification underlying the ordered probit model for y is:

$$y^* = x\beta + \epsilon \tag{6}$$

where y is the latent variable, x is the control for parents highest level of education, β is the corresponding unknown vector of coefficients and ε is the error term which is assumed to be normally distributed across observations with mean

and variance normalized to zero and 1. Although y^* is unobservable, we observe the highest level of children education which is the category of the response that is:

$$y = \begin{cases} 0 & \text{if } y^* \leq \alpha_1 \\ 1 & \text{if } \alpha_1 < y^* \leq \alpha_2 \\ 2 & \text{if } y^* > \alpha_2 \end{cases} \tag{7}$$

where $\alpha_1 < \alpha_2$ are the unknown cut-off points. The likelihood of ending in any educational outcome y is dependent on the observable variables, which in our empirical approach refer to parental schooling, y. In order to obtain a robust indicator of the impact's magnitude of the control variables in the model, we estimate the marginal effects. The marginal effects measure the probability of a children to attain a primary or secondary education when the educational level of their parents changes from no education to primary education, holding all other regressors unchanged.

4 | DATA

4.1 | Sampling

We use data from Comoros—Enquête intégrale auprès des ménages (EIM 2004), Ghana—Ghana Living Standards Survey (GLSS 2012/13), Guinea—Enquête Intégrée de Base pour l'Evaluation de la Pauvreté (EIBEP 2002/03), Madagascar—Enquête permanente auprès des ménages (EPM-2005), Malawi—Malawi Integrated Household Survey (IHS3 2010/11), Nigeria—Nigeria General Household Survey (GHS 2010/2011), Rwanda—Integrated Household Living Conditions Survey (EICV 1999/2000), Tanzania—Tanzania National Panel Survey (NPS 2009/2010), and Uganda—Uganda National Household Survey (UNHS 2005/06). The survey for Ghana, Malawi, Nigeria, Rwanda, Tanzania, and Uganda are from the Living Standards Measurement Study (LSMS) while Comoros, Guinea, and Madagascar are from Integral Household Survey, similar multitopic household surveys conducted by national statistical agencies of each country in collaboration World Bank's Development Data Group.[11]

All the surveys collect detailed information on demographic characteristics, education, health, employment, and time use of respondents and household members. For parents who are not living with their children, retrospective data on parental educational attainment and occupation is only available.[12] The selection of countries and survey years has been driven principally by data availability: all the surveys are representative datasets that collect information on both children and their parent's education regardless of whether parents are alive or not, if alive, live in the same household with their children. This allows us to identify parent's education for almost the entire adult population (in the age group 20–65), including parent–children pairs who do not coreside, in our sample. As of 2016, the countries in our sample were home to slightly more than 373 million people, representing around 37% of SSA population.

All surveys collect the educational attainment of children in a single variable that lists all grade combinations based on the International Standard Classification of Education (ISCED). Unlike children and parents who live in the same households, most of the surveys do not report detailed information about parents' education level. Most of the surveys report parents' education level into five broad categories—less than primary, primary, lower secondary, upper secondary or postsecondary, and tertiary. In all the countries, years of schooling is coded as the number of years associated with the highest grade completed, and repeated grades are not counted.

Parental educational attainment is the average of the years of schooling of the mothers and fathers. All the surveys contain information on the educational attainment of parents in two separate variables that differentiate the education of parents who are coresiding with their children and not residing in the household. We used the personal identification numbers of fathers and mothers to create a pair of parents and children if the parents and children are still living together in a household. In addition to this information, all the surveys we are using have another question that collects information on retrospective parental educational attainment of parents who are not coresiding with their children in a household regardless of whether the parent is alive or not. Combining these two variables, we have been able to identify parental schooling for more than 95% of adult respondents in each country.

Because of the lack of long panel or administrative data, most studies in the literature have used cross-sectional data and coresidence to identify child–parent pairs, mostly father-son pairs (Emran & Shilpi, 2015; Hnatkovska et al., 2013). Using coresidence identification has important implications for the analysis. First, because the distribution of education across both generations is different in the subsample of adults who live together with their parents and versus the total

population, sample selection problems arise that bias the IGE downward. For instance, Francesconi and Nicoletti (2006) and Azam and Bhatt (2015) document a bias because of the coresidence condition that ranges from 12% to 39% in constructing father–son pairs in the United Kingdom and India. Second, cohabitation criteria over identify younger adult children who are still living with their parents; this might leads to an unrepresentative adult population sample (Hnatkovska et al., 2013; Mazumder, 2005). Third, children–parent pairs that are constructed using coresidence identification does not allow cohort-wise long-term trend analysis of intergenerational im(mobility).

4.2 | Data description

Table 1 presents the description of the sample composition in each country. All the surveys have been conducted from 2000 onwards, and most have been conducted after 2005. The analysis is restricted to those individuals ages between 20 and 69, which corresponds to the year of birth going back as far as 1935 for Comoros, 1944 for Ghana, 1933 for Guinea, 1936 for Madagascar, 1942 for Malawi and Nigeria, 1931 for Rwanda, 1941 for Tanzania, and 1937 for Uganda.[13] After data cleaning, the total sample size ranges from 32,730 in Ghana to 6,778 in Tanzania; a total of more than 145,000 adult children (ages between 20 and 69) are represented in the study. The data in all the countries are organized into 5-year birth cohorts based on the children's years of birth. Table 1, also presents the minimum sample size in each country, which corresponds to the smallest sample size of 5-year birth cohort in each country.

The last two columns of Table 1 report the average years of schooling of parents and children in the first and last 5-year birth cohorts. In all countries, the average years of schooling have increased over the past 50 years, among both children and parents. We document 4 to 6 and 2 to 5 years of schooling gain between the first and the last birth cohorts of children and parents, respectively. We observe the least year of schooling gain, about 1 year, among both children and parents in Madagascar. This could be a reflection of Madagascar education system that has been characterized by high inequality even after independence (Mondiale, 2013).

Figure 1 provides a visual illustration of the educational attainment of children (daughters and sons) and their parents across 5-year birth cohorts. With the exception of the youngest cohorts, there has been an upward trend in the average years of schooling among both sons and daughters across cohorts. Average years of schooling is higher for sons than daughters, the gender difference remains similar across the two generations, females (mothers and daughters) have lower years of schooling than their male counterparts (fathers and sons).

Figure 2 presents children's highest level of education across 5-year birth cohorts. Overall, the proportion of children with no schooling has declined over the 50 years. We note a boom in primary education in all the countries, particularly among children born after the 1960s. This coincides with the policy changes in educational systems and a huge investment in human capital accumulation in the region after independence (UNESCO, 2011).

