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Intergenerational Education Mobility in Africa

Has Progress Been Inclusive?

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Abstract

This paper employs nationally representative household survey data on parents of adult individuals to analyze the intergenerational transmission of education in nine Sub-Saharan African countries. The paper provides the levels, trends, and patterns of intergenerational persistence of educational attainment over 50 years, with a special focus on gender differences. The study finds a declining cohort trend in the intergenerational educational persistence in all the countries, particularly after the 1960s. The increase in educational mobility coincides with drastic changes in educational systems and a huge investment in human capital accumulation in the region following independence.

Nevertheless, the education of parents' remains a strong determinant of educational outcomes among the children in all the countries. Ghana, Guinea, Nigeria, and Uganda experienced the highest intergenerational mobility, and the Comoros and Madagascar the lowest. In all the sample countries, more mobility is observed in the lower tail of the distribution of education. Intergenerational educational persistence is strong from mothers to children, and the effect is more pronounced among daughters than sons. The results highlight the need for targeted redistributive policies that improve intergenerational mobility in the region.

Intergenerational Education Mobility in Africa: Has Progress Been Inclusive?[*]

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1 Introduction

Since the mid-1990s, the resurgence of growth has been remarkable in Sub-Sharan Africa. For instance, between 2000 and 2012, the region experienced a 3 percent per capita annual growth rate in Gross Domestic Product (Thorbecke, 2013). Recent evidence indicates that, while the observed growth has led to considerable poverty reduction, it has been accompanied by a rise in inequality in a number of countries, including Kenya, Uganda, and Zambia (Fosu, 2015). Accordingly, there is growing concern that the benefits of economic growth are not shared broadly. For policy making, it is important to understand whether the increase in inequality is an outcome of an economic structure that rewards hard work and risk taking, or whether it is a reflection of the existence of inequality of opportunity within society. The rise in inequality becomes a policy concern if it is an outcome of inequality of opportunity among individuals with different initial circumstances; for example children from poor families with ability and talent are unable to move beyond the position of their parents on the economic ladder through their own effort and choices (Rawls, 1971). Intergenerational persistence in socioeconomic status is the main mechanism through which inequality of opportunity persist in a society. For example, social mobility may differ based on gender, race, ethnicity, or region, suggesting differential access to opportunity across groups within a society. Equality of opportunity has come to be a key condition if a society is to achieve an acceptable level of equity: in its strongest form, equality of opportunity is a more relevant aspect of policy in a society than of inequalities of outcomes (Kanbur and Wagstaff, 2015; Rama et al., 2015). Greater inequality of opportunity may result in greater inequality in a society and affect public attitudes toward other social objectives such as growth and poverty reduction (Atkinson, 1980; Piketty, 1995; Corak, 2013). Because of this, the extent to which socioeconomic outcomes are transmitted from one generation to the next has long been of interest among development 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 because of lack of appropriate data. In particular, intergenerational mobility studies on Sub-Saharan Africa are scarce.[1] 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 in nine Sub-Saharan Africa countries. We use education as an indicator of economic status. Using education as an indicator of economic status has four main advantages. First, the literature in both developed and developing countries identifies education as an important driver of labor market participation and, hence, income, more years of schooling is usually associated with higher income (see Chevalier et al., 2003; Blanden et al., 2005; Black and Devereux, 2011). Understanding the trends, levels and patterns of the persistence of the education attainment across generations therefore sheds light on overall mobility in economic status in a society. Second, schooling is an outcome on which it seems reasonable to assume respondents can reliably report on their parents. Third, data restrictions, especially in developing countries, are much less stringent; retrospective information on parents' education has been more widely available recently than information on parental incomes or occupations. Finally, using income to proxy socioeconomic outcomes in developing countries is found to be problematic. There is a serious concern about persistence of measurement errors in consumption and income data from developing countries (see Deaton, 1997; Glewwe, 2005; Lee, 2009 for detailed discussion). Education is also considered a vital policy instrument in the creation of equal access to economic opportunity, leading to higher social mobility and economic progress (Bowles, 1972; Becker and Tomes, 1979; Piketty, 1995; Hertz et al., 2007; Corak, 2013; Reeves, 2014). Furthermore, the region serves as an excellent case study for intergenerational education mobility. It endorsed the United Nations goal of Education for All agreed in Dakar in 2000, a commitment to provide quality basic education for all children and adults by 2015. Accordingly, many countries in the region undertook major reforms in education systems, including the abolition of school fees (Thakur, 1991; Tomasevski, 2006). Thus, gauging how such policy changes induce intergenerational mobility has important policy implications.

Drawing on nationally representative survey data, the study analyzes the trends, levels, and patterns of intergenerational im(mobility) in educational attainment in the Comoros, Ghana, Guinea, Madagascar, Malawi, Nigeria, Rwanda, Tanzania, and Uganda over 50 years, with a special focus on gender differences. The paper contributes to the existing literature in several ways. First, the study extends the existing evidence by creating comparable recent estimates for nine Sub-Saharan African countries so that we may begin to draw conclusions about the inclusiveness of the recent investment in education in the sampled countries. Using two widely applied measures of intergenerational persistence, we provide persistence estimates for 10 successive five-year birth cohorts at the aggregate and gender levels in each

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[1]South Africa is the exceptional country in the region where there exists a reasonable literature on intergenerational transmission of economic status.

country. Second, by closely following the methodology of the two closest antecedent studies in developing countries (Hertz et al., 2007; Azam and Bhatt, 2015), we are able to rank countries in terms of intergenerational educational mobility. To the best of our knowledge, there exist no comparable estimates on these countries.[2] Third, unlike other studies in developing countries, the estimates presented in this study do not suffer from selection bias caused by imposing co-residence to construct parent and child pairs. Most of the studies on intergenerational mobility still rely on cohabitation to identify parent and child pairs. Using this method has two major consequences. First, using coresidents to identify parent and child pairs leads to a sample selection that biases the intergenerational elasticity downward. For instance, Francesconi and Nicoletti (2006) and Azam and Bhatt (2015) document a substantial bias in constructing father and son pairs in the United Kingdom and India, respectively. Second, coresidence over represents younger adults who are still living with parents, which restricts the analysis to an unrepresentative young population (Jalan and Murgai, 2007; Hnatkovska et al., 2013). The current study addresses this issue by using nationally representative data on educational attainment among adult individuals and their parents regardless of whether parents are alive or, if alive, reside in the same household.[3] Fourth, the existing evidence on the link between child and parental education by gender is largely unexplored. A handful of studies examine the intergenerational persistence of economic status between parents and daughters (see Grusky and DiPrete, 1990; Chadwick and Solon, 2002). In this study, we attempt to fill this gap in the literature and provide gender estimates (daughters-mothers, sons-mothers, daughters-fathers, and sons-fathers) of intergenerational educational persistence by five-year birth cohorts in each country.

The study uses two measures of intergenerational educational mobility: intergenerational elasticity and the partial correlation coefficient. The analysis shows the trends in intergenerational educational mobility across five-year birth cohorts for each sex in each country. There are several findings. Comparing the highest educational attainment, both measures accord in pointing out the importance of parental education in determining the educational attainment of children in all the countries. We find a declining cohort trend in the estimated intergenerational elasticity in all the countries, particularly after the 1960s. This implies greater educational mobility among more recent birth cohorts in all the countries. The declining trend after the 1960s coincides with the drastic changes in educational systems and the huge investment in human capital accumulation in the region since independence. We note a country difference: Nigeria, Guinea, Ghana, and Uganda experienced the highest intergenerational mobility, and the Comoros and Madagascar the lowest. The decline in intergenerational education persistence is strongest in the lower tail of the education distribution, and, daughters' educational attainment is more correlated with parental education. The greater intergenerational persistence among women compared with men is consistent with previous findings in other developing countries (Thomas, 1996; Branson et al., 2012; Ranasinghe, 2015; Emran and Shilpi, 2015). Furthermore, in all the countries except the Comoros, intergenerational persistence from mothers to children is stronger. This result contrasts with evidence from South Africa where the link between children and father's education is stronger than or the same as that of mothers (Lam, 1999; Girdwood and Leibbrandt, 2009). In line with the findings of Hertz et al. (2007) for 42 countries and Azam and Bhatt (2015) for India, we also show that the correlation coefficient between parents and child's schooling has been increasing or remaining constant across cohorts, mainly driven by educational inequality in the parents' generation. This result is not surprising in our context given that the correlation coefficient provides an absolute measure of intergenerational persistence after account is taken of a possible improvement in the distribution of education attainment because of education system reforms, such as the abolition of school fees, which increase average schooling and reduce variation in schooling. The education systems of all the countries in our sample have changed drastically since the 1960s. From a policy perspective, our result highlights the demand for targeted redistributive policies that can improve intergenerational mobility in the region. Moreover, putting in place a favorable environment for women who are less well off in terms of education might play a decisive role in promoting social mobility not only in the short run, but also in the next generation.

The rest of the paper proceeds as follows. Section 2 reviews the literature and places the study in the context of existing literature. Section 3 presents the analytical framework. Section 4 describes the data. Section 5 presents the results. Section 6 offers concluding remarks and describes potential policy implications.

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[2]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. Moreover, the sample of Hertz et al. (2007) uses an old survey of Ghana.

[3]See section 4 on the construction of matched data on parents' and children's educational educational attainment.

2 Related literature

Intergenerational social mobility refers to the ability of children to climb higher than their parents on the socio economic status ladder when they become adults. Although the literature has widely focused on income, several social outcomes such as education, social class, health, or occupation can be used to study intergenerational mobility in a society (Bhalotra and Rawlings, 2011; Causa and Johansson, 2011; Ferreira et al., 2012; Bauer and Riphahn, 2007). Indeed, education is viewed as the main shaper of all other adulthood opportunities (Stiglitz, 2012). The literature on intergenerational mobility in education, occupation, and income is broad and extensive in developed countries. Black and Devereux (2011) update the previous works of Solon (1992, 1999) and present a survey of the literature, along with the methodological challenges of the existing evidence in developed economies. 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 Sub-Saharan African 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 highest and the lowest 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). 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 almost nonexistent.[4] Some important early contributions on South Africa include Thomas (1996), Lam (1999), Case and Deaton (1999), Nimubona and Vencatachellum (2007), and Girdwood and Leibbrandt (2009). Overall, the studies find that parental education determines education outcomes among children and that there is substantial education persistence in the country, especially among black South Africans. Recent studies (Branson et al., 2012; Kwenda et al., 2015) document a decrease in intergenerational transmission of education over the last five decades in the country. To the best of our knowledge, the only cross-country study on intergenerational education mobility that includes other African countries is Hertz et al. (2007). Using data from Ethiopia, Ghana, and South Africa, the authors present evidence of lower educational persistence in African countries compared with Latin American countries. However, the smaller educational persistence rate in educational attainments between children and parents in these countries is not necessarily indicative of greater mobility. Rather, parental education dispersion was limited because of the low educational level in the population during their study period.

The evidence on education mobility across generations by sex is mixed. Lam (1999) finds that the effect of a mother's education on a child's education is no different relative to that of a father in South Africa. In contrast, Kwenda et al. (2015), Thomas (1996), and Branson et al. (2012) on South Africa, Ranasinghe (2015) and Crook (1995) on Australia, and Björklund et al. (2006) on Sweden present empirical evidence that the schooling of mothers has a bigger effect on children's educational attainment than that of fathers, while Girdwood and Leibbrandt (2009), Plug (2004), and Behrman and Rosenzweig (2005) find the paternal effect to be strong in the United States. The current study aims to extend the evidence for on nine Sub-Saharan African countries with recent data and provide an in-depth analysis of intergenerational education mobility over the long term. The study therefore complements the growing literature on international comparisons of intergenerational education mobility and fills the hitherto overlooked aspect of intergenerational mobility in developing countries particularly in Sub-Saharan Africa.

3 Analytical framework

There are several theoretical arguments on how parental educational background affects children's education. Educational decisions on children are determined by parental preference and credit constraints

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[4]To the best of our knowledge, Hertz et al. (2007) are the only exception, their sample includes three Sub-Saharan African countries. This study also updates the data on Ghana using recent survey data.

(Becker and Tomes, 1979, 1986; Solon, 1992, 1999). These theoretical arguments identify many possible channels through which parental education affects children's education. For instance, parents affect their children through innate ability, which has an impact on educational attainment, an aspect first formalized by the seminal work of Becker and Tomes (1979). The nutrition and health status of a mother during pregnancy have a huge impact on a child's initial health endowments and, hence, outcomes in adulthood, including education (Currie, 2009, 2011; Hackman et al., 1983). For instance, a positive relationship between a mother's education and a child's birthweight, which is a strong predictor of health outcomes in adulthood, is found throughout the world (Currie and 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 and Tomes, 1979, 1986). 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. 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 children and to present comparisons of trends in intergenerational educational im(mobility) over time.

3.1 Identification issues

Intergenerational mobility studies have been fraught with econometric challenges that have arisen because of unobservable heterogeneity, including the inheritance of genetic endowments such as ability and preference across generations. The partial correlation observed in the data might be mainly driven by the transmission of preference and ability between parents and children. Previous studies attribute the partial, but high correlations between parents' and children's educational outcomes to nature and nurture, among other factors (Becker and Tomes, 1986; Haveman and Wolfe, 1995; Black and Devereux, 2011; Checchi et al., 2013). Nature refers to a genetic transmission of the ability of a parent to a child. Able parents have a higher chance of producing to have more able children who can attain higher levels of education without special parental investment. For instance, a child might learn skills through observation without any additional effort from parents (Haveman and Wolfe, 1995; Basu and Getachew, 2015). Nurture pertains to the amount of time and economic investments of parents on a child's human capital accumulation.

The standard approach in tackling unobserved heterogeneity is to use instrumental variables. The challenge is to identify exogenous variables that affect parental educational attainment, but do not have any effect on children's educational attainment. However, the instrumental variables used widely in the literature such as family background variables tend to affect children's outcomes, including our main interest here, education. Some studies use data on adoption (Plug, 2004; Plug and Vijverberg, 2003) and twins (Behrman and Rosenzweig, 2005) to isolate the effect of nature from the effect of nurture. However, these studies are limited to developed countries, where reliable data are available. Other studies compare the effect of nature and nurture on social mobility and find that nurture is relatively more important in explaining parent-child education transmission (Checchi et al., 2013; Haveman and Wolfe, 1995). In the absence of quasi-experimental data and credible instruments, we limit our analysis to the correlation between the educational attainment of parents and children. If factors of nature are time invariant, analyzing changes in intergenerational educational mobility over time is policy relevant without differentiating the effect of nature and nature (Heineck and Riphahn, 2009). Moreover, we are not aware of any analysis of intergenerational educational mobility in our sample countries. Thus, the pattern of partial correlation over time may be of independent interest.

3.2 Estimation strategies

In the literature, the measurement of the degree to which family educational background affects the educational attainment of children has been accomplished in different ways (see Fields and Ok, 2000; Ferreira et al., 2012). Perhaps the most basic measures are *intergenerational correlation* and *intergenerational elasticity*. The standard 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 $i = 1, \cdots, I$ indexes families and $j = 1, \cdots, J$ 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 intergenerational elasticity ($\hat{\beta}$). Intergenerational elasticity (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 intergenerational elasticity indicates higher intergenerational persistence and, hence, lower mobility. In this study, the estimations are carried out on five-year birth cohorts by sex in each country. Thus, $\hat{\beta}$ is the estimated intergenerational elasticity of each of five-year birth cohort among sons and daughters. Comparing $\hat{\beta}$ across birth cohorts in each country measures how intergenerational education persistence has evolved in both sexes over time.

The intergenerational education correlation between E_{ij} and EP_i is an alternative measure of intergenerational elasticity 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. Intergenerational elasticity 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:

$$\hat{\beta} = \frac{\sigma_{pc}}{\sigma_p^2} = \rho_{pc} \frac{\sigma_c}{\sigma_p} \tag{2}$$

$$\rho_{pc} = \beta \frac{\sigma^p}{\sigma^c}$$

where σ^p and σ^c are the standard deviations of years of schooling of parents and children in each five-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 intergenerational elasticity ($\hat{\beta}$) 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 ($\hat{\beta}$) 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 the 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. To disentangle the effects of these events from the educational correlation between parents and children, they propose decomposing $\hat{\rho}$ into three components: changes in the dispersion of the educational attainment of parents and children around the respective means, changes in children's educational attainment conditional on the educational attainment of the parents, and changes in the unconditional distribution of parental educational attainment. They argue that changes in children's schooling conditional on parent's education is the most relevant for policy. In the same vein, we model the effect of the highest levels of education of parents on the highest level of schooling of the children, across the five- year birth cohorts using an ordered probit model.

Let's define the educational attainment of children in a household 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

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

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 (see, for example, Ranasinghe, 2015; Checchi et al., 2013; Azam and Bhatt, 2015; Hertz et al., 2007).

In this study, we follow the same tradition and report both measures, intergenerational elasticity ($\hat{\beta}$) and the correlation coefficient ($\hat{\rho}$), across five-year birth cohorts in all the countries. Both measures can be easily extended to analyze different aspects of intergenerational mobility, such as mobility by geography or difference in sex, caste, and other aspects socioeconomic status (Ranasinghe, 2015; Hnatkovska et al., 2013; Azam and Bhatt, 2015; Bourguignon et al., 2007; Binder and Woodruff, 2002). With the objective of assessing a sex difference in intergenerational education persistence, we estimate the parameters in equations (1) and (2) for daughters and sons separately. To strengthen our analysis by looking at changes in children's educational attainment conditional on parental educational attainment and shedding light on the role of maternal and paternal education on children's human capital accumulation, we study the intergenerational transmission of children's highest level of educational attainment across cohorts. We define three categories of education for both the generation of the children and the generation of the parents: no schooling, primary, and secondary schooling and above.[5] Analyzing transitions in educational level between the two generations serves the same propose as the decomposition of Checchi et al. (2013). Theories on education inequality also support this approach by highlighting the importance of socioeconomic background in educational level transitions (Mare, 1980; Raftery and Hout, 1993). According to these theories, it is important to identify levels of education among children that are highly influenced by paternal or maternal education. Studying educational levels that are highly influenced by parental educational attainment is also important for policy within Sub-Saharan Africa. Following a series of education system reforms in many counties in the region, there has been a significant increase in primary education, but enrollment in higher education (secondary education and above) has remained low (Tomasevski, 2006). Hence, this analysis will give an indication where policy should focus to promote equity in the long run. Accordingly, we model the effect of the highest levels of educational attainment among parents on children's highest level of schooling across five-year birth cohorts. This entails estimating an ordered probit model.