TABLE 1 List of countries, dates, sample size, and average years of schooling

					Average years of schooling			
	Dates		Sample size		Parents[a]		Children	
Country	Survey year	Birth years	Total[b]	Minimum[c]	Cohort 1	Cohort 10	Cohort 1	Cohort 10
Comoros	2004	1935–1984	5,835	218	0.25	1.09	1.17	4.19
Ghana	2012/13	1944–1993	31,822	1,046	1.02	5.4	4.36	8.28
Guinea	2002/03	1933–1982	22,052	724	0.12	2.44	0.57	4.26
Madagascar	2005	1936–1985	20,736	508	1.21	2.47	1.05	2.44
Malawi	2010/11	1942–1991	22,427	615	0.35	2.47	2.68	6.19
Nigeria	2010/11	1942–1991	11,643	409	0.28	4.29	3.05	8.63
Rwanda	1999/00	1931–1980	10,653	310	0.16	2.5	1.36	5.2
Tanzania	2009/10	1941–1990	6,527	218	0.55	5.13	2.29	6.75
Uganda	2005/06	1937–1986	13,561	393	0.65	4.63	2.81	7.12

[a]Parents' year of education refers to the average year of schooling of mothers and fathers.

[b]Total refers to the total sample size of adult children aged between 20 and 69 in survey years in each country.

[c]Minimum refers to the sample size of the smallest 5-year birth cohort for each county.

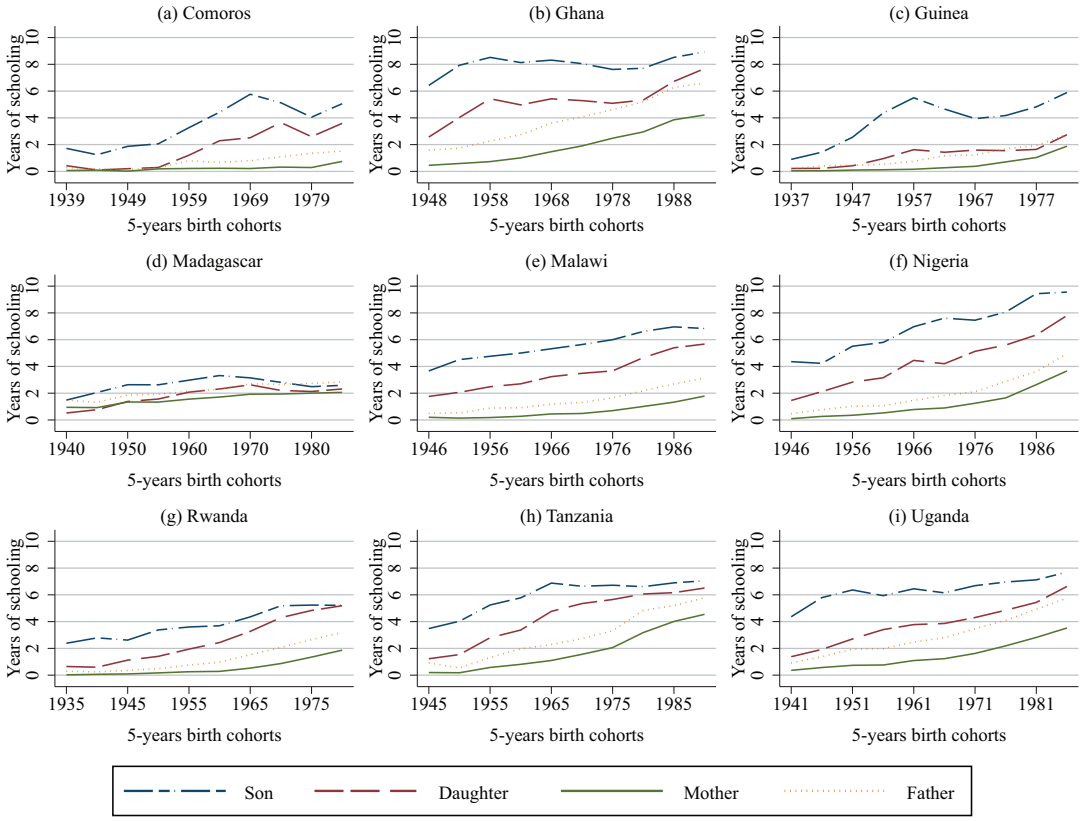

FIGURE 1 Educational attainment of children and parents by year of birth

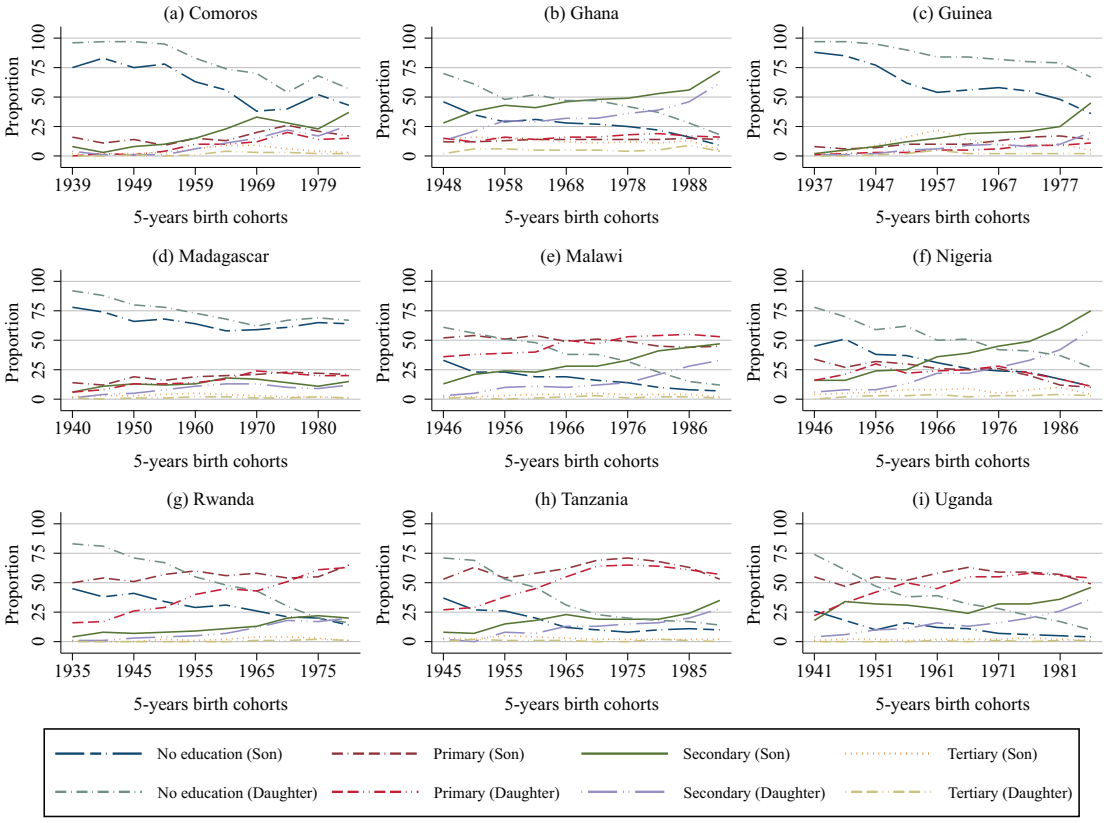

FIGURE 2 Children's highest grade completed, by 5-year birth cohort

In all our sample countries, the proportion of children who completed tertiary education was small. The proportion of daughters who complete tertiary education is less than 10% among all cohorts and countries. We note the same trend among sons except in Ghana and Guinea, where we observe a slight improvement in the two youngest cohorts. Similarly, a large proportion of parents show a lower level of education, no education, and primary education in all the countries across cohorts. Parent–child differentials in the distribution of the highest educational attainment suggest improvement in education mobility or a weak link between the educational persistence of parents and children over time, particularly among the youngest birth cohorts.

5 | ESTIMATION RESULTS

We present the estimates of the two intergenerational education persistence measures, IGE $(\hat{\beta})$ and correlation coefficient $(\hat{\rho})$, in five stages. First, we present our baseline estimates at country level. Second, we discuss the evolution of intergenerational education mobility across 5-year birth cohorts using both measures. Ranking each country among other nations for whom comparable estimates are available follows. Fourth, we explore the potential differences in intergenerational education mobility across gender. The final section discusses the estimates of order probit model for children's highest level of education.

5.1 | Education mobility at the country level

Table 2 presents the estimates of the IGE and correlation coefficients for the pooled sample in each country. The results reveal two main findings of interest. First, parental education has a statistically significant effect on children's educational attainment in all the countries, for all specifications considered. There exists an intergenerational link in educational outcomes: for instance, a 1 year difference in parental schooling is associated with a 0.74-year difference in children's education in Madagascar. In terms of the estimated IGE, Tanzania and the Comoros show the highest and the lowest intergenerational education mobility, respectively. On average, an additional year of parental schooling is associated with a 0.47- and a 0.91-year difference in children's years of schooling in Tanzania and the Comoros, respectively. The estimates imply that, despite the increase in years of schooling over the last 50 years, parental education plays a crucial role in children's education attainment.

Second, gender is an important determinant of educational attainment. This is in line with the exiting evidence in many developing countries. In SSA, boys are 1.6 times more likely to complete secondary education than their girl counterparts (Klugman et al., 2014). After controlling for gender, we find that estimated IGE declined slightly in Ghana, Guinea, Madagascar, Malawi, Nigeria, Rwanda, and Uganda, while it increased slightly in the Comoros and Tanzania, suggesting lower educational mobility or higher educational persistence among daughters than sons in most countries.

In column 3 of Table 2, we include other control variables that are used in the literature: age and number of children in a household. To capture the cohort effect, we also include the square of age.[14] The results show that the addition of the controls does not affect the estimated IGE in any significant way, though it leads to a slight increase in the explanatory power of the regression. The qualitative results remain unchanged; parental education plays a vital role in children's educational attainment in all the countries considered.

5.2 | Cohort analysis

This section presents the trends in intergenerational mobility across the 5-year birth cohorts using years of schooling for both generations. Figure 3 and Table A1 in the Online Annex summarizes the results. In line with our previous observations, parental education has a statistically significant effect on the child's education across most birth cohorts, the effect is more pronounced for younger cohorts. In all the countries, there has been a significant improvement in education mobility from the 1960s onward, but the trend has not been consistent. Nigeria, Guinea, Ghana, and Uganda have recorded the highest gains in intergenerational mobility between those born from 1940s to the 1990s.

The decline in the relationship between the education of parents and children is quite impressive in Nigeria, where the IGE between the youngest and the oldest cohort declined by 65% between 1942 and 1991 (Figure 3, panel [f]). For the Comoros, Guinea, and Rwanda, we document a small intergenerational educational persistence rate for the oldest

TABLE 2 Intergenerational education elasticity and correlation at the country level

Dependent variable: Children years of schooling						
	[1]		[2]		[3]	
	Coef.	Std. Err.	Coef.[a]	Std. Err.	Coef.[b]	Std. Err.
Comoros						
Parents years of schooling ($\hat{\beta}$)	0.906***	0.055	0.909***	0.053	0.833***	0.049
R^2	0.105		0.136		0.192	
Correlation ($\hat{\rho}$)	0.324***					
# Observations	5835		5835		5835	
Ghana						
Parents years of schooling ($\hat{\beta}$)	0.489***	0.007	0.484***	0.006	0.490***	0.007
R^2	0.214		0.262		0.263	
Correlation ($\hat{\rho}$)	0.463***					
# Observations	31,822		31,822		31,822	
Guinea						
Parents years of schooling ($\hat{\beta}$)	0.528***	0.015	0.506***	0.015	0.465***	0.016
R^2	0.139		0.200		0.221	
Correlation ($\hat{\rho}$)	0.372***					
# Observations	22,052		22,052		22,052	
Madagascar						
Parents years of schooling ($\hat{\beta}$)	0.739***	0.017	0.738***	0.017	0.736***	0.017
R^2	0.258		0.262		0.263	
Correlation ($\hat{\rho}$)	0.508***					
# Observations	20,736		20,736		20,736	
Malawi						
Parents years of schooling ($\hat{\beta}$)	0.637***	0.009	0.630***	0.009	0.567***	0.010
R^2	0.214		0.258		0.288	
Correlation ($\hat{\rho}$)	0.463***					
# Observations	22,427		22,427		22,427	
Nigeria						
Parents years of schooling ($\hat{\beta}$)	0.768***	0.012	0.758***	0.012	0.703***	0.123
R^2	0.288		0.317		0.335	
Correlation($\hat{\rho}$)	0.537***					
# Observations	11,643		11,643		11,643	
Rwanda						
Parents years of schooling ($\hat{\beta}$)	0.748***	0.020	0.745***	0.020	0.554***	0.021
R^2	0.188		0.202		0.267	
Correlation ($\hat{\rho}$)	0.434***					
# Observations	10,653		10,653		10,635	
Tanzania						
Parents years of schooling ($\hat{\beta}$)	0.467***	0.012	0.469***	0.012	0.426***	0.014
R^2	0.201		0.225		0.267	
Correlation ($\hat{\rho}$)	0.448***					
# Observations	6,527		6,527		6,527	

TABLE 2 (Continued)

Dependent variable: Children years of schooling	[1]		[2]		[3]	
	Coef.	**Std. Err.**	**Coef.[a]**	**Std. Err.**	**Coef.[b]**	**Std. Err.**
Uganda						
Parents years of schooling ($\hat{\beta}$)	0.616***	0.011	0.613***	0.011	0.543***	0.011
R^2	0.249		0.319		0.388	
Correlation ($\hat{\rho}$)	0.499***					
# Observations	13,561		13,561		13,561	

Notes: Parents education is average of mother's and father's years of schooling.
[a]Regression includes gender of children.
[b]Regression includes gender, age, age square, and the number of children in a family.
*Significant at 10%, **significant at 5%, ***significant at 1%.