Let s^* be an ordered response that takes on values of $0, 1, 2$ denoting children's highest level of education (0 = no schooling, 1 = primary, 2 = secondary and above). The latent model underlying the ordered probit model for s^* is as follows:

$$s^* = sp\beta + \epsilon, \tag{6}$$

where s^* is unobservable; sp is the control for the highest level of education of parents; β is the corresponding unknown coefficient; and ε is the error term, which is assumed to be normally distributed across observations with mean and variance normalized at 0 and 1. Although s^* is unobservable, we observe the highest level of children's educational attainment which is the category of the response, that is, as follows:

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[5]Because of a lower level of schooling among older parents, we could not define more education categories.

$$s = \begin{cases} 0 & \text{if } s^* \leq \alpha_1 \\ 1 & \text{if } \alpha_1 < s^* \leq \alpha_2 \\ 2 & \text{if } s^* > \alpha_2 \end{cases} \qquad (7)$$

where $\alpha_1 < \alpha_2$ are the unknown cutoff points. The estimation of the parameters α and β is performed using maximum likelihood (Wooldridge, 2010).

4 Data

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 description of the sample composition in each country is presented in table 1. All the surveys are the latest representative datasets available that collect information on both children and their parent's education regardless of whether parents are alive or, if alive, live in the same household. 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.[6] 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 20-69) are represented in the study. The data in all the countries are organized into five-year birth cohorts based on the children's years of birth. In table 1, we also present the minimum sample size in each country, which corresponds to the smallest sample size of five-year birth cohort in each country.

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 co-residing or 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. Using this information to create pairs of parents and children imposes a co-residence condition that reduces the sample size significantly. In addition to this information, all the surveys have another question that collects information on retrospective parental educational attainment among household members who are not co-residing in the household regardless of whether the parent is alive.

Combining these two variables, we have been able to identify parental schooling for more than 95 percent 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 co-residence to identify child-parent pairs, mostly father-son pairs (see, for example, Emran and Shilpi, 2015; Hnatkovska et al., 2013; Jalan and Murgai, 2007). Using co-residence identification has three 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 intergenerational elasticity downward. For instance, Francesconi and Nicoletti (2006) and Azam and Bhatt (2015) document a bias because of the co-residence condition that ranges from 12% to 39% and 17% in constructing father-son pairs in the United Kingdom and India, respectively. Second, the co-residency criteria over identify younger adult children who are still living with their parents; this might not lead to a representative adult population sample (Jalan and Murgai, 2007; Hnatkovska et al., 2013). Third, children-parent pairs that are constructed using co-residence identification does not allow cohort-wise long-term trend analysis of intergenerational persistence.

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[6]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.

Table 1: List of Countries, Dates, Sample Size, and Average Years of Schooling

| | Dates | | Sample size | | Average years of schooling | | | |
| | | | | | Parents | | Children | |
Country	Survey Year	Birth Years	Total	Minimum	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

i) Total refers to the total sample size of adult children aged between 20-69 in survey years in each country

ii) Minimum refers to the sample size of the smallest five-years birth cohort for each county

iii) Parents' year of education refers to the average year of schooling of mothers and fathers

The last two columns of table 1 report the average years of schooling of parents and children in the first and last five-year birth cohorts. In all countries except Madagascar, the average years of schooling have increased rapidly over the past 50 years among both children and parents. Excluding Madagascar, we document four to six and two to five years of schooling gain between the first and the last five-year birth cohorts of children and parents, respectively. We observe the least year of schooling gain, about one year, among both children and parents in Madagascar. Figure 1 provides a visual illustration of the educational attainment of children (daughters and sons) and their parents across five-year birth cohorts. In all the countries, children, on average, have higher educational attainment than their parents. 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. In general, average years of schooling is higher among sons than daughters, and the gender difference is significant. The gender difference remains similar across the two generations, women (mothers and daughters) show significantly fewer years of schooling than their men counterparts (fathers and sons).

Figure 1: Educational attainment of children and parents by year of birth
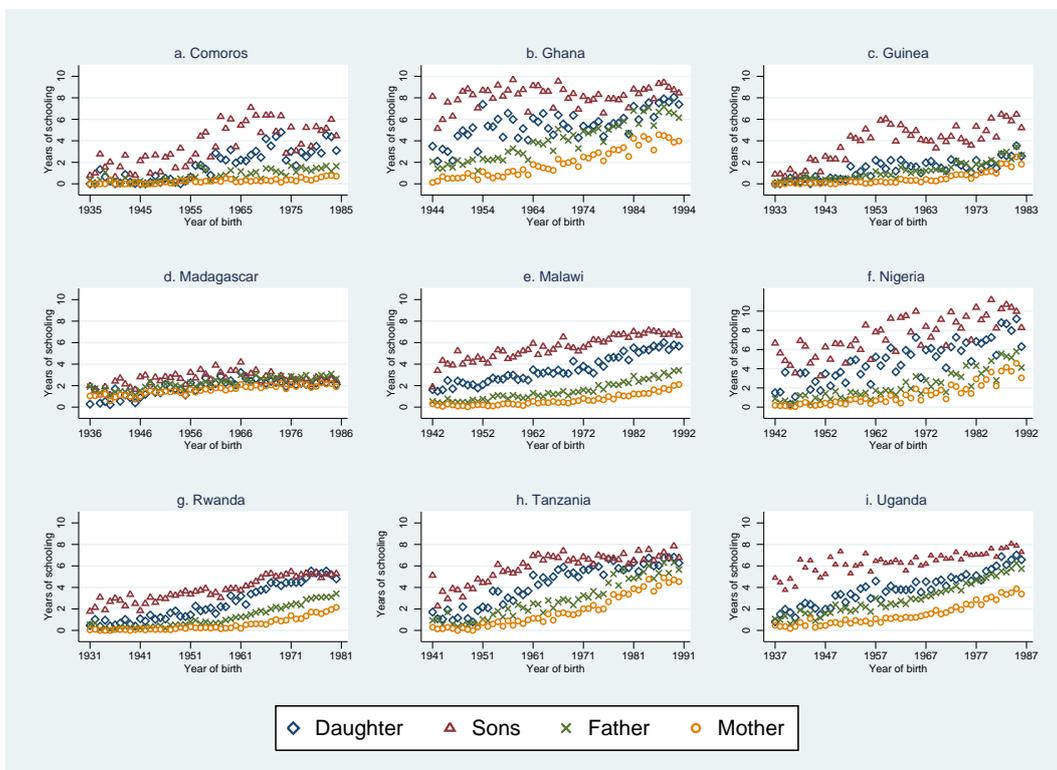
Figure 2 presents children's highest level of education across five-year birth cohorts. Overall, the proportion of children with no schooling has declined over the 50 years. We note a boom in primary education in all the countries, particularly among children born after the 1960s. This coincides with the policy changes in educational systems and a huge investment in human capital accumulation in the region after independence (Thakur, 1991). 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 (see table A1-A9 in Appendix A). 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.

Figure 2: Children's highest grade completed, by five-year birth cohort
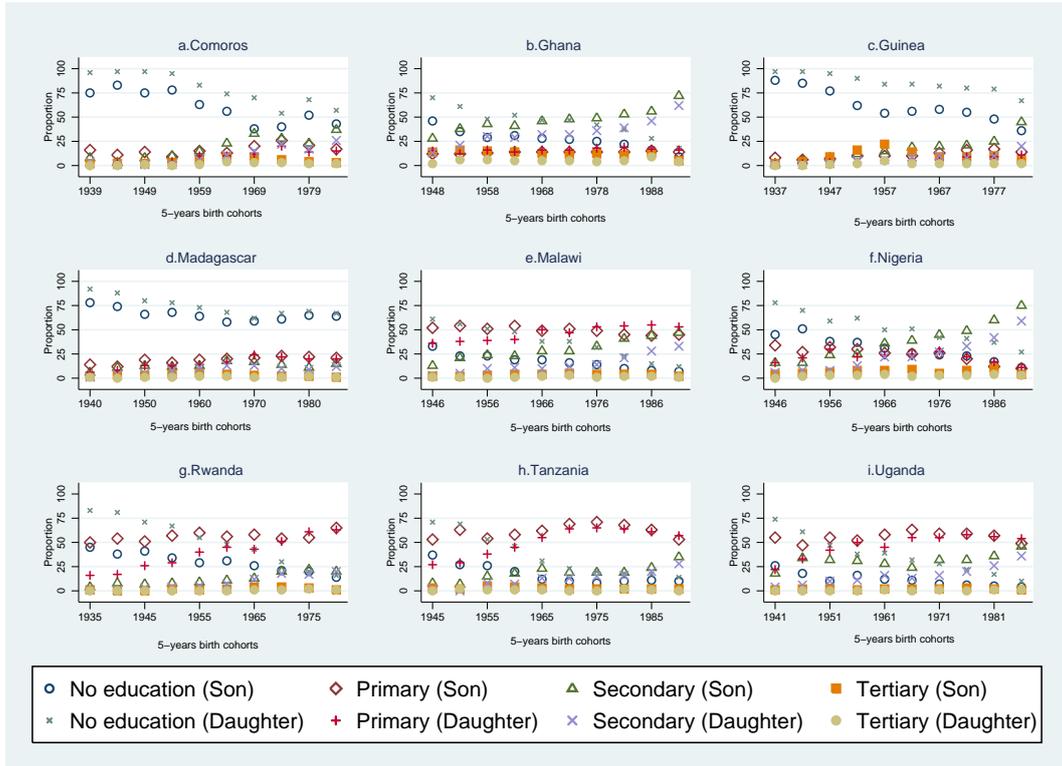
5 Results

We present the estimates of the two intergenerational educational persistence measures, intergenerational elasticity ($\hat{\beta}$) and the correlation coefficient ($\hat{\rho}$), in six stages. First, we present our baseline estimates at the country level using a pooled sample of all children in each country. Second, because our sample is comparable with the datasets used by Hertz et al. (2007) to rank 42 countries in five regions, we pool our data at the regional level and rank Sub-Saharan Africa in terms of intergenerational educational persistence among other regions. Third, we discuss the trend in intergenerational education mobility across five-year birth cohorts using both measures. Ranking each country among other nations on which comparable estimates are available follows. Fourth, we explore the potential differences in intergenerational education mobility across gender. Fifth, we explore the potential difference of paternal and maternal educational attainment in influencing child's educational attainment across five-year birth cohorts in each country. The final section presents the estimates of the order probit model of children's highest level of education.

5.1 Intergenerational education mobility at the country level

Table 2 presents the estimates of the intergenerational elasticity and correlation coefficients for the pooled sample in each country. The results reveal two main findings of interest. First, for all specifications considered, parental education has a statistically significant effect on children's educational attainment in all the countries. The estimates imply that, despite the increase in years of schooling in almost all the countries over the last 50 years, parental education plays a crucial role in children's education attainment. There exists an intergenerational link in educational outcomes: for instance, a one year difference in parental schooling is associated with a 0.74-year difference in children's education in Madagascar. In terms of the estimated intergenerational elasticity, 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. Second, as discussed above, gender is an important determinant of educational attainment in many developing and developed countries.

In low-income countries, girls tend to receive less education than boys (Behrman and Knowles, 1999; Alderman, Harold and King, Elizabeth M, 1998). In Sub-Saharan Africa, boys are still 1.6 times more likely to complete secondary education than their girl counterparts (Klugman et al., 2014). This is also in line with our observation in the sample countries in figures 1 and 2, women (mothers and daughters) show significantly fewer years of schooling than their men counterparts (fathers and sons) in all the countries. Accordingly, in column (2), we control for gender. We find that estimated intergenerational elasticity 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. The next set of results in column 3, table 2 includes other control variables that are used in the literature: age and number of children in a household. Moreover, with the objective of capturing the cohort effect, we also include the square of age. The results in column 3, table 2 show that the addition of the controls does not affect the estimated intergenerational elasticity in any significant way in the countries, though it leads to slight increase in the explanatory power of the regression. Despite the inclusion of such powerful controls, the qualitative results remain unchanged; parental education plays a vital role in children's educational attainment in all the countries.

Table 2: Intergenerational education elasticity and correlation at the country level

Dependent variable: Children Years of Schooling

	[1]		[2]†		[3]‡	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	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	5,835		5,835		5,835	
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						

Table 2 – continued

	[1]		[2]†		[3]‡	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
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	
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	

Parents education is average of mother's and father's years of schooling.

† Regression include gender of children.

‡ In addition to gender this regression includes age, age square and the number of children in a family.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

5.2 Intergenerational education mobility at the regional level

To rank Sub-Saharan Africa among world regions, we have pooled the sample at the regional level. We find a regional correlation coefficient of 0.51, indicating that parental years of schooling account for about 51% of the inequality in children's years of schooling. Our estimate is above the global average of 0.42 (for 42 countries) documented by Hertz et al. (2007), and is comparable with their estimates of 0.39, 0.44, 0.46 in Asia, Western Europe and the United States, and Eastern Europe, respectively. Sub-Saharan Africa has lower estimated intergenerational educational persistence ($\hat{\rho}$) than Latin America. Overall, mobility in Sub-Saharan Africa is lower than Europe and the United States and Eastern Europe and higher than Latin America. Our estimate of intergenerational correlation ($\hat{\rho}$) is also higher than the African average of 0.36 estimated by Hertz et al. (2007). Therefore, using correlation coefficient of parental background explains a significantly higher share of the variation in the educational attainment of children in Sub-Saharan Africa than before.[7]

Similarly, we estimate an intergenerational elasticity of 0.66 for Sub-Saharan Africa, indicating that additional years of parental schooling, on average, increases children's years schooling by 0.66. This estimate is higher than the estimates of Hertz et al. (2007) 0.52 in Western Europe and United States and 0.38 in Eastern bloc Europe, and is lower than the intergenerational elasticity of 0.83 in Latin America and 0.69 in Asia (see table 3). The intergenerational elasticity estimate of the current study is lower than the estimates of Hertz et al. (2007) (0.8) for four African countries (Egypt, Ethiopia, Ghana, and South Africa). Our estimates of the two measures paint a picture that is consistent with previous estimates on developing countries. While intergenerational elasticity demonstrates that an extra year of parental schooling adds fewer years of schooling to children's education now than before, the regional correlation coefficient estimate is higher than previous estimates of Hertz et al. (2007), thereby, telling a bleaker story of mobility in the region. This apparent contradiction can be explained based on Eq.2: two countries can have the same intergenerational elasticity estimates, but the correlation coefficient can be different if the educational inequality in the generation of the parents and children varies over time, for instance because of, education policy changes affecting children's generation (see section 5.3).

As discussed in section 3, Eq.5, the square of intergenerational correlation provides an estimate of the share of the total variance in schooling that can be explained by parental years of schooling alone. We estimate that parents education alone can explain 31% of variations in the years of schooling of daughters and 21% of sons in the region. This estimate is higher than the available estimates for developed countries

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[7]Hertz et al. (2007) used older surveys from the Arab Republic of Egypt, Ethiopia, Ghana, and South Africa and study intergenerational mobility between 1925 and 1978.

that indicate that parental education explains only 9%-21% of the total variation in children's years of schooling and lower than the estimates for India, where parental education explains 27%-29% and 31%-39% of total the variations in the year of schooling of sons and daughters, respectively (Bjorklund and Salvanes, 2010; Emran and Shilpi, 2011).

Table 3: Intergenerational education elasticity and correlation at regional level

Region	No of countries	# Observations	$\hat{\beta}$	$\hat{\rho}$	Rank
Asia	9	96,455	0.69	0.39	5
Sub-Saharan Africa	9	145,256	0.66	0.51	2
Latin America	7	213,768	0.83	0.60	1
Eastern bloc	8	21,809	0.38	0.46	3
Western Europe and USA	13	34,940	0.52	0.44	4

*Note:*Estimates for Sub-Saharan African countries are World Bank calculations.
Estimates for other regions are based on pooled data from Hertz et al. (2007).
Number of countries refers to the sample counties in each region.

5.3   Cohort analysis

In this section, we investigate the trends in intergenerational mobility in educational attainment of each of the five-year birth cohorts based on the number of years of schooling for both generations. Table 4 reports the results. In line with our previous observations in table 2, parental education has a statistically significant effect on the child's education across most birth cohorts in all the countries. The intergenerational persistence of education has generally decreased over the last five decades in all the countries, but the trend has not been consistent. In all the countries, there has been a significant improvement in education mobility from the 1960s onward. 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 intergenerational elasticity between the youngest and the oldest cohort declined by 65% between 1942 and 1991 (table 4). For the Comoros, Guinea, and Rwanda, we document a small intergenerational educational persistence rate for the oldest 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 years of schooling, and parental education can only explain small proportion of the variation in child schooling. For example, children born between 1931 and 1935 in Rwanda have an average 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 4, column 4).

Our sample includes individuals who are continuing their education. This represents either delay in schooling or the pursuit to higher education. If it is caused by delayed completion among children in households with well-educated parents, the intergenerational elasticity will be biased downward. On the other hand, if children in household with less well educated parents are the ones taking more years to complete their education, the covariance between parental education and children's education increases, and the intergenerational elasticity will be upwardly biased. In light of this, we repeat our analysis by excluding the youngest cohort that is made up of children ages between 20 and 24 from each country where the current enrollment is higher.[8] Our results are relatively unaffected, and the bias is fairly small. In the youngest cohort, the true value of years of schooling is less than 1 year of schooling on average than what we observe in the youngest cohort if we use 20 years as the lower age cutoff.[9]

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[8]For the 25 to 29 age-group, the enrollment rate is always less than 7%.
[9]Results are available upon request.