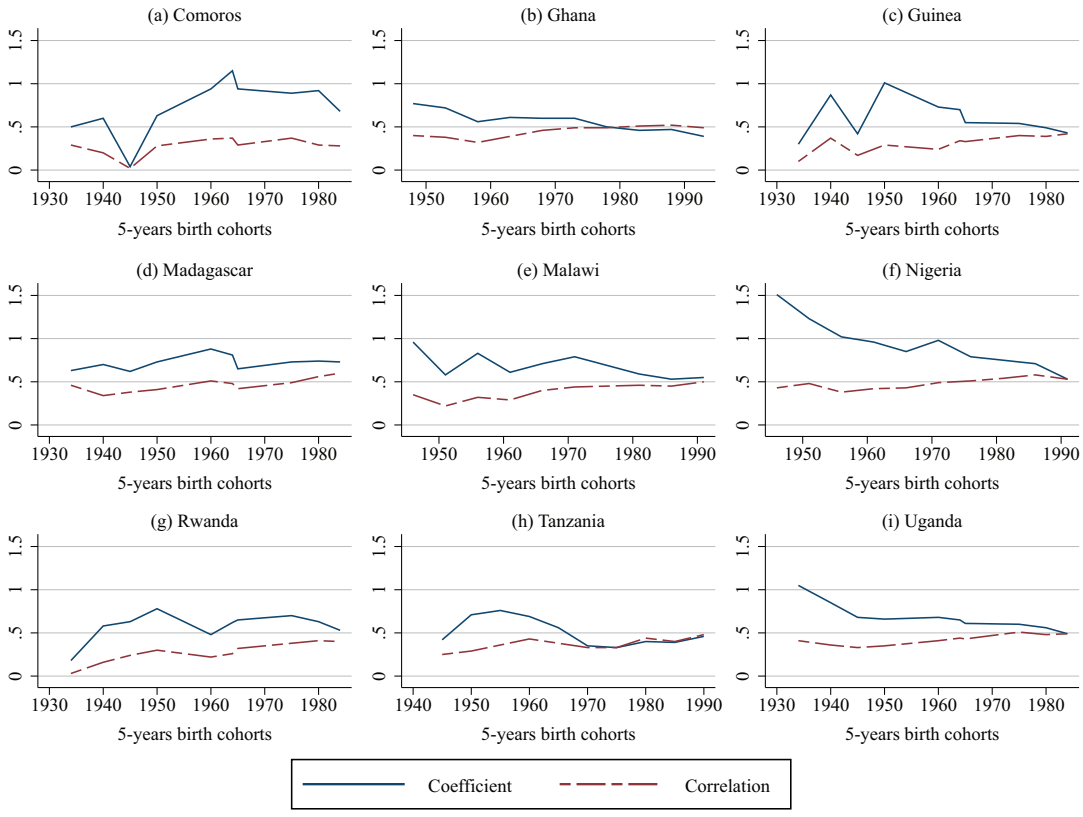

FIGURE 3 Intergenerational education elasticity and correlations by cohort

cohorts. However, a lower persistence rate in educational attainment in these countries does not necessarily reflect high social mobility among older cohorts; rather parental education does not vary across households because of the low education rate, and parental education can only explain a small proportion of the variation in child schooling. For example, children born between 1931 and 1935 in Rwanda have an average of 1.4 years of schooling, while their parents have only 0.2 years of schooling. This is consistent with our observations that the explanatory power of the relationship between parental and children's years of schooling has been limited among older cohorts and increased among the youngest cohorts in these countries (Table A1 in the Online Annex, column 4).

The general declining trend of IGE ($\hat{\beta}$) across cohorts partly reflects the improvement in the education systems and policies in many countries in our sample. The education systems in SSA in general expanded substantially after independence, in the 1960s, which almost doubled primary-school enrollments (UNESCO, 2011). Government expenditure

on education grew substantially during the period (UNESCO, 2011). During the decade, we observe a decline in intergenerational educational persistence in almost all countries in our sample (see, for instance, Comoros, Ghana, Guinea, and Nigeria estimates in Figure 3).

The rapid expansion of primary education 1990s and 2000s in almost all countries including Rwanda—for which the survey we used is from 20 years ago—may have enhanced mobility among subsequent generations. However, this cannot be verified using the available data since the cohorts of children who went through these reforms were not yet old enough to complete their education at the time of the surveys. Relying on a sample of children who reside in the same households with their parents Narayan et al. (2018) used Tobit regression and years-of-schooling-for-age as an alternative to estimate the effect of recent reforms on educational mobility of consequent generations.[15] They report a declining but high IGE for those born in the 1990s, suggesting more mobility among the young cohorts.

Economic factors such as GDP growth to some extent also explain changes in IGE across cohorts. Figure 4 shows the GDP growth trajectories of the countries under review using data from the World Bank, World Development Indicators. In the 1960s when SSA countries considered grew fairly at an average yearly GDP growth rate of 5.0%, intergenerational educational persistence declined significantly. In Nigeria, which benefited from the rapid improvement of the economic growth in the 1960s, the decline in intergenerational persistence between the youngest and oldest cohort surpasses the decrease in other countries. In the 1980s when the recurrent balance of payment failures and economic regression limited the public expenditure on education, we observe a rebound in the intergenerational persistence rate in all the countries. Finally, during the revival of the economies in the 1990s, we again observe a decline in IGE among the youngest cohorts in all countries except Malawi and Tanzania.

For the standardized measure of intergenerational mobility, the correlation coefficient, a declining trend is not visible. A plausible explanation for the discrepancy between the two measures is a change in the dispersion of the years of schooling across the two generations (parents' and their children). To examine this possibility, we present, in Figure 5, the trend in the standard deviations of years of schooling of both generations and the two measures of intergenerational educational persistence.

The result clearly shows that, while the dispersion of education in the children's generation has decreased from the 1960s onward, the inequality in parental education has increased. This finding is expected: if nearly all parents were initially uneducated and then a small proportion, especially young parents, gain access to education, the variance in years of schooling will increase.

For all the countries but Tanzania and Ghana among recent cohorts, the variance in children's years of schooling is always greater than that of the parents. This leads to a ratio of the standard deviation of parental schooling to that of their children of less than 1, because of which the correlation coefficient ($\hat{\rho}$) is less than the IGE ($\hat{\beta}$) among almost all the cohorts in every country. The combined effects, that is, the lower intergenerational correlation and the rise in the dispersion of parental education, explain the slight increase in intergenerational correlation. These patterns are similar to those reported by Narayan et al. (2018), Azam and Bhatt (2015) and Hertz et al. (2007).

5.3 | Cohort analysis by gender

This section presents the trend in intergenerational educational persistence across 5-year birth cohorts by gender.[16] As we observed in the previous section, Figure 6 shows increase in intergenerational mobility across birth cohorts, for both

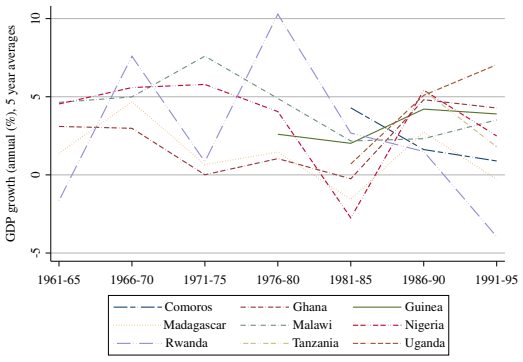

FIGURE 4 GDP growth (annual %), 5 year averages

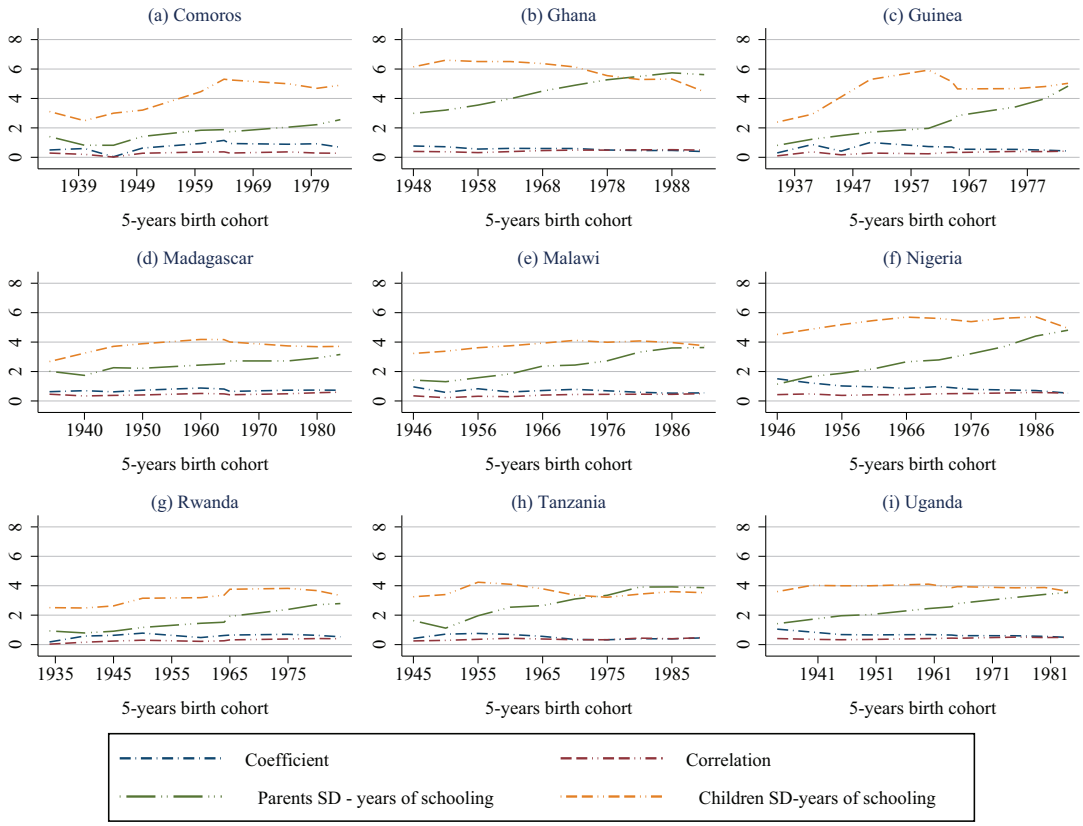

FIGURE 5 Evolution of intergenerational educational persistence and standard deviations education by 5-years birth cohorts

men and women particularly after the 1960s (Table B1 in the online Annex also presents detail results). Although the general trend intergenerational mobility is similar across cohorts, its pace varies by gender. Both measures of intergenerational persistence are higher for daughters than sons except in Comoros and Madagascar. This suggests that daughters' education is more dependent on parental education than their son's counterparts. However, IGE has been declining at a higher rate among girls relative to sons and the gender gap is closing up rapidly in all countries considered. This is in line with the findings of Narayan et al. (2018), which report higher educational mobility among women in both high and low-income countries.

The higher intergenerational educational persistence for daughters corroborates those of earlier findings in both developing and developed economies. For instance, Ranasinghe (2015) and Emran and Shilpi (2015) report higher educational persistence for women compared with men in Australia and India, respectively. Azomahou et al. (2019) report lower occupational mobility to modern sector for women in Nigeria. They argue that psychic cost—a reflection of parent's pessimism on their girl's adulthood outcomes explains the gender gap in intergenerational mobility. Emran and Shilpi (2015) also document lower occupation mobility from agriculture to non-farm activities for women in Vietnam and Nepal.

The results are not surprising in the context we are working. Previous studies in many developing countries report that boys fare better than girls (Aurino, 2017; Barcellos et al., 2014), boys receive more child care, are breastfed longer and even get more dietary supplements. Among other factors eldest-son preferences, restricted time allocation by women in the labor market, and psychic cost explain the systematic gender differences in human capital investment (Aurino, 2017; Azomahou et al., 2019; De la Croix & Vander Donckt, 2010).

5.4 | Countries ranking

To compare levels of intergenerational educational persistence and rank the countries in our sample in terms of im(mobility) in educational attainment, we follow the approach of Hertz et al. (2007) and derive the simple average of