Table 4: Intergenerational education elasticity and correlations by cohort

Birth cohorts	Coefficient ($\hat{\beta}$)	Std.err	R^2	Correlation ($\hat{\rho}$)	# Observations
Comoros					
1934-1939	0.498	0.329	0.085	0.291	218
1940-1944	0.603*	0.249	0.038	0.195	393
1945-1949	0.039	0.116	0.000	0.016	337
1950-1954	0.632*	0.280	0.076	0.275**	558
1955-1959	0.936***	0.171	0.127	0.356***	509
1960-1964	1.153***	0.155	0.138	0.372***	675
1965-1969	0.940***	0.121	0.083	0.288***	839
1970-1974	0.887***	0.090	0.134	0.366***	894
1975-1979	0.917***	0.136	0.087	0.294***	680
1980-1984	0.682***	0.079	0.078	0.279***	732
Ghana					
1944-1948	0.773***	0.050	0.157	0.396***	1,046
1949-1953	0.720***	0.048	0.146	0.382***	1,499
1954-1958	0.557***	0.049	0.103	0.321***	1,774
1959-1963	0.609***	0.031	0.153	0.392***	2,514
1964-1968	0.602***	0.028	0.208	0.456***	2,770
1969-1973	0.601***	0.024	0.239	0.489***	3,452
1974-1978	0.500***	0.018	0.242	0.492***	3,928
1979-1983	0.464***	0.017	0.259	0.509***	4,272
1984-1988	0.466***	0.016	0.274	0.524***	4,842
1989-1993	0.385***	0.014	0.243	0.493***	5,725
Guinea					
1933-1937	0.299	0.203	0.009	0.096	724
1938-1942	0.868***	0.263	0.134	0.366***	1,156
1943-1947	0.423	0.231	0.030	0.172*	1,125
1948-1952	1.007***	0.103	0.086	0.293***	1,652
1953-1957	0.733***	0.104	0.055	0.235***	1,883
1958-1962	0.695***	0.061	0.112	0.335***	2,218
1963-1967	0.552***	0.049	0.111	0.333***	2,695
1968-1972	0.538***	0.046	0.158	0.398***	3,013
1973-1977	0.486***	0.032	0.155	0.394***	3,498
1978-1982	0.429***	0.019	0.172	0.415***	4,088
Madagascar					
1936-1940	0.633***	0.097	0.213	0.462***	508
1941-1945	0.698***	0.130	0.113	0.337***	652
1946-1950	0.621***	0.115	0.148	0.384***	905
1951-1955	0.731***	0.072	0.166	0.407***	1,604
1956-1960	0.876***	0.057	0.258	0.508***	1,853
1961-1965	0.808***	0.051	0.234	0.484***	2,225
1966-1970	0.652***	0.052	0.178	0.422***	2,576
1971-1975	0.732***	0.042	0.236	0.485***	2,961
1976-1980	0.738***	0.044	0.317	0.563***	3,499
1981-1985	0.732***	0.032	0.356	0.597***	3,953
Malawi					
1942-1946	0.955***	0.156	0.125	0.354***	615
1947-1951	0.575***	0.125	0.049	0.221***	916
1952-1956	0.833***	0.125	0.102	0.320***	927
1957-1961	0.613***	0.088	0.081	0.285***	1,181
1962-1966	0.710***	0.050	0.160	0.399***	1,625
1967-1971	0.794***	0.045	0.189	0.435***	1,901
1972-1976	0.685***	0.032	0.199	0.446***	2,783
1977-1981	0.590***	0.026	0.212	0.460***	3,529
1982-1986	0.529***	0.019	0.199	0.447***	4,393
1987-1991	0.545***	0.015	0.246	0.496***	4,557
Nigeria					
1942-1946	1.507***	0.177	0.181	0.425***	409
1947-1951	1.228***	0.103	0.230	0.480***	664

Table 4 – continued

Birth cohorts	Coefficient ($\hat{\beta}$)	Std.err	R^2	Correlation ($\hat{\rho}$)	# Observations
1952-1956	1.024***	0.126	0.141	0.375***	626
1957-1961	0.962***	0.066	0.173	0.416***	963
1962-1966	0.851***	0.060	0.182	0.426***	1,028
1967-1971	0.980***	0.049	0.240	0.489***	1,264
1972-1976	0.790***	0.043	0.256	0.506***	1,400
1977-1981	0.752***	0.033	0.294	0.542***	1,444
1982-1986	0.710***	0.025	0.337	0.581***	1,852
1987-1991	0.526***	0.021	0.279	0.528***	1,993
Rwanda					
1931-1935	0.178	0.443	0.001	0.027	310
1936-1940	0.577*	0.225	0.025	0.157*	421
1941-1945	0.630***	0.160	0.056	0.237***	507
1946-1950	0.782***	0.139	0.089	0.299***	746
1951-1955	0.478***	0.091	0.050	0.223***	941
1956-1960	0.617***	0.085	0.069	0.262***	1,243
1961-1965	0.651***	0.064	0.105	0.324***	1,247
1966-1970	0.698***	0.050	0.144	0.380***	1,303
1971-1975	0.628***	0.048	0.165	0.406***	1,557
1976-1980	0.529***	0.033	0.161	0.401***	2,378
Tanzania					
1941-1945	0.416	0.125	0.060	0.245	218
1946-1950	0.705***	0.170	0.084	0.290*	255
1951-1955	0.758***	0.118	0.132	0.363***	356
1956-1960	0.687***	0.070	0.181	0.426***	408
1961-1965	0.555***	0.061	0.146	0.382***	572
1966-1970	0.350***	0.052	0.106	0.326***	645
1971-1975	0.329***	0.034	0.110	0.331***	833
1976-1980	0.395***	0.027	0.191	0.437***	943
1981-1985	0.385***	0.031	0.161	0.402***	1,057
1986-1990	0.463***	0.028	0.226	0.475***	1,240
Uganda					
1937-1941	1.047***	0.191	0.167	0.409***	393
1942-1946	0.853***	0.123	0.129	0.359***	454
1947-1951	0.679***	0.081	0.106	0.326***	561
1952-1956	0.660***	0.080	0.124	0.352***	723
1957-1961	0.680***	0.054	0.171	0.414***	1,011
1962-1966	0.653***	0.047	0.189	0.435***	1,265
1967-1971	0.609***	0.033	0.187	0.433***	1,688
1972-1976	0.603***	0.029	0.255	0.505***	1,949
1977-1981	0.561***	0.025	0.226	0.475 ***	2,484
1982-1986	0.494***	0.020	0.237	0.487***	3,033

Parents education is average of mother's and father's years of schooling.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

For the standardized measure of intergenerational mobility, the correlation coefficient, a declining trend is not visible. This result is similar to the findings of previous studies in developing countries (see, for example, Hertz et al., 2007; Azam and Bhatt, 2015; Daude and Robano, 2015). 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 3, 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 intergenerational elasticity ($\hat{\beta}$) 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 Hertz et al. (2007) and Azam and Bhatt (2015).

Figure 3: Evolution of intergenerational educational persistence and standard deviations education by 5 years birth cohorts
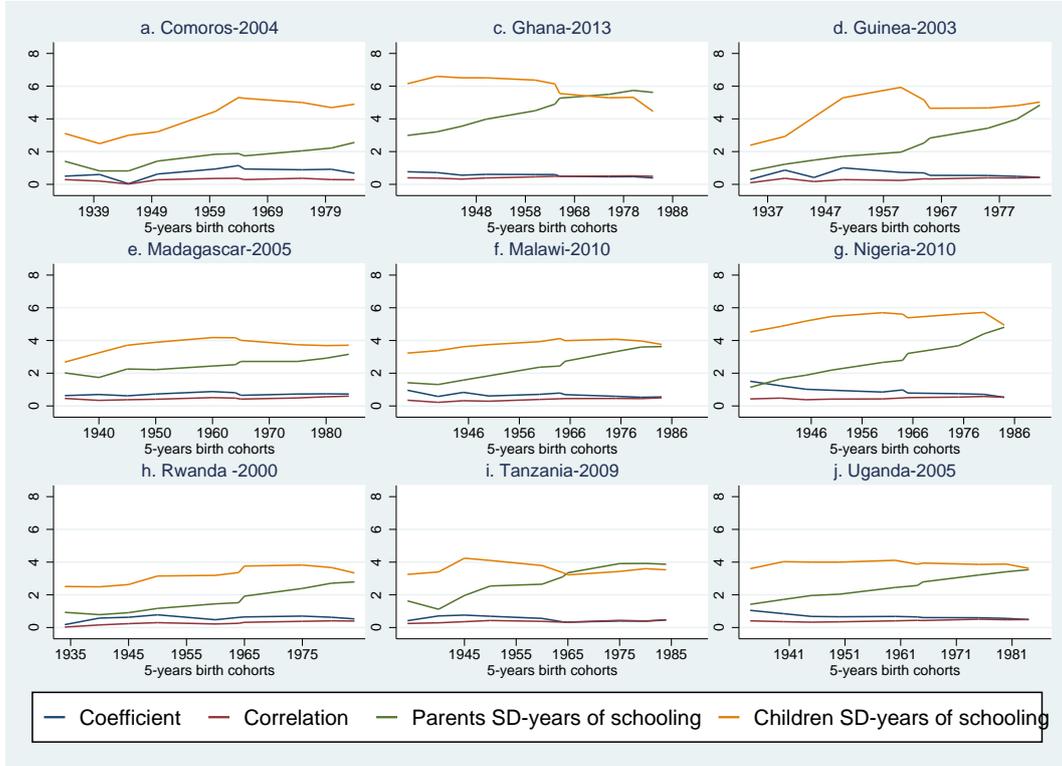
The general declining trend of intergenerational elasticity ($\hat{\beta}$) across cohorts partly reflects the improvement in the education systems and policies in many countries in the region. The education systems in Sub-Saharan Africa expanded substantially after independence in the 1960s, which almost doubled primary-school enrollments in many of the countries (Thakur, 1991). The expansion of primary education was facilitated through the expansion of public education. Government expenditure on education grew substantially during the period (UNESCO, 1970). During the decade, we observe a decline in intergenerational educational persistence in almost all countries in our sample (see, for instance the Comoros, Ghana, Guinea, and Nigeria estimates in table 4). In the 1980s, 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 our sample countries. A revival of public education funding occurred again in the 1990s and the education systems in many countries in the region underwent dramatic policy changes. One of the most dramatic educational policy changes, for instance, was the abolition of primary school fees in Ghana, Malawi, and Uganda in the 1990s and in Benin, Burundi, Lesotho, Liberia, Mozambique, Rwanda, Sierra Leone, Tanzania, and Zambia in the 2000s (UNESCO, 2011). In line with this, we observe a decline in intergenerational elasticity among the youngest cohorts in all countries except Malawi and Tanzania. The positive relationship between public education expenditure and individual educational attainment has been extensively documented in the literature on both developing and developed countries (Black and Devereux, 2011). Hertz et al. (2007) also provides a survey of the existing literature that reports changes in education policy and intergenerational education mobility. There is also empirical evidence that higher public expenditure on primary education is boosting education mobility across generations in many countries. Thus, it is plausible to hypothesize that our result of rising educational mobility across cohorts using intergenerational education elasticity to some extent reflects the inclusiveness of the policy changes in the region to create equal educational opportunities for children from different parental education backgrounds over time.

Economic theory suggests three possible drivers of intergenerational mobility across countries, namely,

income inequality, the returns to education and public education expenditure. Without inferring any causality, this section shows the correlation between the two measures of intergenerational mobility and the potential drivers in each country. Figure 4 suggests a positive correlation educational persistence and income inequality measured by the Gini coefficient. Countries that show lower educational mobility over the 50 years tend to experience a higher level of income inequality (figure 4). Contrary to the prediction of theory, we observe a negative correlation between returns to education and intergenerational educational persistence. In countries where we observe greater mobility, the returns to education tend to be smaller. One plausible explanation might be the credit constraints affecting poor households in a country where the returns to education are higher. Children with higher parental years of schooling probably have higher incomes and, will have the capacity to invest more on children's education relative to poor households. The results also suggest a negative relationship between educational persistence and public expenditure on education as a share of total government expenditure, implying that progressive public investment on education helps to foster equal opportunity in education among all children, including children with different parental educational backgrounds (figure 4).

Figure 4: Possible drivers of intergenerational education persistence across countries
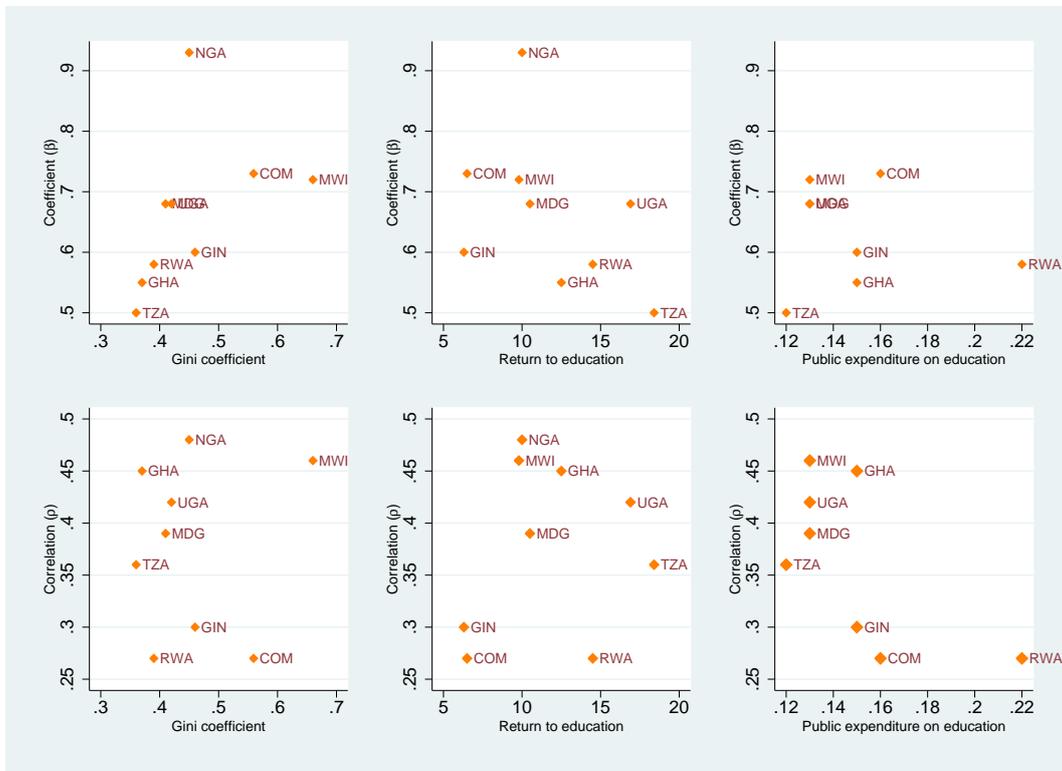
To compare levels of intergenerational educational persistence and rank the countries in our sample in terms of im(mobility) in educational attainment, we follow the approach of Hertz et al. (2007) and derive the simple average of $\hat{\beta}$ and $\hat{\rho}$ across five-year birth cohorts in each country.[10] Using the intergenerational correlation ($\hat{\rho}$) our result shows that most of the countries, except Rwanda and the Comoros, show greater intergenerational educational mobility than Latin American countries, but lower mobility than Western Europe, the United States and Eastern European countries.[11] The estimates for Rwanda and the Comoros show that these countries are more mobile than most developed countries. However, parents in both countries show fewer average years of schooling even among the youngest birth cohorts, and parental

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[10] 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 3 is that the former does not give more weight to larger cohorts (Hertz et al., 2007).

[11] As discussed above in section 3, $\hat{\beta}$ measures interpersonal differences in education, whereas the correlation coefficient divides the education difference by the standard deviation of education for the respective generation. Therefore, the question of which measure is more appropriate involves self-judgment. Since we are comparing countries with different educational systems and educational distribution, we use $\hat{\rho}$ to rank the countries.

schooling can explain only a small proportion of the variation in children's schooling (see figure 1, figure 2, and table 4).

Table 5: Countries ranked by average parent-child education correlations

Country	Coefficient ($\hat{\beta}$)	Rank	Correlation ($\hat{\rho}$)	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
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

India data from Azam and Bhatt (2015).
Australia data from Ranasinghe (2015).

country	Coefficient	Rank	Correlation	Rank

Other countries data from Hertz et al. (2007).

Estimates for Sub-Saharan African countries are World Bank calculations.

5.4   Cohort analysis by gender

In this section, we analyze the trends in intergenerational educational persistence across five-year birth cohorts by gender.[12] Table 6 reports estimates of intergenerational elasticity and the correlation coefficient among daughters and sons separately in each country. As we observed above, there is an increase in intergenerational mobility across birth cohorts. Although the general trend in intergenerational mobility is similar across cohorts, the pace of change varies along gender. In all countries, the pattern of intergenerational educational mobility is different among sons and daughters in the same birth cohorts. Both measures of intergenerational persistence are higher among daughters than sons except in the Comoros and Madagascar. This is especially true among children born after the 1960s. The results suggest that daughters education is more dependent on parental education relative to sons. The higher intergenerational educational persistence among daughters compared with sons is consistent with previous findings in both developing and developed economies. For instance, Ranasinghe (2015) and Emran and Shilpi (2015) report higher educational persistence among women compared with men in Australia and India, respectively. Emran and Shilpi (2015) also document lower occupational mobility from agriculture to nonfarm activities among women in Vietnam and Nepal.

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[12]Our analysis across gender is based on intergenerational elasticity that is estimated separately AMONG daughter and son subsample, showing the cohort trend within each gender.

Table 6: Intergenerational educational attainment persistence by gender

Dependent variable: Children Years of Schooling
Children Birth Cohort

A. Comoros

	1934-1939	1940-1944	1945-1949	1950-1954	1955-1959	1960-1964	1965-1969	1970-1974	1975-1979	1980-1984
					Daughters					
IGE ($\hat{\beta}$)	1.041***	0.0873	0.0268	0.0643	0.829***	1.077***	0.714***	0.962***	0.695***	0.664***
	(0.137)	(0.100)	(0.017)	(0.081)	(0.186)	(0.254)	(0.144)	(0.118)	(0.155)	(0.092)
Correlation ($\hat{\rho}$)	0.822**	0.126	0.023	0.063	0.556***	0.413***	0.267**	0.435***	0.232*	0.277***
# Observations	92	189	176	305	236	330	417	506	416	435
R^2	0.676	0.016	0.001	0.004	0.309	0.170	0.071	0.190	0.054	0.076
					Sons					
IGE ($\hat{\beta}$)	0.008	0.969**	1.690***	1.306**	1.401***	1.193***	1.042***	0.790***	1.064***	0.688***
	(0.168)	(0.313)	(0.085)	(0.411)	(0.249)	(0.157)	(0.146)	(0.134)	(0.181)	(0.133)
Correlation ($\hat{\rho}$)	0.004	0.249	0.186	0.426***	0.344***	0.353***	0.308***	0.291***	0.341***	0.279***
# Observations	126	204	161	253	273	345	422	388	264	297
R^2	0.000	0.062	0.034	0.181	0.118	0.125	0.095	0.085	0.117	0.078

B. Ghana

	1944-1948	1949-1953	1954-1958	1959-1963	1964-1968	1969-1973	1974-1978	1979-1983	1984-1988	1989-1993
					Daughters					
IGE ($\hat{\beta}$)	0.686***	0.801***	0.669***	0.685***	0.662***	0.668***	0.511***	0.468***	0.476***	0.434***
	(0.070)	(0.065)	(0.069)	(0.045)	(0.033)	(0.032)	(0.023)	(0.021)	(0.022)	(0.019)
Correlation ($\hat{\rho}$)	0.408***	0.507***	0.422***	0.444***	0.511***	0.551***	0.524***	0.535***	0.523***	0.533***
# Observations	559	797	933	1405	1495	1890	2158	2317	2675	2981
R^2	0.167	0.257	0.178	0.197	0.261	0.303	0.274	0.286	0.273	0.284
					Sons					
IGE ($\hat{\beta}$)	0.819***	0.688***	0.553***	0.517***	0.526***	0.491***	0.465***	0.443***	0.428***	0.320***
	(0.063)	(0.061)	(0.059)	(0.041)	(0.045)	(0.034)	(0.025)	(0.026)	(0.022)	(0.018)
Correlation ($\hat{\rho}$)	0.407***	0.333***	0.284***	0.352***	0.413***	0.430***	0.470***	0.484***	0.522***	0.441***
# Observations	487	702	841	1109	1275	1562	1770	1955	2167	2744
R^2	0.166	0.111	0.081	0.124	0.170	0.185	0.220	0.234	0.273	0.195