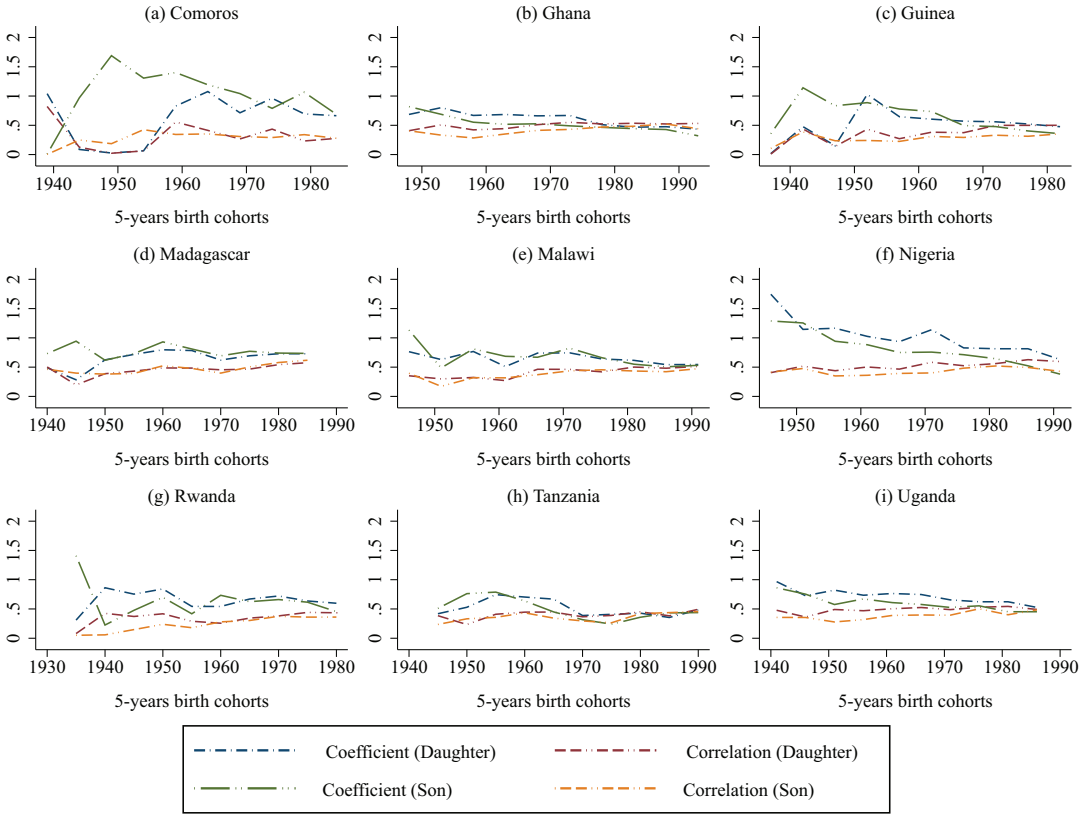

FIGURE 6 Intergenerational education elasticity and correlations by cohort and gender

$\hat{\beta}$ and $\hat{\rho}$ across 5-year birth cohorts in each country.[17] As discussed above in Section 3, $\hat{\beta}$ measures interpersonal differences in education, whereas $\hat{\rho}$ divides the education difference by the standard deviation of education for the respective generation. Therefore, the question of which measure is more appropriate for ranking nations involves self-judgment. Since we are comparing countries with different educational systems and educational distribution, we use $\hat{\rho}$ to rank the countries.

Our result shows that most of the countries, except Rwanda and Comoros, show greater intergenerational educational mobility than Latin American countries, but lower mobility than Western Europe countries, the United States, and Eastern European countries (Table 3). The estimates for Rwanda and the Comoros which show higher mobility than most developed countries should be interpreted with caution. It is worth to remember that parents in both countries had fewer average years of schooling even among the youngest birth cohorts, and parental schooling explains only a small proportion of the variation in children's schooling (see Figure 1, Figure 2, and Table 1) and hence lower estimates of intergenerational persistence measures.

Less is known about the origins of differences in educational persistence between countries, in particular the large difference that we have observed between Nordic countries and the rest of the World. The higher intergenerational educational mobility in Nordic countries is suggestive of a role for public policy to promote social mobility, given the high level of political commitment to equitable society and social welfare in those countries. Using data from 16 Latin American countries Behrman and Birdsall (2001) echo this argument, their finding suggests that higher government expenditures on primary education, higher average levels of education of the teachers, and greater financial inclusion reduce the intergenerational persistence of schooling significantly.

Our hypothesis is that the origin of the difference in SSA countries considered lies in the initial education conditions at the time of independence and relate to the way and the time primary schooling reforms implemented in each country. Countries like Ghana, Uganda, and Nigeria which had a better stock of educated old generation and were in the front line to expand primary education and abolition of primary school fees experienced a higher decline in intergenerational educational persistence over the past five decades compared to other countries in our sample.

TABLE 3 Countries ranked by average parent–child education correlations

Country	$\hat{\beta}$	Rank	$\hat{\rho}$	Rank
Peru	0.88	7	0.66	1
Ecuador	0.72	15	0.61	2
Panama	0.73	12	0.61	3
Chile	0.64	23	0.60	4
Brazil	0.95	4	0.59	5
Colombia	0.80	9	0.59	6
Nicaragua	0.82	8	0.55	7
Indonesia	0.78	10	0.55	8
Italy	0.67	21	0.54	9
Slovenia	0.54	35	0.52	11
Egypt, Arab Rep.	1.03	2	0.50	12
Hungary	0.61	25	0.49	13
Sri Lanka	0.61	24	0.48	14
Nigeria	**0.93**	**6**	**0.48**	**15**
Madagascar	**0.72**	**14**	**0.46**	**16**
Pakistan	1.00	3	0.46	17
United States	0.46	42	0.46	18
Switzerland	0.49	39	0.46	19
Ireland	0.70	17	0.46	20
Ghana	**0.55**	**34**	**0.45**	**21**
South Africa	0.69	18	0.44	22
Poland	0.48	40	0.43	23
Uganda	**0.68**	**19**	**0.42**	**24**
Philippines	0.41	45	0.41	25
Vietnam	0.58	29	0.40	26
Belgium	0.41	44	0.40	27
Estonia	0.54	36	0.40	28
Sweden	0.58	32	0.40	29
Malawi	**0.68**	**20**	**0.39**	**30**
Ukraine	0.37	49	0.39	31
East Timor	1.27	1	0.39	32
Bangladesh	0.58	31	0.38	33
Slovakia	0.61	26	0.37	34
Czech	0.44	43	0.37	35
Netherlands	0.58	30	0.36	36
Tanzania	**0.50**	**37**	**0.36**	**37**
Norway	0.40	47	0.35	38
Nepal	0.94	5	0.35	39
New Zealand	0.40	46	0.33	40
Finland	0.48	41	0.33	41
Northern Ireland	0.59	28	0.32	42
United Kingdom	0.71	16	0.31	43
Malaysia	0.38	48	0.31	45

(Continues)

TABLE 3 (Continued)

Country	$\hat{\beta}$	Rank	$\hat{\rho}$	Rank
Guinea	**0.60**	**27**	**0.30**	46
Denmark	0.49	38	0.30	47
Kyrgyzstan	0.20	52	0.28	48
Comoros	**0.73**	**13**	**0.27**	**49**
Rwanda	**0.58**	**33**	**0.27**	**50**
China	0.34	50	0.20	51
India	0.64	22	0.52	10
Australia	0.30	51	0.31	44
Ethiopia	0.75	11	0.10	52

Notes: India data from Azam and Bhatt (2015). Australia data from Ranasinghe (2015). Other countries data from Hertz et al. (2007). Estimates for Sub-Saharan African countries are authors calculations. The bold values are average of 10 estimates with different significance level, at times.