Table 6 – continued

Dependent variable: Children Years of Schooling

Children Birth Cohort

C. Guinea

	1933-1937	1938-1942	1943-1947	1948-1952	1953-1957	1958-1962	1963-1967	1968-1972	1973-1977	1978-1982
					Daughters					
IGE ($\hat{\beta}$)	0.017	0.477*	0.151	1.029***	0.647***	0.605***	0.571***	0.560***	0.522***	0.477***
	(0.031)	(0.212)	(0.137)	(0.143)	(0.159)	(0.075)	(0.061)	(0.057)	(0.038)	(0.025)
Correlation ($\hat{\rho}$)	0.009	0.437*	0.139	0.434***	0.271***	0.382***	0.374***	0.499***	0.499***	0.500***
# Observations	347	605	546	837	990	1272	1637	1776	2028	2114
R^2	0.000	0.191	0.019	0.188	0.073	0.146	0.140	0.249	0.249	0.250
					Sons					
IGE ($\hat{\beta}$)	0.357	1.141**	0.834***	0.887***	0.778***	0.736***	0.496***	0.478***	0.404***	0.357***
	(0.280)	(0.385)	(0.201)	(0.135)	(0.133)	(0.092)	(0.076)	(0.072)	(0.050)	(0.028)
Correlation ($\hat{\rho}$)	0.105	0.387*	0.236*	0.241***	0.225***	0.310***	0.293***	0.331***	0.313***	0.354***
# Observations	377	551	579	815	893	946	1058	1237	1470	1974
R^2	0.011	0.150	0.056	0.058	0.051	0.096	0.086	0.109	0.098	0.125

D. Madagascar

	1936-1940	1941-1945	1946-1950	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985
					Daughters					
IGE ($\hat{\beta}$)	0.490***	0.284*	0.624***	0.718***	0.797***	0.784***	0.621***	0.694***	0.729***	0.729***
	(0.121)	(0.130)	(0.176)	(0.090)	(0.085)	(0.078)	(0.054)	(0.058)	(0.075)	(0.050)
Correlation ($\hat{\rho}$)	0.503*	0.196**	0.388***	0.432***	0.487***	0.484***	0.454***	0.467***	0.543***	0.576***
# Observations	223	320	464	785	933	1103	1346	1577	1862	2077
R^2	0.253	0.039	0.150	0.187	0.238	0.235	0.206	0.218	0.294	0.332
					Sons					
IGE ($\hat{\beta}$)	0.731***	0.944***	0.618***	0.731***	0.932***	0.810***	0.693***	0.771***	0.740***	0.735***
	(0.150)	(0.181)	(0.149)	(0.103)	(0.074)	(0.064)	(0.089)	(0.057)	(0.050)	(0.039)
Correlation ($\hat{\rho}$)	0.464***	0.398***	0.381***	0.393***	0.523***	0.479***	0.398***	0.504***	0.579***	0.618***
# Observations	285	332	441	819	920	1122	1230	1384	1637	1876
R^2	0.215	0.158	0.145	0.155	0.273	0.230	0.158	0.254	0.336	0.382

Table 6 – continued

Dependent variable: Children Years of Schooling
Children Birth Cohort

E. Malawi

	1942-1946	1947-1951	1952-1956	1957-1961	1962-1966	1967-1971	1972-1976	1977-1981	1982-1986	1987-1991
					Daughters					
IGE ($\hat{\beta}$)	0.764**	0.630***	0.768***	0.509***	0.740***	0.744***	0.640***	0.616***	0.543***	0.545***
	(0.240)	(0.164)	(0.180)	(0.127)	(0.084)	(0.063)	(0.057)	(0.043)	(0.027)	(0.021)
Correlation ($\hat{\rho}$)	0.353***	0.299***	0.324***	0.270***	0.464***	0.462***	0.420***	0.501***	0.482***	0.512***
# Observations	317	503	492	588	793	924	1359	1767	2360	2523
R^2	0.124	0.089	0.105	0.073	0.215	0.213	0.176	0.251	0.233	0.262
					Sons					
IGE ($\hat{\beta}$)	1.133***	0.487**	0.811***	0.685***	0.669***	0.824***	0.661***	0.550***	0.506***	0.531***
	(0.118)	(0.184)	(0.168)	(0.112)	(0.059)	(0.059)	(0.037)	(0.029)	(0.025)	(0.020)
Correlation ($\hat{\rho}$)	0.395*	0.172*	0.320***	0.317***	0.371***	0.437***	0.455***	0.434***	0.422***	0.474***
# Observations	298	413	435	593	832	977	1424	1762	2033	2034
R^2	0.156	0.030	0.102	0.100	0.138	0.191	0.207	0.188	0.178	0.225

F. Nigeria

	1942-1946	1947-1951	1952-1956	1957-1961	1962-1966	1967-1971	1972-1976	1977-1981	1982-1986	1987-1991
					Daughters					
IGE ($\hat{\beta}$)	1.745***	1.145***	1.165***	1.026***	0.935***	1.139***	0.829***	0.814***	0.814***	0.631***
	(0.374)	(0.168)	(0.255)	(0.091)	(0.089)	(0.076)	(0.060)	(0.047)	(0.032)	(0.029)
Correlation ($\hat{\rho}$)	0.406**	0.516***	0.439***	0.503***	0.466***	0.583***	0.524***	0.561***	0.628***	0.596***
# Observations	184	300	295	462	529	705	802	883	1137	1042
R^2	0.165	0.266	0.193	0.253	0.217	0.339	0.274	0.314	0.395	0.355
					Sons					
IGE ($\hat{\beta}$)	1.289***	1.255***	0.942***	0.883***	0.750***	0.757***	0.713***	0.644***	0.523***	0.381***
	(0.172)	(0.111)	(0.122)	(0.093)	(0.081)	(0.063)	(0.058)	(0.047)	(0.037)	(0.028)
Correlation ($\hat{\rho}$)	0.414**	0.477***	0.350***	0.361***	0.393***	0.401***	0.483***	0.520***	0.495***	0.428***
# Observations	225	364	331	501	499	559	598	561	715	951
R^2	0.171	0.228	0.123	0.131	0.154	0.161	0.233	0.271	0.245	0.183

Table 6 – continued

Dependent variable: Children Years of Schooling
Children Birth Cohort

G. Rwanda

	1931-1935	1936-1940	1941-1945	1946-1950	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980
					Daughters					
IGE ($\hat{\beta}$)	0.31	0.863***	0.754***	0.842***	0.544***	0.543***	0.670***	0.722***	0.637***	0.598***
	(0.414)	(0.195)	(0.199)	(0.154)	(0.113)	(0.092)	(0.078)	(0.067)	(0.060)	(0.048)
Correlation ($\hat{\rho}$)	0.080	0.425*	0.372**	0.418***	0.290***	0.257***	0.344***	0.382***	0.442***	0.435***
# Observations	177	244	291	433	497	736	704	737	903	1311
R^2	0.006	0.180	0.139	0.175	0.084	0.066	0.118	0.146	0.196	0.189
					Sons					
IGE ($\hat{\beta}$)	1.409***	0.226	0.477	0.698**	0.418**	0.734***	0.624***	0.661***	0.616***	0.455***
	(0.161)	(0.353)	(0.272)	(0.239)	(0.149)	(0.164)	(0.108)	(0.074)	(0.080)	(0.045)
Correlation ($\hat{\rho}$)	0.051	0.058	0.148	0.239**	0.180**	0.280***	0.303***	0.375***	0.361***	0.362***
# Observations	133	177	216	313	444	507	543	566	654	1067
R^2	0.003	0.003	0.022	0.057	0.032	0.079	0.092	0.141	0.131	0.131

H. Tanzania

	1941-1945	1946-1950	1951-1955	1956-1960	1961-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990
					Daughters					
IGE ($\hat{\beta}$)	0.419***	0.529	0.745***	0.704***	0.668***	0.388***	0.409***	0.428***	0.355***	0.484***
	(0.099)	(0.291)	(0.132)	(0.098)	(0.085)	(0.077)	(0.045)	(0.038)	(0.040)	(0.036)
Correlation ($\hat{\rho}$)	0.385**	0.235	0.410***	0.446***	0.447***	0.367***	0.390***	0.452***	0.383***	0.495***
# Observations	118	127	183	209	278	344	453	504	603	675
R^2	0.148	0.055	0.168	0.199	0.199	0.135	0.152	0.204	0.147	0.245
					Sons					
IGE ($\hat{\beta}$)	0.510*	0.762***	0.788***	0.638***	0.450***	0.317***	0.241***	0.359***	0.434***	0.438***
	(0.2230)	(0.134)	(0.198)	(0.090)	(0.083)	(0.057)	(0.051)	(0.040)	(0.045)	(0.043)
Correlation ($\hat{\rho}$)	0.236*	0.332*	0.358***	0.434***	0.344***	0.296***	0.264***	0.422***	0.438***	0.456***
# Observations	100	128	173	199	294	301	380	439	454	565
R^2	0.056	0.110	0.128	0.188	0.118	0.088	0.070	0.178	0.192	0.208

Table 6 – continued

Dependent variable: Children Years of Schooling

Children Birth Cohort

I. Uganda

	1937-1941	1942-1946	1947-1951	1952-1956	1957-1961	1962-1966	1967-1971	1972-1976	1977-1981	1982-1986
					Daughters					
IGE ($\hat{\beta}$)	0.967***	0.726***	0.822***	0.735***	0.764***	0.747***	0.656***	0.623***	0.623***	0.526***
	(0.204)	(0.159)	(0.096)	(0.106)	(0.069)	(0.059)	(0.042)	(0.040)	(0.032)	(0.029)
Correlation ($\hat{\rho}$)	0.478***	0.363***	0.491***	0.470***	0.504***	0.525***	0.489***	0.530***	0.544***	0.492***
# Observations	205	233	282	386	509	664	853	989	1350	1611
R^2	0.228	0.131	0.242	0.220	0.254	0.276	0.240	0.281	0.296	0.242
					Sons					
IGE ($\hat{\beta}$)	0.862***	0.753***	0.576***	0.672***	0.609***	0.577***	0.526***	0.554***	0.453***	0.453***
	(0.255)	(0.146)	(0.125)	(0.099)	(0.072)	(0.069)	(0.046)	(0.034)	(0.037)	(0.028)
Correlation ($\hat{\rho}$)	0.356**	0.355***	0.278***	0.319***	0.390***	0.397***	0.394***	0.503***	0.401***	0.485***
# Observations	188	221	279	337	502	601	835	960	1134	1422
R^2	0.127	0.126	0.077	0.102	0.152	0.157	0.155	0.253	0.161	0.236

Parents education is average of mother's and father's years of schooling.

Robust standard errors are in parentheses.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

5.5 What is important, education among mothers or education among fathers?

As discussed in section 2, much is still not known about the relative importance of the education of mothers and the education of fathers on children's educational outcomes, but the existing evidence reveals some suggestive patterns. With the objective of looking at the differential effect of the education of mothers and the education of fathers on the intergenerational mobility of daughters and sons, we carry out the same analysis on each sample. Figure 5 and Appendix B present the results. There are two notable findings. First, in all countries except the Comoros, both measures coincide in pointing out the stronger effects of maternal years of schooling relative to paternal education. This finding echoes previous findings in other countries such as South Africa, Australia, and Sweden (Kwenda et al., 2015; Ranasinghe, 2015; Thomas, 1996; Branson et al., 2012). Figure 5 shows that, in all countries except Madagascar, maternal schooling has a stronger effect on daughters than on sons. The results suggest that extra maternal years of schooling have an important role in determining the educational outcomes among daughters than sons (see tables B10-B18 in Appendix B). This finding is similar to the findings of previous studies results in other parts of the world. Several studies in developed countries underlined that mothers education strongly affects the educational attainment of female children relative to male children (see, for example, Crook, 1995 on Australia; Björklund et al., 2006 on Sweden). The differences in the effects of maternal and paternal years of schooling on children's educational outcomes might emerge from the different roles played by mothers and fathers in family life, in the labor market, and role model effect in each country. It is likely that mothers become the natural role model for a daughter, and fathers for sons. Social norms regarding gender roles might also play a big role on who, sons or daughters, obtain more years of schooling. Second, in line with our other findings, we note a decline in father–child and mother–child intergenerational elasticity ($\hat{\beta}$) across birth cohorts after the 1960s. The mother–child intergenerational elasticity declined more than father–child's elasticity in Ghana, Guinea, Madagascar, Nigeria, Rwanda, and Uganda over the 50 years. In the Comoros, Malawi, and Tanzania, we document more gains in mobility from fathers to children.

Figure 5: The education of mothers or fathers?

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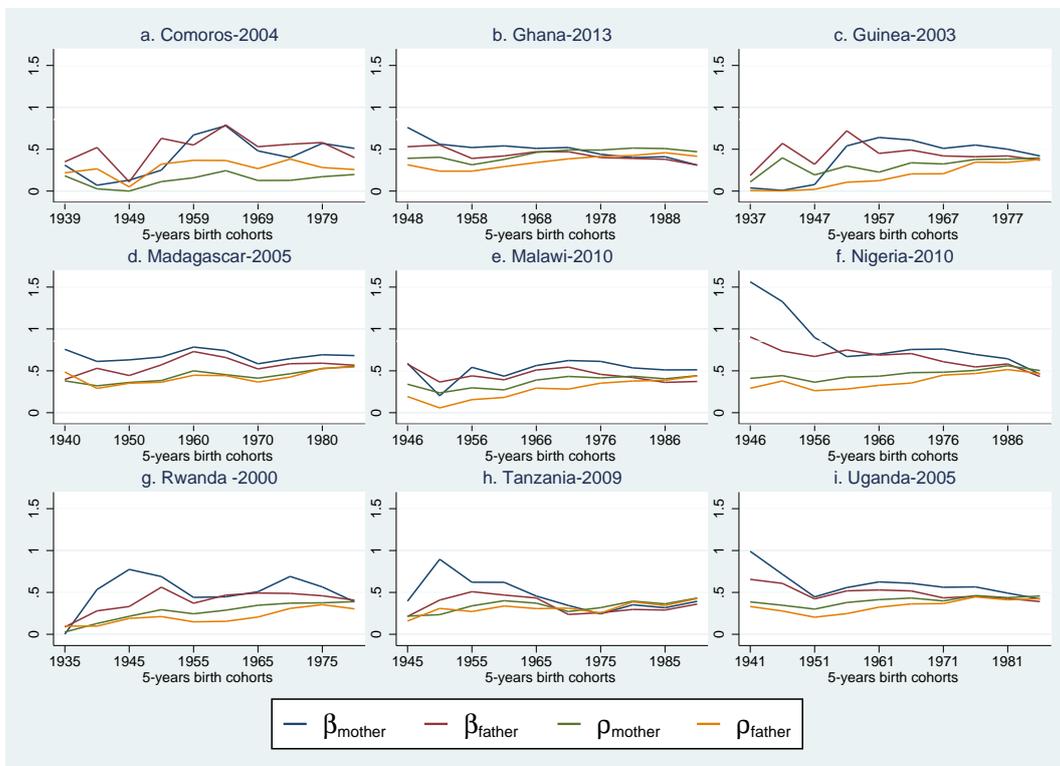
5.6 Intergenerational mobility in educational attainment

As discussed in section 3, estimates of intergenerational elasticity and the correlation coefficient do not allow us to identify the level of children's educational attainment that is more affected by parental education. To investigate this, we estimate an order probit model for children's highest level of education in each country for each five-year birth cohort. The tables in Appendix C present the probability of a child achieving primary educational attainment or above, conditional on her mother or father's education across each five-year birth cohort in each country. In all countries, the omitted category of mother's and father's education is parents with no schooling.

Despite family background, we document a convergence toward zero in the probability of children attaining no education in all countries. The results show that downward mobility, that is, attaining no schooling if parents have at least primary education, is negative across cohorts, suggesting an upward mobility from no schooling to an upper level of educational attainment. Concerning primary education, we find a narrowing, but not closing gap in the probability of childrens attaining primary education across all family educational backgrounds. For instance, in the Comoros, the probability of attaining a primary education when a mother has primary education as well declines from 13 percent in the oldest cohort to 2.5 percent in the youngest cohort. We observe a similar trend in primary education in all the countries except Ghana, Nigeria, and Uganda. This result suggests a narrowing, but not closing gap in primary education across children with a different parental educational background. However, in Ghana, Nigeria, and Uganda, the children of parents who have primary education experienced upward mobility and had a greater chance of obtaining a secondary education or above. Furthermore, children in more well educated households (parents who have secondary education or above) have a greater chance of obtaining a higher education than the children of parents who have no education or who have completed only primary education. Thus, children with poor parental education still have a lower prospect of attaining higher education. The overall results suggest that all the counties experienced upward intergenerational educational mobility over the last 50 years. However, the observed mobility in almost all the countries is concentrated in the lower tail of the education distribution, primary education. It is plausible that this is the result of the expansion in primary education in the region after independence in the 1960s. In line with our results in previous sections, we document evidence that maternal education is more important in influencing children's education relative to schooling of fathers in all the countries but the Comoros.

6 Conclusion

Drawing on nationally representative survey data, we study the intergenerational im(mobility) of educational attainment in the Comoros, Ghana, Guinea, Madagascar, Malawi, Nigeria, Rwanda, Tanzania, and Uganda over 50 years, with a particular focus on gender differences. 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 document a country difference: 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 find considerable gender differences in the persistence of education across generations, which are masked in the country estimations; the educational attainment of daughters is more closely correlated with parental years of schooling relative to educational attainment of sons. On paternal or maternal effects, the education of mothers is significantly more important than the education of fathers in shaping the educational attainment of both daughters and sons, though the effect is much stronger among daughters. Furthermore, we document more mobility in the lower tail of education distribution. In the countries, children from all family backgrounds exhibit a greater chance of attaining primary schooling, while children from more well educated family backgrounds have a greater chance of obtaining more schooling beyond primary education.

From a policy perspective, our results suggest a need for targeted redistribution policies that improve intergenerational mobility in the region. Moreover, putting in place an inclusive environment for women (mothers) who are less well off in human capital accumulation might play a decisive role in promoting social mobility in the long run. While primary education enrollment in our sample has generally increased over the five decades, access to secondary schooling is far from universal. Putting in place policies that promote access to secondary education is therefore a priority among the educational systems in the countries under investigation. Evidence from developed countries suggests that making secondary education mandatory better promotes education outcomes among the next generation. However, the policies in each country should be context specific.

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. 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 five-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 the region in promoting social mobility.

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Appendix A   Educational attainment

Table A1: The Comoros - Educational attainment of children and their parents by five-year birth cohort

Cohort	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1934-1939	1.7	75.0	15.6	7.8	1.6
1940-1944	1.2	83.3	11.5	3.4	1.9
1945-1949	1.9	75.3	14.2	8.0	2.5
1950-1954	2.1	77.5	9.3	10.1	3.1
1955-1959	3.3	63.4	15.4	14.7	6.5
1960-1964	4.4	55.7	13.1	22.7	8.5
1965-1969	5.8	38.3	19.9	32.6	9.2
1970-1974	5.1	39.7	26.1	28.4	5.8
1975-1979	4.1	52.2	20.6	22.8	4.4
1980-1984	5.1	42.7	17.5	37.2	2.6
Daughter					
1934-1939	0.4	95.7	0.0	4.3	0.0
1940-1944	0.1	97.4	2.1	0.5	0.0
1945-1949	0.2	97.2	1.1	1.1	0.6
1950-1954	0.3	94.8	3.9	1.3	0.0
1955-1959	1.2	83.2	9.7	6.3	0.8
1960-1964	2.3	74.4	10.4	11.0	4.2
1965-1969	2.5	70.4	12.0	15.1	2.6
1970-1974	3.7	54.4	20.3	22.0	3.3
1975-1979	2.6	67.8	13.9	16.7	1.7
1980-1984	3.6	57.4	14.5	26.3	1.8
Mother					
1934-1939	0.1	98.5	0.5	1.0	0.0
1940-1944	0.1	98.9	0.8	0.3	0.0
1945-1949	0.0	99.7	0.3	0.0	0.0
1950-1954	0.2	97.5	1.9	0.6	0.0
1955-1959	0.2	96.7	2.3	1.0	0.0
1960-1964	0.2	96.8	2.0	0.8	0.5
1965-1969	0.2	96.6	2.4	0.9	0.1
1970-1974	0.3	95.9	2.8	1.1	0.3
1975-1979	0.3	94.5	4.0	1.2	0.4
1980-1984	0.7	90.4	6.5	3.2	0.0
Father					
1934-1939	0.3	96.5	2.0	1.5	0.0
1940-1944	0.2	97.3	2.4	0.3	0.0
1945-1949	0.1	98.4	1.3	0.3	0.0
1950-1954	0.3	97.2	1.7	1.1	0.0
1955-1959	0.8	92.4	3.5	2.5	1.7
1960-1964	0.7	92.2	5.5	1.5	0.8
1965-1969	0.8	90.2	6.7	2.8	0.4
1970-1974	1.1	87.3	7.8	3.1	1.8
1975-1979	1.4	84.3	9.5	4.6	1.7
1980-1984	1.5	82.9	9.2	6.5	1.5

Table A2: Ghana - Educational attainment of children and their parents by five-year birth cohort

Cohort	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1944-1948	6.4	46.1	12.0	28.0	13.9
1949-1953	7.9	34.7	11.9	37.8	15.6
1954-1958	8.5	28.9	13.2	43.2	14.7
1959-1963	8.1	31.5	13.6	40.5	14.5
1964-1968	8.3	28.4	13.6	46.2	11.9
1969-1973	8.1	27.4	13.8	48.3	10.6
1974-1978	7.6	25.2	14.2	48.8	11.8
1979-1983	7.7	21.8	14.1	52.8	11.4
1984-1988	8.5	16.0	14.7	56.0	13.2
1989-1993	8.9	8.8	14.1	72.3	4.8
Daughter					
1944-1948	2.6	69.8	15.0	12.9	2.3
1949-1953	4.0	60.8	12.5	21.2	5.6
1954-1958	5.4	47.7	16.1	29.9	6.3
1959-1963	5.0	51.9	14.1	29.4	4.6
1964-1968	5.4	47.3	15.7	31.8	5.3
1969-1973	5.3	46.7	16.4	32.4	4.5
1974-1978	5.1	41.8	18.1	36.2	3.8
1979-1983	5.3	37.4	19.0	38.7	4.9
1984-1988	6.7	28.4	16.9	45.8	8.9
1989-1993	7.7	18.1	16.0	61.9	4.1
Mother					
1944-1948	0.5	95.8	1.3	2.5	0.4
1949-1953	0.6	94.3	1.8	3.2	0.7
1954-1958	0.7	93.1	2.5	3.9	0.6
1959-1963	1.0	90.8	2.8	5.4	1.0
1964-1968	1.5	86.1	4.2	8.0	1.7
1969-1973	1.9	82.4	4.9	11.1	1.6
1974-1978	2.5	77.7	5.1	15.1	2.2
1979-1983	3.0	73.4	6.7	17.3	2.6
1984-1988	3.9	64.8	8.4	23.5	3.3
1989-1993	4.2	59.8	11.1	25.6	3.6
Father					
1944-1948	1.6	87.8	1.1	8.8	2.3
1949-1953	1.7	86.3	2.0	9.5	2.2
1954-1958	2.3	81.9	3.0	11.7	3.5
1959-1963	2.7	79.0	2.5	14.2	4.3
1964-1968	3.6	72.1	3.1	19.6	5.2
1969-1973	4.1	69.5	2.5	20.5	7.5
1974-1978	4.6	65.3	2.9	23.9	7.9
1979-1983	5.2	60.5	4.0	26.4	9.1
1984-1988	6.3	51.6	4.9	32.4	11.1
1989-1993	6.6	46.1	7.9	35.3	10.7

Table A3: Guinea - Educational attainment of children and their parents by five-year birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1933-1937	0.9	87.8	8.2	1.9	2.1
1938-1942	1.4	85.1	5.8	5.4	3.8
1943-1947	2.6	76.7	6.5	7.5	9.3
1948-1952	4.4	61.8	9.5	12.2	16.5
1953-1957	5.5	54.0	9.8	14.6	21.7
1958-1962	4.7	56.2	10.5	19.0	14.3
1963-1967	3.9	57.9	13.1	20.1	8.9
1968-1972	4.2	54.7	15.7	20.7	9.0
1973-1977	4.8	47.9	17.3	24.7	10.1
1978-1982	5.9	36.5	14.2	44.5	4.8
Daughter					
1933-1937	0.2	97.2	1.4	1.1	0.3
1938-1942	0.2	96.9	1.8	1.1	0.2
1943-1947	0.4	94.9	2.7	1.6	0.7
1948-1952	1.0	90.2	2.8	4.6	2.4
1953-1957	1.6	83.9	4.6	6.3	5.1
1958-1962	1.4	84.1	4.7	8.9	2.3
1963-1967	1.6	81.7	6.4	9.6	2.4
1968-1972	1.6	80.0	9.3	8.3	2.3
1973-1977	1.6	78.7	9.3	10.1	1.9
1978-1982	2.7	67.0	11.2	20.0	1.9
Mother					
1933-1937	0.0	99.4	0.4	0.1	0.0
1938-1942	0.0	99.5	0.2	0.4	0.0
1943-1947	0.1	98.7	0.9	0.5	0.0
1948-1952	0.1	98.8	0.5	0.5	0.2
1953-1957	0.2	98.2	0.9	0.8	0.2
1958-1962	0.3	96.9	1.5	1.0	0.6
1963-1967	0.4	96.0	1.5	1.8	0.7
1968-1972	0.7	92.1	3.4	3.1	1.4
1973-1977	1.0	89.7	3.5	3.9	2.8
1978-1982	1.9	82.1	5.1	7.2	5.6
Father					
1933-1937	0.2	97.7	1.1	0.6	0.6
1938-1942	0.4	96.4	0.9	1.3	1.4
1943-1947	0.5	95.2	2.4	1.1	1.3
1948-1952	0.5	95.0	2.3	1.3	1.5
1953-1957	0.8	93.0	3.1	1.4	2.6
1958-1962	1.2	89.8	3.3	2.4	4.5
1963-1967	1.2	89.7	3.4	3.0	4.0
1968-1972	1.7	85.5	5.0	3.3	6.3
1973-1977	1.9	84.6	4.4	4.0	7.1
1978-1982	2.8	76.7	6.2	6.4	10.6

Table A4: Madagascar - Educational attainment of children and their parents by five-years birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1936-1940	1.5	78.2	14.5	5.5	1.9
1941-1945	2.1	74.2	12.0	11.2	2.6
1946-1950	2.6	65.8	18.6	12.6	3.1
1951-1955	2.6	67.6	16.3	11.8	4.3
1956-1960	3.0	63.5	18.5	13.3	4.6
1961-1965	3.3	58.3	19.9	17.9	3.8
1966-1970	3.1	58.9	21.3	17.1	2.7
1971-1975	2.8	61.1	22.6	14.1	2.2
1976-1980	2.5	65.0	21.9	11.0	2.2
1981-1985	2.6	63.5	20.8	14.6	1.1
Daughter					
1936-1940	0.5	91.9	5.9	1.5	0.7
1941-1945	0.8	88.5	7.5	3.8	0.3
1946-1950	1.4	80.1	13.3	5.5	1.1
1951-1955	1.6	78.2	13.1	7.5	1.2
1956-1960	2.1	72.7	14.1	10.7	2.5
1961-1965	2.3	68.3	17.2	12.8	1.6
1966-1970	2.6	61.8	24.1	12.7	1.4
1971-1975	2.2	67.0	22.2	9.6	1.2
1976-1980	2.1	68.9	20.5	8.9	1.7
1981-1985	2.3	66.8	20.2	11.9	1.1
Mother					
1936-1940	0.9	70.8	27.6	1.2	0.4
1941-1945	0.9	70.3	28.4	1.1	0.2
1946-1950	1.3	61.5	35.3	2.9	0.2
1951-1955	1.3	60.3	37.1	2.4	0.3
1956-1960	1.6	56.5	39.3	3.8	0.4
1961-1965	1.7	53.8	41.4	4.5	0.3
1966-1970	1.9	49.5	44.6	5.4	0.5
1971-1975	1.9	51.1	42.4	6.3	0.2
1976-1980	2.0	52.3	40.6	6.3	0.7
1981-1985	2.1	57.9	33.0	8.5	0.6
Father					
1936-1940	1.5	61.5	34.2	3.9	0.4
1941-1945	1.3	62.5	34.1	3.2	0.2
1946-1950	1.9	52.4	41.9	5.1	0.7
1951-1955	1.9	50.3	43.6	5.7	0.5
1956-1960	2.1	46.8	45.6	6.9	0.6
1961-1965	2.3	43.7	48.3	7.2	0.8
1966-1970	2.7	38.9	49.8	10.4	0.9
1971-1975	2.7	40.3	48.4	10.5	0.8
1976-1980	2.7	41.9	46.1	10.4	1.6
1981-1985	2.8	47.6	37.8	12.6	2.0

Table A5: Malawi - Educational attainment of children and their parents by five-years birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1942-1946	3.7	33.2	51.7	13.1	2.0
1947-1951	4.5	22.5	54.2	21.1	2.2
1952-1956	4.8	22.8	50.6	24.1	2.5
1957-1961	5.0	19.1	54.1	23.3	3.5
1962-1966	5.3	19.4	49.2	27.6	3.9
1967-1971	5.6	15.8	50.7	28.5	5.1
1972-1976	6.0	14.1	48.6	33.2	4.1
1977-1981	6.6	10.3	45.1	40.9	3.7
1982-1986	7.0	7.8	44.0	44.4	3.8
1987-1991	6.8	6.9	45.1	46.5	1.5
Daughter					
1942-1946	1.8	61.2	35.7	2.5	0.6
1947-1951	2.1	56.3	38.2	4.8	0.8
1952-1956	2.5	51.4	38.6	9.6	0.4
1957-1961	2.7	48.5	40.1	10.9	0.5
1962-1966	3.2	38.1	50.1	10.2	1.6
1967-1971	3.5	38.4	46.7	11.7	3.3
1972-1976	3.7	31.8	53.1	14.2	0.9
1977-1981	4.7	22.6	53.6	21.4	2.4
1982-1986	5.4	14.8	54.6	28.5	2.2
1987-1991	5.7	12.3	53.5	32.9	1.4
Mother					
1942-1946	0.2	97.8	0.2	2.1	0.0
1947-1951	0.1	98.3	0.3	1.3	0.1
1952-1956	0.2	97.7	0.4	1.9	0.0
1957-1961	0.3	96.7	0.4	2.9	0.1
1962-1966	0.5	95.1	0.4	4.3	0.3
1967-1971	0.5	94.2	1.1	4.4	0.3
1972-1976	0.7	91.6	1.5	6.6	0.4
1977-1981	1.0	88.4	2.4	8.3	0.9
1982-1986	1.3	83.5	5.3	10.4	0.8
1987-1991	1.8	73.8	13.4	12.0	0.8
Father					
1942-1946	0.5	94.4	0.2	5.3	0.2
1947-1951	0.5	94.1	0.0	5.8	0.1
1952-1956	0.9	90.0	0.0	10.0	0.1
1957-1961	0.9	90.3	0.0	9.3	0.4
1962-1966	1.2	88.0	0.1	10.9	1.0
1967-1971	1.3	86.7	0.3	12.4	0.7
1972-1976	1.6	83.0	0.5	15.2	1.3
1977-1981	2.2	78.1	1.4	18.3	2.3
1982-1986	2.7	72.1	3.6	21.8	2.6
1987-1991	3.1	63.7	10.2	23.4	2.8

Table A6: Nigeria-Educational attainment of children and their parents by five-year birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1942-1946	4.4	45.3	34.2	16.0	4.4
1947-1951	4.2	51.1	27.1	16.4	5.5
1952-1956	5.5	37.8	32.0	23.9	6.3
1957-1961	5.8	37.3	30.3	24.8	7.6
1962-1966	7.0	30.7	25.6	35.5	8.2
1967-1971	7.6	26.2	25.1	39.4	9.3
1972-1976	7.5	23.9	26.3	44.7	5.2
1977-1981	8.1	22.7	20.2	49.3	7.8
1982-1986	9.4	17.0	12.4	60.1	10.5
1987-1991	9.6	11.1	9.8	75.3	3.8
Daughter					
1942-1946	1.5	77.8	15.7	6.5	0.0
1947-1951	2.1	69.6	21.1	7.6	1.7
1952-1956	2.8	59.5	29.7	8.1	2.7
1957-1961	3.2	61.6	22.2	13.4	2.8
1962-1966	4.5	49.9	24.4	21.7	4.0
1967-1971	4.2	51.1	24.7	22.0	2.1
1972-1976	5.1	42.0	27.8	27.0	3.2
1977-1981	5.6	41.0	22.5	33.1	3.4
1982-1986	6.4	37.4	17.1	41.7	3.8
1987-1991	7.8	26.8	11.4	58.6	3.2
Mother					
1942-1946	0.1	98.3	1.7	0.0	0.0
1947-1951	0.3	94.8	4.7	0.5	0.0
1952-1956	0.4	93.7	5.6	0.6	0.0
1957-1961	0.5	92.5	5.5	1.7	0.3
1962-1966	0.8	88.2	9.2	2.3	0.3
1967-1971	0.9	86.2	10.9	2.8	0.2
1972-1976	1.3	81.4	14.2	4.1	0.4
1977-1981	1.7	76.9	16.4	5.9	0.7
1982-1986	2.6	66.8	19.9	11.6	1.7
1987-1991	3.7	55.9	23.8	18.6	1.6
Father					
1942-1946	0.5	92.7	5.6	1.5	0.2
1947-1951	0.8	88.9	7.9	2.9	0.3
1952-1956	1.0	84.6	12.9	1.9	0.6
1957-1961	1.1	85.2	10.4	4.1	0.3
1962-1966	1.5	80.9	13.1	5.1	1.0
1967-1971	1.8	76.4	15.7	6.5	1.4
1972-1976	2.1	73.2	17.3	8.0	1.5
1977-1981	2.9	65.8	19.9	11.5	2.9
1982-1986	3.6	59.3	21.8	14.6	4.3
1987-1991	4.9	47.0	25.6	21.2	6.3

Table A7: Rwanda - Educational attainment of children and their parents by five-year birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1931-1935	2.4	44.7	50.4	4.3	0.7
1936-1940	2.8	38.2	54.3	7.5	0.0
1941-1945	2.6	41.5	51.3	6.8	0.4
1946-1950	3.4	33.7	56.6	7.7	2.0
1951-1955	3.6	29.2	60.4	9.5	1.0
1956-1960	3.7	30.8	55.8	11.3	2.0
1961-1965	4.4	25.9	57.7	12.8	3.6
1966-1970	5.2	21.3	54.1	20.3	4.3
1971-1975	5.2	20.2	54.8	22.2	2.8
1976-1980	5.2	13.5	64.8	20.4	1.3
Daughter					
1931-1935	0.6	82.8	16.2	1.0	0.0
1936-1940	0.6	81.4	17.5	0.7	0.4
1941-1945	1.1	71.4	25.7	2.9	0.0
1946-1950	1.4	66.8	28.9	3.8	0.4
1951-1955	1.9	54.7	39.8	5.3	0.2
1956-1960	2.4	48.4	44.5	6.7	0.5
1961-1965	3.3	43.2	43.4	12.4	1.0
1966-1970	4.3	29.7	51.1	18.2	1.0
1971-1975	4.8	20.4	60.9	17.0	1.6
1976-1980	5.2	15.8	63.1	19.8	1.3
Mother					
1931-1935	0.0	99.4	0.6	0.0	0.0
1936-1940	0.1	98.6	1.4	0.0	0.0
1941-1945	0.1	97.3	2.7	0.0	0.0
1946-1950	0.2	96.6	3.3	0.1	0.0
1951-1955	0.3	94.0	5.9	0.1	0.0
1956-1960	0.3	93.8	5.8	0.4	0.0
1961-1965	0.5	87.6	11.8	0.6	0.0
1966-1970	0.9	81.2	17.1	1.5	0.2
1971-1975	1.3	73.4	22.9	3.5	0.3
1976-1980	1.9	60.1	35.2	4.4	0.2
Father					
1931-1935	0.3	96.3	2.8	0.6	0.3
1936-1940	0.2	95.8	3.5	0.7	0.0
1941-1945	0.4	93.9	5.1	1.0	0.0
1946-1950	0.5	91.2	7.5	1.3	0.0
1951-1955	0.8	86.3	12.6	1.1	0.1
1956-1960	1.0	81.4	16.7	1.8	0.1
1961-1965	1.5	72.5	24.1	3.1	0.3
1966-1970	2.1	63.9	30.5	5.1	0.5
1971-1975	2.7	54.1	38.8	6.4	0.8
1976-1980	3.2	43.8	46.9	8.3	0.9