5.5 | Educational level intergenerational mobility

As discussed in Section 3, intergenerational im(mobility) measures obtained from a regression of the education of children on the education of their parents do not distinguish between upward and downward mobility. To investigate the influence of parental background on the likelihood of children achieving various levels of educational attainment, we estimate an ordered probit model. Tables D1-D18 in online Annex present the marginal effects of a child achieving various level of education, conditional on her mother or father education for each 5-year birth cohort in each country. In all countries, the omitted category for mothers and fathers education pertains to parents with no schooling.

There are several findings of interest. First, there is convergence toward zero in the probability of children having no education in all countries. Results show that downward mobility that is attaining no schooling when parents have at least primary education compared to the reference group (parents without education) is negative across cohorts suggesting upward mobility from no schooling to upper level of education. Second, we find a narrowing but not closing gap in the probability of children's having primary education across all family educational backgrounds. For instance in Comoros, the probability of having a primary education when a mother has primary education instead of no education declines from 13% in the oldest cohort to 2.5% in the youngest cohort. We observe a similar trend in Guinea, Madagascar, Rwanda and Tanzania. This result suggests a narrowing but not closing gaps in primary education for children with at least primary education.

In Ghana, Nigeria, Uganda, and Malawi children from parents that have primary education instead of no education experienced an upward mobility, children have a higher chance of obtaining a secondary education and above. Finally, children from the better-off family background (parents that have secondary and above education) compared with children with worse-off family background have a greater chance of getting a higher education than children from parents that have no education or completed primary education. Thus, children with poor parental education still have a lower prospect of attaining higher education. Checchi et al. (2013) also report a high persistence of educational attainment in Italy mainly driven by children with highly educated fathers having a higher probability of obtaining a college degree than those with less educated fathers.

Overall, our results suggest that all the counties experienced upward intergenerational education mobility over the last 50 years. However, the observed mobility is concentrated in the lower tail of the education distribution, primary education. It is plausible to argue that the observed increase in education mobility could be mainly a result of expansion of primary education which do not extend to higher education. A possible explanation for this is the underdeveloped higher education system with a declining public expenditure.

6 | DETERMINANTS OF EDUCATIONAL MOBILITY

The previous section shows that intergenerational educational mobility varies significantly across countries. In this section, we investigate the correlation between the two measures of intergenerational mobility and potential drivers.[18]

Existing economic literature considers income inequality, return to education, and government spending on education as the major determinants of intergenerational mobility (Daude & Robano, 2015). High levels of inequality can distort individual incentives and exclude talented individuals from poor family backgrounds to benefit from rewarding opportunities (Corak, 2013; Cunha et al., 2010). High return to education encourages parental investments on education that are likely to play a pivotal role in intergenerational reproduction of socioeconomic status (Torche, 2014), through providing more incentive to better-off households to invest more in human capital accumulation. Progressive public investment on education on the other hand, could reduce the cost of education for poor households and equalize opportunities for children with different parental backgrounds (Daude & Robano, 2015; Herrington, 2015).

Figure 7 shows the relationship between the IGE and partial correlation coefficient and three variables that the literature considers potential drivers of social mobility. The IGE and the partial correlation coefficient are the averages across 5-year birth cohorts in each country. The data on return to education for additional year of schooling are from Montenegro and Patrinos (2014); we use the earliest available estimates for each country.[19] Gini index and government spending on education are from the World Bank World development indicator database and they are average values between 1980 and 2000.[20]

Results presented Figure 7 suggest a positive correlation between the IGE and income inequality measured by the Gini coefficient. From the countries considered, Malawi and Comoros exhibit higher income inequality and higher educational persistence. This results are similar to the findings of (Daude & Robano, 2015; Narayan et al., 2018).

In contrary to the theoretical prediction, we observe a negative correlation between a return to education and intergenerational educational persistence measures. Tanzania exhibits the highest mobility and returns to additional years of schooling in our sample. One plausible explanation might be that poor households invest in education based on greater perceived economic pay-offs to education. This argument corroborates the findings of Hedges et al. (2016) who observe farmers and small business owners investing more in education in rural Tanzania. Montenegro and Patrinos (2014) estimate return to education measured by labor market earnings using semilog earnings function. Their analysis excludes self-employed or individuals who are engaged in the informal sector. Given that we are working in context where self-employment and informal sector is predominant, the negative relationship we document might arise due to measurement errors.

The results also suggest a negative relationship between education persistence and public expenditure, implying public investment in education creates an equal opportunity of education to children with a different parental background. Ghana exemplifies this, for the period under consideration, it experienced one of the highest reduction in the IGE between the oldest and the youngest cohorts and has the highest government expenditure on education as a share of total government expenditure. The positive relationship between public education expenditure and educational

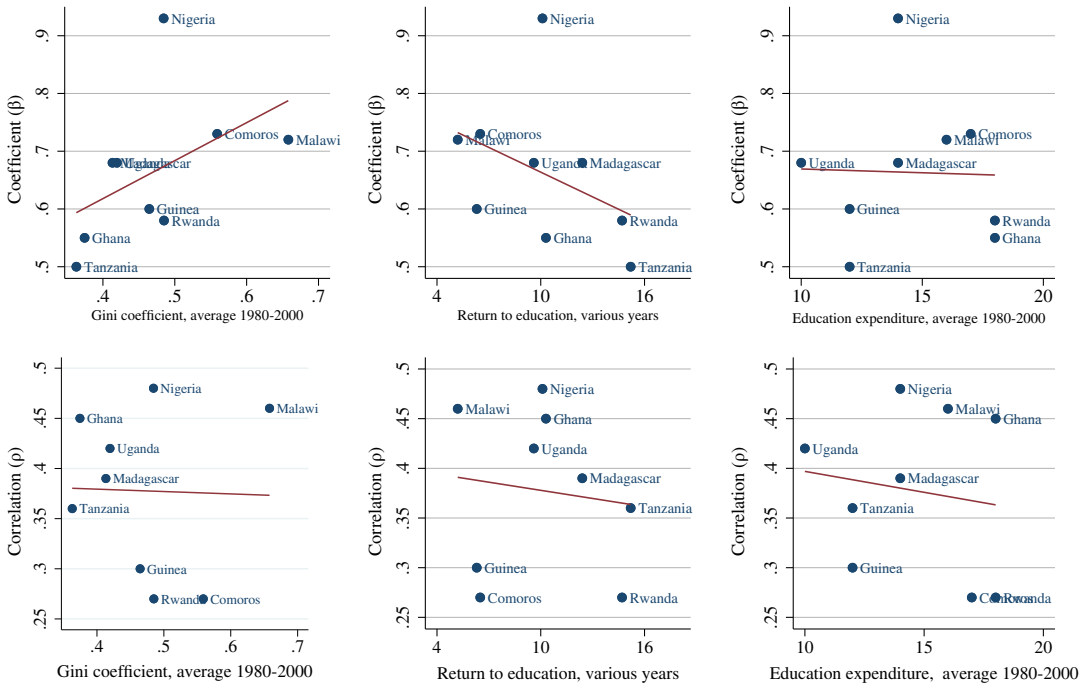

FIGURE 7 Possible drivers of intergenerational education persistence across countries

attainment has been extensively documented in the literature, in both developing and developed countries (Black & Devereux, 2011).