Table A8: Tanzania - Educational attainment of children and their parents by five-year birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1941-1945	3.5	36.8	52.8	7.6	2.8
1946-1950	4.0	26.9	63.4	7.5	2.2
1951-1955	5.2	25.8	54.5	14.6	5.1
1956-1960	5.8	19.8	58.5	17.9	3.9
1961-1965	6.9	12.0	62.2	22.7	3.0
1966-1970	6.6	10.3	68.7	19.4	1.6
1971-1975	6.7	8.4	70.9	19.0	1.8
1976-1980	6.6	10.2	68.4	19.0	2.4
1981-1985	6.9	10.6	63.2	23.8	2.3
1986-1990	7.1	10.5	52.8	35.0	1.7
Daughter					
1941-1945	1.2	71.4	26.9	1.7	0.0
1946-1950	1.5	69.5	29.0	0.0	1.5
1951-1955	2.8	53.1	38.1	7.7	1.0
1956-1960	3.4	46.3	45.4	7.4	0.9
1961-1965	4.8	31.4	55.4	12.5	0.7
1966-1970	5.3	23.4	63.8	12.5	0.3
1971-1975	5.7	19.7	65.4	15.0	0.0
1976-1980	6.1	17.8	64.4	16.1	1.7
1981-1985	6.2	17.0	61.5	20.4	1.1
1986-1990	6.5	14.3	56.9	28.4	0.4
Mother					
1941-1945	0.2	96.2	3.8	0.0	0.0
1946-1950	0.2	95.9	4.1	0.0	0.0
1951-1955	0.6	88.9	10.6	0.3	0.3
1956-1960	0.8	84.9	13.5	1.6	0.0
1961-1965	1.1	80.2	19.5	0.4	0.0
1966-1970	1.6	73.1	24.4	1.8	0.7
1971-1975	2.1	66.6	30.3	2.5	0.5
1976-1980	3.2	51.5	43.3	4.2	1.1
1981-1985	4.0	42.5	48.0	8.3	1.2
1986-1990	4.5	37.2	51.1	10.6	1.1
Father					
1941-1945	0.9	85.7	12.9	0.5	1.0
1946-1950	0.5	88.1	11.5	0.4	0.0
1951-1955	1.3	74.5	24.1	0.9	0.6
1956-1960	2.0	68.0	27.9	2.6	1.6
1961-1965	2.3	61.1	36.0	2.1	0.8
1966-1970	2.7	55.8	38.2	4.7	1.3
1971-1975	3.3	48.0	45.5	4.7	1.9
1976-1980	4.8	34.9	51.4	9.6	4.1
1981-1985	5.2	29.4	55.3	11.6	3.6
1986-1990	5.8	25.8	55.5	15.0	3.7

Table A9: Uganda - Educational attainment of children and their parents by five-year birth cohort

	Average years of schooling	No schooling	Primary	Secondary	Tertiary
Son					
1937-1941	4.4	26.0	55.0	18.0	1.0
1942-1946	5.8	18.1	46.6	33.6	1.7
1947-1951	6.4	10.4	55.2	31.9	2.4
1952-1956	5.9	16.0	51.5	31.4	1.1
1957-1961	6.5	11.8	57.7	28.5	2.1
1962-1966	6.1	11.1	62.7	24.0	2.2
1967-1971	6.7	7.2	58.6	32.4	1.8
1972-1976	7.0	5.9	59.5	32.0	2.6
1977-1981	7.1	4.9	57.2	35.9	1.9
1982-1986	7.7	4.1	49.2	46.1	0.6
Daughter					
1937-1941	1.4	74.1	21.8	3.7	0.5
1942-1946	1.9	60.6	33.3	5.7	0.4
1947-1951	2.7	47.4	42.1	10.3	0.3
1952-1956	3.4	38.5	49.9	11.4	0.3
1957-1961	3.8	38.6	45.3	15.5	0.6
1962-1966	3.9	32.0	54.7	13.0	0.3
1967-1971	4.3	28.0	55.3	15.9	0.8
1972-1976	4.9	21.8	57.9	19.8	0.5
1977-1981	5.4	17.3	56.4	25.7	0.6
1982-1986	6.6	9.6	53.6	36.3	0.6
Mother					
1937-1941	0.4	91.8	7.9	0.3	0.0
1942-1946	0.6	86.3	13.2	0.5	0.0
1947-1951	0.7	82.4	16.6	0.8	0.2
1952-1956	0.8	81.8	17.6	0.6	0.0
1957-1961	1.1	76.2	22.8	1.0	0.0
1962-1966	1.2	72.7	25.9	1.4	0.0
1967-1971	1.6	66.4	31.6	2.0	0.0
1972-1976	2.2	57.3	38.4	4.2	0.1
1977-1981	2.8	48.0	45.2	6.5	0.3
1982-1986	3.5	39.7	49.0	11.0	0.3
Father					
1937-1941	0.9	79.3	19.8	0.9	0.0
1942-1946	1.4	69.8	29.3	0.7	0.2
1947-1951	1.9	60.7	36.2	2.8	0.4
1952-1956	2.0	59.0	38.1	2.6	0.3
1957-1961	2.5	53.1	42.8	3.6	0.4
1962-1966	2.8	47.9	47.0	4.6	0.5
1967-1971	3.5	38.9	53.2	7.1	0.8
1972-1976	4.1	34.3	53.2	11.0	1.5
1977-1981	4.9	26.4	55.5	16.0	2.1
1982-1986	5.8	19.5	54.2	24.1	2.1

Appendix B Estimates of intergenerational educational persistence

Table B10: Comoros - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
			All children			
1934-1939	0.308	0.311	0.347	0.293	0.182	0.218
1940-1944	0.070	0.037	0.518***	0.143	0.027	0.266
1945-1949	0.126***	0.028	0.106	0.157	0.000	0.050
1950-1954	0.246	0.157	0.625*	0.255	0.113	0.322*
1955-1959	0.666	0.348	0.546***	0.087	0.159	0.367***
1960-1964	0.778***	0.138	0.792***	0.087	0.244	0.365***
1965-1969	0.482***	0.112	0.530***	0.088	0.127***	0.268***
1970-1974	0.397**	0.137	0.560***	0.048	0.128***	0.382***
1975-1979	0.574***	0.151	0.576***	0.104	0.172***	0.281***
1980-1984	0.512***	0.086	0.401***	0.058	0.198***	0.258***
			Daughters			
1934-1939	0.712**	0.255	1.095***	0.013	0.596	0.802**
1940-1944	0.023	0.036	0.266	0.176	0.059	0.247
1945-1949	0.056	0.034	0.030	0.019	0.000	0.026
1950-1954	0.046	0.059	0.064	0.075	0.058	0.071
1955-1959	0.450	0.255	0.519***	0.109	0.192	0.592***
1960-1964	0.565**	0.181	0.853***	0.134	0.224***	0.454***
1965-1969	0.632***	0.113	0.357**	0.119	0.201*	0.209***
1970-1974	0.423*	0.172	0.600***	0.056	0.159***	0.448***
1975-1979	0.580**	0.224	0.423**	0.146	0.168**	0.198***
1980-1984	0.511***	0.100	0.404***	0.091	0.209***	0.246***
			Sons			
1934-1939	0.136	0.031	0.09	0.233	0.065	0.056
1940-1944	0.012	0.041	0.486**	0.157	0.247	0.250
1945-1949	0.044	0.034	0.853***	0.041	0.026	0.196
1950-1954	0.627**	0.191	1.219***	0.187	0.196	0.484*
1955-1959	1.44	0.773	0.687***	0.125	0.215	0.315**
1960-1964	0.993***	0.155	0.717***	0.111	0.273**	0.313***
1965-1969	0.31	0.171	0.603***	0.094	0.079	0.305***
1970-1974	0.406**	0.129	0.504***	0.088	0.101*	0.307***
1975-1979	0.547**	0.197	0.632***	0.124	0.175	0.330**
1980-1984	0.500**	0.154	0.394***	0.074	0.181***	0.271***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B11: Ghana - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
All children						
1934-1939	0.763***	0.050	0.531***	0.042	0.391***	0.314***
1940-1944	0.557***	0.063	0.550***	0.035	0.404***	0.238***
1945-1949	0.521***	0.043	0.389***	0.042	0.314***	0.238***
1950-1954	0.536***	0.034	0.424***	0.027	0.378***	0.292***
1955-1959	0.505***	0.028	0.471***	0.024	0.462***	0.341***
1960-1964	0.516***	0.024	0.466***	0.020	0.491***	0.385***
1965-1969	0.440***	0.019	0.401***	0.016	0.490***	0.414***
1970-1974	0.404***	0.017	0.387***	0.014	0.514***	0.425***
1975-1979	0.406***	0.016	0.382***	0.015	0.508***	0.458***
1980-1984	0.309***	0.012	0.308***	0.012	0.470***	0.416***
Daughters						
1934-1939	0.759***	0.059	0.439***	0.060	0.393**	0.360**
1940-1944	0.680***	0.079	0.614***	0.042	0.540***	0.363***
1945-1949	0.567***	0.063	0.455***	0.057	0.418***	0.291***
1950-1954	0.592***	0.052	0.463***	0.033	0.442***	0.313***
1955-1959	0.578***	0.031	0.496***	0.030	0.501***	0.403***
1960-1964	0.580***	0.033	0.514***	0.024	0.552***	0.442***
1965-1969	0.452***	0.025	0.406***	0.021	0.519***	0.445***
1970-1974	0.407***	0.022	0.381***	0.017	0.534***	0.440***
1975-1979	0.413***	0.022	0.392***	0.019	0.516***	0.449***
1980-1984	0.366***	0.017	0.341***	0.017	0.498***	0.467***
Sons						
1934-1939	0.741***	0.065	0.604***	0.045	0.417***	0.294***
1940-1944	0.450***	0.099	0.528***	0.048	0.354***	0.159***
1945-1949	0.516***	0.045	0.369***	0.055	0.273***	0.222***
1950-1954	0.452***	0.044	0.382***	0.042	0.337***	0.267***
1955-1959	0.416***	0.047	0.436***	0.037	0.435***	0.287***
1960-1964	0.415***	0.030	0.386***	0.029	0.433***	0.331***
1965-1969	0.408***	0.027	0.375***	0.022	0.468***	0.392***
1970-1974	0.377***	0.024	0.383***	0.024	0.496***	0.404***
1975-1979	0.371***	0.020	0.350***	0.021	0.497***	0.464***
1980-1984	0.241***	0.017	0.265***	0.015	0.436***	0.354***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B12: Guinea - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
1934-1939	0.038	0.035	0.187	0.124	0.109	0.007
1940-1944	0.009	0.096	0.566***	0.168	0.397***	0.002
1945-1949	0.078	0.145	0.315*	0.142	0.193	0.021
1950-1954	0.538**	0.179	0.718***	0.073	0.300***	0.106
1955-1959	0.636***	0.154	0.453***	0.083	0.226***	0.124***
1960-1964	0.609***	0.098	0.493***	0.046	0.338***	0.205***
1965-1969	0.511***	0.072	0.415***	0.039	0.324***	0.207***
1970-1974	0.548***	0.070	0.414***	0.037	0.378***	0.346***
1975-1979	0.498***	0.039	0.416***	0.027	0.382***	0.342***
1980-1984	0.417***	0.022	0.369***	0.019	0.395***	0.378***
			Daughters			
1934-1939	0.025	0.047	0.01	0.027	0.006	0.012
1940-1944	0.117	0.129	0.304*	0.137	0.472	0.081
1945-1949	0.129	0.188	0.12	0.092	0.158	0.078
1950-1954	0.537*	0.228	0.714***	0.080	0.439**	0.181
1955-1959	0.513*	0.249	0.362***	0.106	0.258***	0.132
1960-1964	0.604***	0.103	0.384***	0.052	0.361***	0.252**
1965-1969	0.495***	0.093	0.386***	0.050	0.352***	0.237***
1970-1974	0.563***	0.092	0.388***	0.048	0.460***	0.409***
1975-1979	0.502***	0.054	0.416***	0.034	0.474***	0.421***
1980-1984	0.464***	0.029	0.386***	0.025	0.460***	0.467***
			Sons			
1934-1939	0.115***	0.027	0.187	0.145	0.109	0.011
1940-1944	0.154***	0.037	0.766**	0.240	0.425***	0.023
1945-1949	0.012	0.213	0.553***	0.123	0.251**	0.002
1950-1954	0.480	0.289	0.634***	0.102	0.247***	0.075
1955-1959	0.686***	0.182	0.574***	0.109	0.234***	0.119*
1960-1964	0.518**	0.187	0.605***	0.063	0.345***	0.161**
1965-1969	0.482***	0.112	0.426***	0.058	0.301***	0.170***
1970-1974	0.465***	0.106	0.420***	0.059	0.330***	0.286***
1975-1979	0.414***	0.059	0.378***	0.044	0.317***	0.270***
1980-1984	0.335***	0.032	0.326***	0.027	0.350***	0.311***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B13: Madagascar - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
			All children			
1934-1939	0.757***	0.129	0.397***	0.081	0.380***	0.486***
1940-1944	0.612***	0.133	0.530***	0.110	0.321***	0.290***
1945-1949	0.631***	0.135	0.444***	0.079	0.361***	0.352***
1950-1954	0.665***	0.071	0.571***	0.063	0.384***	0.364***
1955-1959	0.784***	0.062	0.730***	0.046	0.500***	0.447***
1960-1964	0.742***	0.053	0.659***	0.046	0.454***	0.443***
1965-1969	0.584***	0.051	0.523***	0.041	0.412***	0.366***
1970-1974	0.645***	0.051	0.585***	0.035	0.465***	0.425***
1975-1979	0.692***	0.044	0.591***	0.038	0.525***	0.530***
1980-1984	0.682***	0.034	0.567***	0.027	0.555***	0.546***
			Daughters			
1934-1939	0.474**	0.179	0.365***	0.083	0.498*	0.388*
1940-1944	0.137	0.120	0.250*	0.115	0.230*	0.089**
1945-1949	0.611**	0.197	0.421***	0.112	0.339***	0.370***
1950-1954	0.613***	0.105	0.638***	0.079	0.436***	0.381***
1955-1959	0.739***	0.094	0.640***	0.067	0.458***	0.455***
1960-1964	0.729***	0.085	0.597***	0.063	0.421***	0.458***
1965-1969	0.552***	0.052	0.487***	0.040	0.429***	0.403***
1970-1974	0.606***	0.073	0.553***	0.041	0.441***	0.411***
1975-1979	0.679***	0.075	0.584***	0.064	0.498***	0.516***
1980-1984	0.667***	0.049	0.567***	0.044	0.520***	0.540***
			Sons			
1934-1939	0.892***	0.168	0.413**	0.136	0.339**	0.531***
1940-1944	0.857***	0.175	0.744***	0.149	0.376***	0.364***
1945-1949	0.667***	0.158	0.456***	0.108	0.375***	0.339***
1950-1954	0.708***	0.097	0.526***	0.084	0.352***	0.363***
1955-1959	0.827***	0.076	0.792***	0.059	0.528***	0.447***
1960-1964	0.732***	0.066	0.689***	0.060	0.473***	0.426***
1965-1969	0.638***	0.090	0.566***	0.071	0.400***	0.342***
1970-1974	0.691***	0.066	0.615***	0.054	0.487***	0.444***
1975-1979	0.699***	0.049	0.591***	0.045	0.547***	0.543***
1980-1984	0.703***	0.045	0.567***	0.034	0.588***	0.556***

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Table B14: Malawi - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
			All children			
1934-1939	0.589**	0.221	0.579***	0.113	0.340***	0.193*
1940-1944	0.202	0.191	0.366***	0.072	0.237***	0.057***
1945-1949	0.542**	0.172	0.440***	0.073	0.297***	0.156***
1950-1954	0.436***	0.127	0.393***	0.061	0.273***	0.182***
1955-1959	0.563***	0.070	0.510***	0.040	0.390***	0.293***
1960-1964	0.623***	0.066	0.544***	0.033	0.433***	0.282***
1965-1969	0.613***	0.039	0.458***	0.026	0.416***	0.353***
1970-1974	0.535***	0.032	0.421***	0.021	0.435***	0.378***
1975-1979	0.511***	0.022	0.362***	0.016	0.405***	0.387***
1980-1984	0.512***	0.018	0.373***	0.013	0.442***	0.439***
			Daughters			
1934-1939	0.219	0.113	0.502**	0.158	0.381***	0.089
1940-1944	0.261	0.285	0.409***	0.096	0.319***	0.095
1945-1949	0.392***	0.117	0.402***	0.098	0.320***	0.084*
1950-1954	0.451**	0.164	0.280**	0.085	0.226***	0.218**
1955-1959	0.525***	0.116	0.563***	0.066	0.471***	0.313***
1960-1964	0.630***	0.092	0.537***	0.050	0.445***	0.344***
1965-1969	0.549***	0.072	0.385***	0.041	0.375***	0.320***
1970-1974	0.588***	0.039	0.432***	0.033	0.470***	0.421***
1975-1979	0.525***	0.032	0.371***	0.023	0.441***	0.416***
1980-1984	0.516***	0.025	0.366***	0.018	0.446***	0.463***
			Sons			
1934-1939	0.910***	0.183	0.664***	0.134	0.353***	0.282
1940-1944	0.137	0.170	0.299**	0.105	0.184**	0.033
1945-1949	0.476*	0.208	0.454***	0.104	0.297***	0.166**
1950-1954	0.421*	0.183	0.480***	0.069	0.326***	0.173**
1955-1959	0.595***	0.080	0.453***	0.050	0.345***	0.298***
1960-1964	0.661***	0.081	0.522***	0.041	0.430***	0.270***
1965-1969	0.603***	0.044	0.468***	0.032	0.434***	0.368***
1970-1974	0.469***	0.049	0.402***	0.025	0.417***	0.344***
1975-1979	0.486***	0.027	0.346***	0.021	0.382***	0.366***
1980-1984	0.491***	0.023	0.370***	0.018	0.434***	0.409***

Significance levels: $*$: 10% $**$: 5% $***$: 1%

Table B15: Nigeria - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
All children						
1934-1939	1.563***	0.341	0.905***	0.108	0.410***	0.291**
1940-1944	1.326***	0.210	0.735***	0.073	0.443***	0.379***
1945-1949	0.898***	0.110	0.671***	0.104	0.364***	0.263***
1950-1954	0.670***	0.063	0.749***	0.057	0.424***	0.283***
1955-1959	0.700***	0.053	0.688***	0.042	0.436***	0.327***
1960-1964	0.755***	0.053	0.706***	0.036	0.478***	0.354***
1965-1969	0.760***	0.054	0.609***	0.032	0.483***	0.449***
1970-1974	0.695***	0.038	0.546***	0.029	0.505***	0.468***
1975-1979	0.644***	0.026	0.582***	0.022	0.561***	0.515***
1980-1984	0.461***	0.020	0.432***	0.018	0.504***	0.468***
Daughters						
1934-1939	1.730***	0.053	0.967***	0.272	0.389***	0.238**
1940-1944	1.264***	0.337	0.660***	0.097	0.468***	0.408***
1945-1949	1.132***	0.214	0.695***	0.205	0.402***	0.334***
1950-1954	0.809***	0.103	0.763***	0.077	0.505***	0.362***
1955-1959	0.770***	0.077	0.745***	0.069	0.470***	0.363***
1960-1964	0.887***	0.086	0.786***	0.055	0.548***	0.438***
1965-1969	0.825***	0.056	0.624***	0.045	0.489***	0.481***
1970-1974	0.742***	0.056	0.566***	0.041	0.511***	0.481***
1975-1979	0.753***	0.036	0.656***	0.030	0.603***	0.563***
1980-1984	0.567***	0.028	0.532***	0.025	0.573***	0.537***
Sons						
1934-1939	1.310**	0.394	0.789***	0.112	0.401***	0.284**
1940-1944	1.297***	0.240	0.778***	0.090	0.451***	0.365***
1945-1949	0.736***	0.108	0.669***	0.094	0.360***	0.222***
1950-1954	0.533***	0.082	0.736***	0.076	0.384***	0.225***
1955-1959	0.616***	0.073	0.615***	0.052	0.407***	0.298***
1960-1964	0.569***	0.058	0.572***	0.048	0.408***	0.277***
1965-1969	0.655***	0.091	0.566***	0.041	0.475***	0.410***
1970-1974	0.597***	0.049	0.496***	0.038	0.502***	0.447***
1975-1979	0.470***	0.036	0.432***	0.033	0.473***	0.445***
1980-1984	0.323***	0.029	0.303***	0.023	0.404***	0.372***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B16: Rwanda - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
			All children			
1934-1939	0.001	0.311	0.087	0.222	0.027	0.098
1940-1944	0.535	0.300	0.280	0.152	0.129*	0.098*
1945-1949	0.775***	0.153	0.332**	0.110	0.215***	0.190**
1950-1954	0.690***	0.199	0.563***	0.092	0.294***	0.212***
1955-1959	0.441***	0.129	0.371***	0.064	0.245***	0.149***
1960-1964	0.448***	0.104	0.468***	0.057	0.288***	0.155***
1965-1969	0.508***	0.072	0.493***	0.056	0.347***	0.206***
1970-1974	0.691***	0.061	0.488***	0.040	0.372***	0.309***
1975-1979	0.566***	0.054	0.460***	0.039	0.376***	0.354***
1980-1984	0.388***	0.033	0.408***	0.028	0.390***	0.304***
			Daughters			
1934-1939	0.050	0.104	0.155	0.207	0.081	0.027
1940-1944	0.669	0.348	0.648***	0.171	0.394**	0.324**
1945-1949	0.907***	0.155	0.403*	0.166	0.335***	0.352**
1950-1954	0.673**	0.222	0.578***	0.104	0.413***	0.274**
1955-1959	0.566**	0.172	0.402***	0.089	0.305***	0.222***
1960-1964	0.563***	0.118	0.383***	0.062	0.255***	0.187***
1965-1969	0.601***	0.096	0.487***	0.065	0.357***	0.251***
1970-1974	0.658***	0.081	0.487***	0.055	0.367***	0.299***
1975-1979	0.551***	0.071	0.469***	0.047	0.415***	0.373***
1980-1984	0.416***	0.047	0.484***	0.041	0.438***	0.315***
			Sons			
1934-1939	0.222	0.039	0.699***	0.081	0.050	0.081
1940-1944	0.422***	0.099	0.0778	0.188	0.039	0.041
1945-1949	0.838	0.715	0.252	0.148	0.147	0.083
1950-1954	0.687	0.352	0.541***	0.147	0.244***	0.185**
1955-1959	0.324	0.193	0.347***	0.088	0.207***	0.098*
1960-1964	0.298*	0.149	0.596***	0.098	0.342***	0.110**
1965-1969	0.346**	0.110	0.506***	0.100	0.346***	0.138***
1970-1974	0.725***	0.089	0.481***	0.057	0.378***	0.321***
1975-1979	0.592***	0.083	0.445***	0.066	0.327***	0.333***
1980-1984	0.356***	0.045	0.330***	0.039	0.334***	0.289***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B17: Tanzania - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
			All children			
1934-1939	0.396	0.281	0.213**	0.070	0.217***	0.159
1940-1944	0.896***	0.195	0.409**	0.155	0.235***	0.309***
1945-1949	0.622***	0.131	0.509***	0.093	0.340***	0.272***
1950-1954	0.621***	0.074	0.469***	0.061	0.401***	0.338***
1955-1959	0.457***	0.067	0.434***	0.051	0.372***	0.307***
1960-1964	0.344***	0.045	0.237***	0.050	0.272***	0.312***
1965-1969	0.244***	0.035	0.258***	0.031	0.318***	0.254***
1970-1974	0.353***	0.029	0.297***	0.025	0.396***	0.387***
1975-1979	0.317***	0.029	0.290***	0.030	0.364***	0.344***
1980-1984	0.394***	0.028	0.361***	0.025	0.433***	0.427***
			Daughters			
1934-1939	0.049	0.137	0.212***	0.049	0.372	0.023
1940-1944	0.750*	0.318	0.264	0.237	0.168	0.278
1945-1949	0.660***	0.164	0.456***	0.093	0.352***	0.353***
1950-1954	0.657***	0.119	0.438***	0.077	0.399***	0.369***
1955-1959	0.578***	0.083	0.507***	0.073	0.423***	0.385***
1960-1964	0.394***	0.061	0.253**	0.078	0.289***	0.372***
1965-1969	0.278***	0.049	0.335***	0.037	0.381***	0.286***
1970-1974	0.385***	0.039	0.320***	0.036	0.408***	0.410***
1975-1979	0.266***	0.038	0.295***	0.040	0.388***	0.295***
1980-1984	0.424***	0.039	0.358***	0.032	0.442***	0.444***
			Sons			
1934-1939	0.490	0.263	0.387*	0.162	0.237**	0.202
1940-1944	0.917***	0.139	0.480***	0.133	0.286***	0.336**
1945-1949	0.625**	0.191	0.563***	0.157	0.355***	0.243***
1950-1954	0.554***	0.079	0.486***	0.085	0.444***	0.328***
1955-1959	0.329***	0.099	0.370***	0.066	0.350***	0.239***
1960-1964	0.283***	0.058	0.231***	0.045	0.275***	0.249***
1965-1969	0.218***	0.051	0.175***	0.046	0.240***	0.234***
1970-1974	0.315***	0.045	0.272***	0.034	0.386***	0.360***
1975-1979	0.383***	0.044	0.299***	0.043	0.356***	0.412***
1980-1984	0.363***	0.041	0.366***	0.039	0.426***	0.411***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table B18: Uganda - Estimates of intergenerational educational persistence by five-year birth cohort

Cohort	$\hat{\beta}_{mother}$	Std. Err	$\hat{\beta}_{father}$	Std. Err	$\hat{\rho}_{mother}$	$\hat{\rho}_{father}$
All children						
1934-1939	0.991***	0.233	0.656***	0.142	0.387***	0.332***
1940-1944	0.717***	0.150	0.608***	0.109	0.347***	0.278***
1945-1949	0.447***	0.113	0.423***	0.061	0.301***	0.204***
1950-1954	0.558***	0.101	0.519***	0.058	0.380***	0.247***
1955-1959	0.626***	0.063	0.530***	0.043	0.414***	0.324***
1960-1964	0.609***	0.057	0.518***	0.039	0.433***	0.363***
1965-1969	0.562***	0.040	0.435***	0.028	0.399***	0.367***
1970-1974	0.566***	0.032	0.454***	0.024	0.463***	0.447***
1975-1979	0.492***	0.027	0.427***	0.023	0.438***	0.412***
1980-1984	0.422***	0.020	0.391***	0.019	0.457***	0.425***
Daughters						
1934-1939	0.833***	0.219	0.664***	0.145	0.471***	0.323***
1940-1944	0.722***	0.188	0.477**	0.143	0.328***	0.311***
1945-1949	0.560**	0.173	0.448***	0.067	0.420***	0.336***
1950-1954	0.699***	0.132	0.525***	0.072	0.462***	0.368***
1955-1959	0.781***	0.090	0.542***	0.054	0.473***	0.434***
1960-1964	0.734***	0.075	0.551***	0.049	0.486***	0.468***
1965-1969	0.636***	0.051	0.472***	0.037	0.450***	0.429***
1970-1974	0.599***	0.043	0.459***	0.032	0.475***	0.490***
1975-1979	0.575***	0.032	0.471***	0.029	0.505***	0.486***
1980-1984	0.458***	0.030	0.395***	0.026	0.444***	0.435***
Sons						
1934-1939	0.825**	0.293	0.523*	0.212	0.327***	0.310***
1940-1944	0.583***	0.175	0.532***	0.133	0.335***	0.268***
1945-1949	0.345**	0.118	0.428***	0.096	0.291***	0.148**
1950-1954	0.439**	0.151	0.591***	0.072	0.385***	0.177**
1955-1959	0.509***	0.084	0.520***	0.059	0.416***	0.281***
1960-1964	0.501***	0.083	0.493***	0.056	0.426***	0.306***
1965-1969	0.456***	0.057	0.375***	0.040	0.364***	0.320***
1970-1974	0.505***	0.040	0.436***	0.030	0.482***	0.423***
1975-1979	0.368***	0.041	0.354***	0.034	0.374***	0.333***
1980-1984	0.384***	0.027	0.375***	0.026	0.471***	0.426***

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Appendix C   Ordered probit estimates

Table C19: Comoros – Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	1.114***	0.192	0.201*	0.207
1940-1944	-0.028*	0.127	0.939***	0.139
1945-1949	0.629***	0.115	0.105**	0.042
1950-1954	-0.111*	0.080	-0.161*	0.113
1955-1959	-0.307**	0.161	-0.584**	0.290
1960-1964	-0.393**	0.171	-0.748***	0.154
1965-1969	-0.306***	0.089	-0.494**	0.235
1970-1974	-0.260***	0.094	-0.222*	0.223
1975-1979	-0.334***	0.114	-2.526***	0.057
1980-1984	-0.410***	0.089	-0.668***	0.163
Child: Primary				
1934-1939	-0.520***	0.150	-0.094*	0.098
1940-1944	0.017*	0.079	-0.580***	0.117
1945-1949	-0.303***	0.079	-0.053**	0.030
1950-1954	0.040*	0.030	0.058*	0.042
1955-1959	0.094**	0.051	0.178**	0.093
1960-1964	0.076**	0.035	0.145***	0.038
1965-1969	0.053***	0.018	0.085**	0.043
1970-1974	0.040**	0.017	0.034*	0.035
1975-1979	0.071***	0.027	0.536***	0.086
1980-1984	0.027**	0.011	0.044**	0.019
Child: Secondary and above				
1934-1939	-0.594***	0.152	-0.107*	0.113
1940-1944	0.011*	0.049	-0.359***	0.099
1945-1949	-0.326***	0.090	-0.051***	0.017
1950-1954	0.071*	0.052	0.103*	0.073
1955-1959	0.213**	0.113	0.406**	0.202
1960-1964	0.317**	0.138	0.603***	0.125
1965-1969	0.253***	0.074	0.408**	0.194
1970-1974	0.219***	0.079	0.187*	0.189
1975-1979	0.263***	0.091	1.990***	0.090
1980-1984	0.383***	0.084	0.624***	0.152

The reference group is parents with is no education.

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Table C20: Comoros–Ordered probit: marginal effects for fathers's education

| | Father: Primary | | Father: Secondary and above | |
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.251*	0.162	-0.300*	0.222
1940-1944	-0.285***	0.083	-0.306***	0.024
1945-1949	-0.156*	0.101	-0.097*	0.155
1950-1954	-0.180**	0.079	-0.272**	0.111
1955-1959	-0.355***	0.105	-0.645***	0.086
1960-1964	-0.614***	0.099	-0.599***	0.115
1965-1969	-0.315***	0.088	-0.460***	0.102
1970-1974	-0.362***	0.073	-0.712***	0.108
1975-1979	-0.327***	0.104	-0.712***	0.135
1980-1984	-0.337***	0.098	-0.492***	0.100
Child: Primary				
1934-1939	0.130*	0.089	0.155*	0.121
1940-1944	0.182***	0.064	0.195***	0.041
1945-1949	0.077*	0.055	0.048*	0.078
1950-1954	0.065**	0.032	0.099**	0.045
1955-1959	0.135***	0.045	0.244***	0.047
1960-1964	0.132***	0.028	0.129***	0.031
1965-1969	0.056***	0.018	0.082***	0.022
1970-1974	0.064***	0.018	0.125***	0.029
1975-1979	0.072***	0.026	0.156***	0.039
1980-1984	0.025**	0.011	0.036***	0.014
Child: Secondary and above				
1934-1939	0.121*	0.082	0.144*	0.111
1940-1944	0.103***	0.039	0.111***	0.028
1945-1949	0.079*	0.050	0.049*	0.079
1950-1954	0.114**	0.051	0.173**	0.072
1955-1959	0.221***	0.066	0.401***	0.063
1960-1964	0.482***	0.081	0.470***	0.093
1965-1969	0.259***	0.073	0.379***	0.084
1970-1974	0.298***	0.061	0.587***	0.093
1975-1979	0.256***	0.082	0.556***	0.108
1980-1984	0.312***	0.091	0.456***	0.093

The reference group is parents with is no education.

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Table C21: Ghana–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	-0.649***	0.145	-0.943***	0.150
1940-1944	-0.404***	0.100	-0.528***	0.099
1945-1949	-0.382***	0.080	-0.502***	0.081
1950-1954	-0.332***	0.073	-0.516***	0.054
1955-1959	-0.267***	0.055	-0.553***	0.053
1960-1964	-0.438***	0.049	-0.536***	0.040
1965-1969	-0.267***	0.055	-0.553***	0.053
1970-1974	-0.438***	0.049	-0.536***	0.040
1975-1979	-0.291***	0.034	-0.454***	0.030
1980-1984	-0.110***	0.013	-0.191***	0.013
Child: Primary				
1934-1939	0.063***	0.024	0.092***	0.030
1940-1944	0.004*	0.006	0.006*	0.008
1945-1949	-0.036***	0.010	-0.047***	0.012
1950-1954	-0.019***	0.006	-0.030***	0.008
1955-1959	-0.031***	0.007	-0.064***	0.011
1960-1964	-0.048***	0.008	-0.059***	0.009
1965-1969	-0.031***	0.007	-0.064***	0.011
1970-1974	-0.048***	0.008	-0.059***	0.009
1975-1979	-0.050***	0.007	-0.078***	0.010
1980-1984	-0.098***	0.011	-0.170***	0.012
Child: Secondary and above				
1934-1939	0.586***	0.131	0.851***	0.139
1940-1944	0.399***	0.099	0.522***	0.098
1945-1949	0.418***	0.087	0.549***	0.088
1950-1954	0.351***	0.078	0.547***	0.057
1955-1959	0.297***	0.061	0.617***	0.060
1960-1964	0.486***	0.054	0.595***	0.045
1965-1969	0.297***	0.061	0.617***	0.060
1970-1974	0.486***	0.054	0.595***	0.045
1975-1979	0.341***	0.039	0.532***	0.036
1980-1984	0.207***	0.023	0.361***	0.020

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C22: Ghana–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.021*	0.200	-0.588***	0.060
1940-1944	-0.485***	0.094	-0.588***	0.057
1945-1949	-0.322***	0.078	-0.393***	0.060
1950-1954	-0.449***	0.074	-0.446***	0.035
1955-1959	-0.208***	0.061	-0.474***	0.029
1960-1964	-0.328***	0.064	-0.536***	0.027
1965-1969	-0.321***	0.047	-0.453***	0.023
1970-1974	-0.229***	0.037	-0.431***	0.020
1975-1979	-0.190***	0.027	-0.343***	0.018
1980-1984	-0.095***	0.013	-0.195***	0.012
Child: Primary				
1934-1939	0.002*	0.023	0.069***	0.020
1940-1944	0.003*	0.008	0.004*	0.010
1945-1949	-0.029***	0.010	-0.036***	0.012
1950-1954	-0.030***	0.008	-0.030***	0.007
1955-1959	-0.026***	0.008	-0.060***	0.009
1960-1964	-0.042***	0.009	-0.069***	0.009
1965-1969	-0.055***	0.009	-0.077***	0.008
1970-1974	-0.059***	0.010	-0.111***	0.011
1975-1979	-0.086***	0.013	-0.155***	0.010
1980-1984	-0.093***	0.012	-0.189***	0.011
Child: Secondary and above				
1934-1939	0.019*	0.177	0.519***	0.053
1940-1944	0.482***	0.093	0.585***	0.057
1945-1949	0.351***	0.084	0.428***	0.069
1950-1954	0.478***	0.079	0.476***	0.038
1955-1959	0.234***	0.069	0.534***	0.032
1960-1964	0.370***	0.071	0.605***	0.030
1965-1969	0.376***	0.054	0.530***	0.025
1970-1974	0.288***	0.046	0.541***	0.024
1975-1979	0.275***	0.039	0.498***	0.023
1980-1984	0.188***	0.024	0.384***	0.017

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C23: Guinea–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	0.016*	0.067	0.484***	0.100
1940-1944	0.635***	0.094	-0.066*	0.072
1945-1949	-0.177**	0.093	0.037*	0.097
1950-1954	0.014*	0.116	-0.267***	0.101
1955-1959	-0.324***	0.118	-0.265***	0.085
1960-1964	-0.196**	0.095	-0.504***	0.093
1965-1969	-0.446***	0.076	-0.339***	0.052
1970-1974	-0.335***	0.059	-0.442***	0.053
1975-1979	-0.267***	0.057	-0.490***	0.034
1980-1984	-0.425***	0.041	-0.503***	0.036
Child: Primary				
1934-1939	-0.010*	0.044	-0.317***	0.090
1940-1944	-0.233***	0.054	0.024*	0.028
1945-1949	0.057**	0.032	-0.012*	0.031
1950-1954	-0.003*	0.025	0.058**	0.023
1955-1959	0.062**	0.024	0.051***	0.018
1960-1964	0.046**	0.023	0.119***	0.026
1965-1969	0.123***	0.024	0.093***	0.017
1970-1974	0.110***	0.021	0.145***	0.020
1975-1979	0.076***	0.018	0.141***	0.015
1980-1984	0.067***	0.009	0.080***	0.010
Child: Secondary and above				
1934-1939	-0.005*	0.023	-0.167***	0.044
1940-1944	-0.402***	0.085	0.042*	0.045
1945-1949	0.121**	0.064	-0.025*	0.066
1950-1954	-0.011*	0.091	0.209***	0.079
1955-1959	0.262*	0.096	0.215***	0.069
1960-1964	0.150***	0.073	0.386***	0.072
1965-1969	0.323**	0.056	0.246***	0.038
1970-1974	0.225***	0.040	0.297***	0.038
1975-1979	0.190***	0.041	0.350***	0.026
1980-1984	0.357***	0.036	0.423***	0.031

The reference group is parents with is no education.