7 | CONCLUSION

Drawing on nationally representative survey data, we study the intergenerational im(mobility) of educational attainment in Comoros, Ghana, Guinea, Madagascar, Malawi, Nigeria, Rwanda, Tanzania, and Uganda over 50 years. The overall results indicate that there has been a significant improvement in intergenerational educational mobility during the last five decades, particularly after the 1960s. We also document country heterogeneity: Nigeria, Guinea, Ghana, and Uganda experienced the highest intergenerational mobility, and the Comoros and Madagascar the lowest. Nevertheless, the educational attainment of parents remains a strong determinant of children's schooling outcomes. We also document more mobility in the lower tail of the education distribution; children from poor family educational backgrounds exhibit a greater chance of attaining primary schooling, while children from well-educated family backgrounds have a greater chance of obtaining schooling beyond primary education. Most of the African countries have greater intergenerational educational mobility than Latin American countries. However, mobility in the sample countries is lower than European countries, the USA, and the former Eastern Bloc countries.

From a policy perspective, our results suggest the need for targeted redistribution policies that improve intergenerational mobility in the region. Our result points toward the importance of public investment in boosting opportunities for the disadvantaged, countries that were in frontline in implementing universal primary education, and allocated higher public resources on education exhibited the highest mobility, over the five decades. Emerging research also suggests that comprehensive early childhood development comprising health, nutrition, and emotional development would play a vital role in promoting social mobility. Conditional cash-transfer programs like Livelihood Empowerment Against Poverty Program (LEAP) in Ghana and PROGRESA/Oportunidades in Mexico, which are often conditional on households to make pre-specified investments in the human capital of their children, have shown to be a useful tool for increasing school enrolment, reduced grade repetition and school absenteeism (Handa et al., 2013; Vegas & Santibáñez, 2010). While primary education enrolment in our sample has generally increased over the five decades, access to secondary schooling is far from being universal and children with poor educational family background have a lower chance to attain a higher level of education. Evidence from developed countries suggests that making secondary education mandatory weakens the link between parental education and child education (Oreopoulos et al., 2006). Putting in place policies that promote access to secondary education is, therefore, a priority target for the educational system in the countries under investigation. Moreover, progressive public investments like student grants and student loans in higher education could create equal opportunities for children with poor family backgrounds.

There are two caveats. Because it was difficult to find valid instrumental variables to address the genetic correlations (ability and preference) between parents and their offspring, the study does not distinguish the effects of nature and nurture. As such, we limit our analysis to investigating the correlation between the educational attainment of parents and children without implying any causality. Second, for all countries in our sample, we rely on single cross-sectional surveys and study intergenerational mobility among 5-year age cohorts. Hence, we cannot assess the extent of measurement error, if any, in the education variable of both parents and their children. Future research might, therefore, involve examining the importance of these elements to document the importance of the recent education policy changes in Africa in promoting social mobility.

ACKNOWLEDGMENTS

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ENDNOTES

[1] Inequality in an outcome such as income and education depends not only on an opportunity an individual has but also on effort and risk-taking. Reward to risk-taking behavior and effort might increase inequality. From this perspective, not all form of inequality is necessarily

bad, although a high level of inequality can have an immense socioeconomic cost for a society, such as low growth-poverty elasticity and social unrest, among others (Beegle et al., 2016; Ferreira & Gignoux, 2011).

[2] Income and wealth data for Africa countries is almost nonexistent. For example, income data is available for less than 1% of the adult population in Ghana, Kenya, Tanzania, Nigeria, and Uganda (Alvaredo et al., 2017). It is also difficult to use tax records due to large informal sector (La Porta & Shleifer, 2014).

[3] To address life cycle bias in income estimates, one needs long-run data on income; using 5 year average of parents' income is found to underestimate intergenerational persistence by 30% (Mazumder, 2005).

[4] All the surveys are the latest representative data sets available that collect information on both children and their parent's education regardless of whether parents live in the same household or not.

[5] It is worth to mention that the data used in this study are comparable with the data set used by Hertz et al. (2007) for 42 countries and Azam and Bhatt (2015) for India.

[6] See Section 4 on the construction of parents' and children's matched data for the analysis.

[7] See Black and Devereux (2011) for a recent survey of the literature, along with the methodological challenges of the existing evidence in developed economies.

[8] When the interest of the analysis is measuring intergenerational persistence, accounting for other covariates would bias estimates as other controls capture parts of the effects. For example, including geographical fixed effects wipes-off part of family background effects that are related to neighborhood characteristics. Therefore, in the literature it is tradition to use estimates without any additional controls as a benchmark for country comparisons.

[9] All the surveys collets data on area of residence of children, that allows undertaking the rural–urban gap of intergenerational mobility.

[10] Due to a lower level of schooling for older parents we could not define more education categories.

[11] More statistical addendum of the surveys and a guide how to access the microdata are available on the Website of the World Bank (https://microdata.worldbank.org/index.php/catalog/lsms).

[12] Common sociodemographic characteristics of children such as gender and area of residence at the time of the surveys allow a comparative analysis of mobility across countries within the sociodemographic characteristics.

[13] The age range is consistent with Hertz et al. (2007), which makes our estimates directly comparable with their estimates of 41 countries. As a result, we are able to rank the countries in our sample against their estimates.

[14] Detail results are available from authors.

[15] These estimates can be considered as a proxy for intergenerational elasticity ($\hat{\beta}$) of young cohorts. However, they are not directly comparable with our estimates because of differences in methodology and construction of parents and children pairs.

[16] It is important to note that our analysis across gender is based on intergenerational elasticity that is estimated separately for daughters and sons subsample, showing the cohort trend within each gender (Zuberi, 2003 for detailed discussion).

[17] One advantage of using the average of educational persistence measures across cohorts rather than running a single regression for all age-groups as we did in Table 2 is that the former does not give more weight to larger cohorts.

[18] It is important to note that, rather than presenting a causal inference, our analysis shows cross-country correlations to motivate future research in this area.

[19] Different studies have reported different estimates of returns to schooling across developing economies, including the countries under investigation. We choose the estimates of Montenegro and Patrinos (2014) because they provide comparable estimates, using semi-log earnings function and labor income, for all the countries in our sample.

[20] Table C1 in the online Annex shows the measure of the variables in each country.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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