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗∗∗ : 1%

Table C24: Guinea–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.030*	0.055	-0.126**	0.062
1940-1944	-0.157**	0.071	-0.235***	0.048
1945-1949	-0.097**	0.058	-0.214***	0.063
1950-1954	-0.295***	0.050	-0.468***	0.062
1955-1959	-0.256***	0.045	-0.392***	0.036
1960-1964	-0.301***	0.043	-0.357***	0.033
1965-1969	-0.303***	0.043	-0.428***	0.032
1970-1974	-0.303***	0.043	-0.428***	0.032
1975-1979	-0.251***	0.044	-0.473***	0.028
1980-1984	-0.373***	0.035	-0.479***	0.029
Child: Primary				
1934-1939	0.020*	0.036	0.083**	0.043
1940-1944	0.067**	0.033	0.101***	0.027
1945-1949	0.032*	0.020	0.070***	0.026
1950-1954	0.063***	0.014	0.100***	0.019
1955-1959	0.068***	0.014	0.104***	0.015
1960-1964	0.091***	0.015	0.108***	0.014
1965-1969	0.101***	0.017	0.143***	0.015
1970-1974	0.101***	0.017	0.143***	0.015
1975-1979	0.071***	0.014	0.134***	0.013
1980-1984	0.058***	0.008	0.074***	0.008
Child: Secondary and above				
1934-1939	0.010*	0.019	0.043**	0.023
1940-1944	0.090**	0.042	0.134***	0.033
1945-1949	0.065**	0.039	0.143***	0.043
1950-1954	0.232***	0.040	0.368***	0.050
1955-1959	0.188***	0.033	0.288***	0.028
1960-1964	0.210***	0.030	0.248***	0.024
1965-1969	0.202***	0.030	0.285***	0.024
1970-1974	0.202***	0.030	0.285***	0.024
1975-1979	0.180***	0.032	0.339***	0.021
1980-1984	0.315***	0.030	0.405***	0.026

The reference group is parents with is no education.

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Table C25: Madagascar–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	-0.216***	0.052	-0.395***	0.118
1940-1944	-0.159***	0.044	-0.652***	0.107
1945-1949	-0.291***	0.044	-0.433***	0.117
1950-1954	-0.194***	0.032	-0.620***	0.074
1955-1959	-0.228***	0.030	-0.643***	0.071
1960-1964	-0.227***	0.027	-0.692***	0.070
1965-1969	-0.257***	0.027	-0.615***	0.055
1970-1974	-0.199***	0.023	-0.684***	0.048
1975-1979	-0.194***	0.022	-0.666***	0.044
1980-1984	-0.237***	0.022	-0.690***	0.037
Child: Primary				
1934-1939	0.144***	0.035	0.264***	0.091
1940-1944	0.067***	0.020	0.274***	0.066
1945-1949	0.162***	0.028	0.241***	0.071
1950-1954	0.102***	0.019	0.325***	0.047
1955-1959	0.099***	0.016	0.279***	0.037
1960-1964	0.095***	0.013	0.289***	0.033
1965-1969	0.128***	0.015	0.307***	0.032
1970-1974	0.115***	0.015	0.395***	0.034
1975-1979	0.112***	0.014	0.386***	0.031
1980-1984	0.119***	0.013	0.346***	0.027
Child: Secondary and above				
1934-1939	0.072**	0.033	0.131**	0.056
1940-1944	0.092***	0.029	0.378***	0.073
1945-1949	0.130***	0.026	0.193***	0.055
1950-1954	0.092***	0.017	0.295***	0.042
1955-1959	0.129***	0.018	0.364***	0.047
1960-1964	0.132***	0.016	0.403***	0.046
1965-1969	0.129***	0.015	0.309***	0.032
1970-1974	0.084***	0.011	0.289***	0.025
1975-1979	0.081***	0.010	0.279***	0.024
1980-1984	0.118***	0.012	0.344***	0.023

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C26: Madagascar–Ordered probit: marginal effects for fathers's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	-0.154***	0.058	-0.313***	0.067
1940-1944	-0.176***	0.041	-0.398***	0.116
1945-1949	-0.223***	0.044	-0.503***	0.090
1950-1954	-0.201***	0.033	-0.526***	0.064
1955-1959	-0.187***	0.031	-0.648***	0.067
1960-1964	-0.215***	0.028	-0.631***	0.055
1965-1969	-0.225***	0.029	-0.576***	0.042
1970-1974	-0.209***	0.025	-0.668***	0.038
1975-1979	-0.157***	0.024	-0.628***	0.039
1980-1984	-0.183***	0.024	-0.621***	0.034
Child: Primary				
1934-1939	0.094***	0.030	0.191***	0.058
1940-1944	0.078***	0.023	0.175***	0.062
1945-1949	0.132***	0.028	0.299***	0.062
1950-1954	0.106***	0.020	0.279***	0.043
1955-1959	0.081***	0.015	0.281***	0.037
1960-1964	0.093***	0.014	0.274***	0.030
1965-1969	0.113***	0.016	0.288***	0.027
1970-1974	0.125***	0.016	0.401***	0.030
1975-1979	0.095***	0.015	0.380***	0.030
1980-1984	0.093***	0.013	0.317***	0.024
Child: Secondary and above				
1934-1939	0.060**	0.036	0.122***	0.044
1940-1944	0.098***	0.025	0.222***	0.069
1945-1949	0.091***	0.022	0.205***	0.044
1950-1954	0.094***	0.017	0.247***	0.035
1955-1959	0.106***	0.019	0.366***	0.043
1960-1964	0.122***	0.016	0.357***	0.036
1965-1969	0.112***	0.016	0.287***	0.026
1970-1974	0.083***	0.011	0.267***	0.021
1975-1979	0.062***	0.010	0.249***	0.021
1980-1984	0.089***	0.013	0.303***	0.021

The reference group is parents with is no education.

Significance levels: ∗ : 10%   ∗∗ : 5%   ∗ ∗ ∗ : 1%

Table C27: Malawi–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-2.826***	0.083	-0.452***	0.167
1940-1944	-0.128*	0.080	-0.097*	0.151
1945-1949	-0.170***	0.019	-0.521***	0.128
1950-1954	-0.037*	0.098	-0.320***	0.112
1955-1959	-0.014*	0.257	-0.400***	0.068
1960-1964	-0.079*	0.074	-0.368***	0.064
1965-1969	-0.135*	0.096	-0.466***	0.039
1970-1974	-0.183***	0.043	-0.313***	0.038
1975-1979	-0.117***	0.019	-0.264***	0.019
1980-1984	-0.126***	0.011	-0.246***	0.015
Child: Primary				
1934-1939	1.689***	0.192	0.270**	0.106
1940-1944	0.064*	0.041	0.048*	0.076
1945-1949	0.071***	0.014	0.217***	0.059
1950-1954	0.014*	0.037	0.120***	0.044
1955-1959	0.004*	0.065	0.101***	0.023
1960-1964	0.010*	0.010	0.047***	0.017
1965-1969	0.005*	0.006	0.017*	0.017
1970-1974	-0.068***	0.018	-0.116***	0.025
1975-1979	-0.105***	0.017	-0.236***	0.024
1980-1984	-0.177***	0.016	-0.345***	0.024
Child: Secondary and above				
1934-1939	1.137***	0.145	0.182***	0.069
1940-1944	0.064*	0.040	0.049*	0.076
1945-1949	0.099***	0.006	0.304***	0.076
1950-1954	0.023*	0.061	0.200***	0.071
1955-1959	0.011*	0.192	0.298***	0.052
1960-1964	0.069*	0.064	0.321***	0.057
1965-1969	0.130*	0.093	0.449***	0.039
1970-1974	0.251***	0.059	0.429***	0.059
1975-1979	0.222***	0.035	0.500***	0.038
1980-1984	0.303***	0.025	0.591***	0.032

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C28: Malawi–Ordered probit: marginal effects for fathers's education

| | Father: Primary | | Father: Secondary and above | |
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-2.746***	0.088	-0.518***	0.104
1940-1944	-0.145***	0.017	0.361***	0.061
1945-1949	-0.156***	0.020	-0.381***	0.067
1950-1954	-0.121***	0.020	-0.332***	0.064
1955-1959	-0.255**	0.120	-0.465***	0.034
1960-1964	-0.005*	0.053	-0.360***	0.026
1965-1969	-0.115**	0.049	-0.275***	0.019
1970-1974	-0.115**	0.049	-0.275***	0.019
1975-1979	-0.077***	0.022	-0.192***	0.012
1980-1984	-0.085***	0.011	-0.180***	0.010
Child: Primary				
1934-1939	1.703***	0.195	0.322***	0.077
1940-1944	-0.198***	0.028	-0.185***	0.036
1945-1949	-0.142***	0.022	0.163***	0.034
1950-1954	-0.163***	0.018	0.127***	0.028
1955-1959	0.033**	0.019	0.059***	0.020
1960-1964	0.000*	0.002	0.015*	0.014
1965-1969	-0.046**	0.020	-0.110***	0.017
1970-1974	-0.046**	0.020	-0.110***	0.017
1975-1979	-0.070***	0.020	-0.174***	0.015
1980-1984	-0.114***	0.015	-0.242***	0.017
Child: Secondary and above				
1934-1939	1.043***	0.144	0.197***	0.044
1940-1944	0.343***	0.036	-0.176***	0.031
1945-1949	0.298***	0.035	0.218***	0.040
1950-1954	0.284***	0.031	0.205***	0.040
1955-1959	0.223**	0.104	0.406***	0.030
1960-1964	0.005*	0.051	0.345***	0.025
1965-1969	0.161**	0.068	0.384***	0.029
1970-1974	0.161**	0.068	0.384***	0.029
1975-1979	0.147***	0.041	0.366***	0.022
1980-1984	0.198***	0.025	0.422***	0.021

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C29: Nigeria–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	-0.704***	0.176	0.340***	0.060
1940-1944	-0.528***	0.095	-2.926***	0.051
1945-1949	-0.430***	0.069	-2.850***	0.058
1950-1954	-0.380***	0.059	-0.737***	0.151
1955-1959	-0.363***	0.050	-0.856***	0.157
1960-1964	-0.473***	0.046	-0.690***	0.113
1965-1969	-0.444***	0.036	-0.591***	0.111
1970-1974	-0.370***	0.033	-0.637***	0.058
1975-1979	-0.373***	0.028	-0.543***	0.040
1980-1984	-0.230***	0.021	-0.349***	0.026
Child: Primary				
1934-1939	0.250***	0.074	-0.139***	0.036
1940-1944	0.165***	0.039	0.914***	0.135
1945-1949	0.101***	0.027	0.670***	0.133
1950-1954	0.061***	0.017	0.118***	0.033
1955-1959	-0.017*	0.011	-0.040*	0.029
1960-1964	-0.003*	0.013	-0.005*	0.019
1965-1969	-0.059***	0.015	-0.078***	0.028
1970-1974	-0.091***	0.013	-0.157***	0.025
1975-1979	-0.121***	0.013	-0.176***	0.021
1980-1984	-0.110***	0.011	-0.166***	0.017
Child: Secondary and above				
1934-1939	0.454***	0.120	-0.201***	0.035
1940-1944	0.363***	0.068	2.011***	0.116
1945-1949	0.329***	0.052	2.180***	0.094
1950-1954	0.319***	0.049	0.619***	0.130
1955-1959	0.379***	0.052	0.896***	0.170
1960-1964	0.476***	0.046	0.695***	0.116
1965-1969	0.503***	0.041	0.669***	0.132
1970-1974	0.462***	0.040	0.793***	0.074
1975-1979	0.494***	0.035	0.719***	0.055
1980-1984	0.339***	0.028	0.515***	0.036

The reference group is parents with is no education.

Significance levels: $*:10\%$ $**:5\%$ $***:1\%$

Table C30: Nigeria–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child: No schooling				
1934-1939	-0.546***	0.095	-0.674***	0.158
1940-1944	-0.365***	0.063	-0.690***	0.115
1945-1949	-0.500***	0.059	-0.458**	0.184
1950-1954	-0.483***	0.048	-0.664***	0.092
1955-1959	-0.374***	0.044	-0.773***	0.082
1960-1964	-0.419***	0.040	-0.703***	0.063
1965-1969	-0.349***	0.033	-0.605***	0.051
1970-1974	-0.323***	0.030	-0.542***	0.039
1975-1979	-0.353***	0.028	-0.549***	0.032
1980-1984	-0.251***	0.020	-0.334***	0.022
Child: Primary				
1934-1939	0.209***	0.051	0.258***	0.074
1940-1944	0.128***	0.030	0.242***	0.052
1945-1949	0.141***	0.029	0.129**	0.056
1950-1954	0.087***	0.021	0.119***	0.030
1955-1959	-0.021**	0.012	-0.042*	0.026
1960-1964	-0.005*	0.012	-0.009*	0.021
1965-1969	-0.049***	0.012	-0.086***	0.022
1970-1974	-0.081***	0.011	-0.135***	0.020
1975-1979	-0.130***	0.014	-0.203***	0.025
1980-1984	-0.127***	0.014	-0.170***	0.016
Child: Secondary and above				
1934-1939	0.337***	0.063	0.415***	0.102
1940-1944	0.237***	0.042	0.448***	0.081
1945-1949	0.358***	0.045	0.328**	0.134
1950-1954	0.397***	0.041	0.545***	0.078
1955-1959	0.394***	0.046	0.816***	0.091
1960-1964	0.425***	0.042	0.711***	0.067
1965-1969	0.399***	0.037	0.691***	0.061
1970-1974	0.404***	0.035	0.677***	0.050
1975-1979	0.484***	0.035	0.752***	0.048
1980-1984	0.379***	0.029	0.504***	0.029

The reference group is parents with is no education.

Significance levels: ∗ : 10% ∗∗ : 5% ∗∗∗ : 1%

Table C31: Rwanda–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.292***	0.070	-0.025*	0.021
1940-1944	-0.486***	0.097	-0.394***	0.058
1945-1949	-0.505***	0.087	-0.290***	0.049
1950-1954	-0.402***	0.100	-0.242***	0.041
1955-1959	-0.254***	0.070	-2.836***	0.084
1960-1964	-0.286***	0.060	-0.371***	0.090
1965-1969	-0.327***	0.044	-2.857***	0.064
1970-1974	-0.290***	0.035	-0.851***	0.188
1975-1979	-0.174***	0.026	-0.640***	0.083
1980-1984	-0.093***	0.013	-0.333***	0.038
Child: Primary				
1934-1939	-0.025**	0.015	-0.002*	0.002
1940-1944	0.383***	0.091	0.450***	0.060
1945-1949	0.432***	0.083	-0.035***	0.011
1950-1954	0.301***	0.081	-0.063***	0.014
1955-1959	0.186***	0.054	2.082***	0.143
1960-1964	0.194***	0.043	0.252***	0.064
1965-1969	0.187***	0.030	1.639***	0.132
1970-1974	0.105***	0.019	0.308***	0.080
1975-1979	0.020**	0.012	0.072**	0.042
1980-1984	-0.030***	0.008	-0.109***	0.027
Child: Secondary and above				
1934-1939	0.317***	0.071	0.027*	0.023
1940-1944	0.102***	0.030	-0.055***	0.020
1945-1949	0.074***	0.021	0.325***	0.052
1950-1954	0.101***	0.028	0.304***	0.045
1955-1959	0.068***	0.019	0.754***	0.096
1960-1964	0.092***	0.020	0.119***	0.030
1965-1969	0.139***	0.020	1.219***	0.093
1970-1974	0.185***	0.023	0.543***	0.122
1975-1979	0.155***	0.023	0.569***	0.076
1980-1984	0.123***	0.017	0.442***	0.049

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C32: Rwanda–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	0.316*	0.223	-2.844***	0.139
1940-1944	-0.390***	0.061	-0.285*	0.412
1945-1949	-0.449***	0.116	-0.704***	0.166
1950-1954	-0.378***	0.064	-0.637***	0.135
1955-1959	-0.268***	0.049	-0.671***	0.127
1960-1964	-0.269***	0.040	-0.728***	0.139
1965-1969	-0.320***	0.037	-0.620***	0.120
1970-1974	-0.275***	0.028	-0.566***	0.126
1975-1979	-0.166***	0.023	-0.559***	0.063
1980-1984	-0.104***	0.012	-0.352***	0.028
Child: Primary				
1934-1939	-0.280*	0.199	2.523***	0.262
1940-1944	0.319***	0.067	0.233*	0.338
1945-1949	0.392***	0.105	0.614***	0.152
1950-1954	0.293***	0.059	0.493***	0.115
1955-1959	0.204***	0.042	0.510***	0.105
1960-1964	0.188***	0.032	0.509***	0.104
1965-1969	0.194***	0.028	0.376***	0.079
1970-1974	0.106***	0.018	0.219***	0.055
1975-1979	0.011*	0.012	0.037*	0.039
1980-1984	-0.041***	0.009	-0.139***	0.030
Child: Secondary and above				
1934-1939	-0.036*	0.032	0.321**	0.162
1940-1944	0.071***	0.020	0.052*	0.077
1945-1949	0.057***	0.020	0.090***	0.031
1950-1954	0.085***	0.018	0.143***	0.038
1955-1959	0.064***	0.013	0.161***	0.036
1960-1964	0.081***	0.013	0.219***	0.045
1965-1969	0.126***	0.016	0.244***	0.050
1970-1974	0.169***	0.017	0.347***	0.081
1975-1979	0.155***	0.021	0.522***	0.061
1980-1984	0.145***	0.017	0.491***	0.040

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C33: Tanzania–Ordered probit: marginal effects for mother's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.429**	0.195	-0.356**	0.171
1940-1944	-0.475**	0.198	-0.476***	0.183
1945-1949	-0.332***	0.076	-0.741***	0.269
1950-1954	-0.387***	0.066	-0.803***	0.245
1955-1959	-0.280***	0.044	-0.345**	0.173
1960-1964	-0.143***	0.032	-0.403***	0.085
1965-1969	-0.141***	0.025	-0.345***	0.094
1970-1974	-0.147***	0.023	-0.554***	0.062
1975-1979	-0.141***	0.022	-0.447***	0.050
1980-1984	-0.157***	0.019	-0.428***	0.044
Child: Primary				
1934-1939	0.365**	0.171	0.320**	0.156
1940-1944	0.421**	0.182	0.444**	0.175
1945-1949	0.217***	0.057	0.485***	0.185
1950-1954	0.251***	0.054	0.521***	0.170
1955-1959	0.137***	0.031	0.169**	0.090
1960-1964	0.056***	0.020	0.158***	0.055
1965-1969	0.051***	0.016	0.126***	0.047
1970-1974	0.031**	0.015	0.116**	0.054
1975-1979	0.015*	0.013	0.048*	0.039
1980-1984	-0.061***	0.015	-0.168***	0.042
Child: Secondary and above				
1934-1939	0.064**	0.034	0.036**	0.022
1940-1944	0.054**	0.025	0.032**	0.016
1945-1949	0.115***	0.028	0.256***	0.097
1950-1954	0.136***	0.027	0.282***	0.094
1955-1959	0.143***	0.026	0.176**	0.088
1960-1964	0.087***	0.021	0.245***	0.054
1965-1969	0.090***	0.016	0.220***	0.061
1970-1974	0.116***	0.018	0.438***	0.050
1975-1979	0.126***	0.019	0.398***	0.044
1980-1984	0.218***	0.023	0.596***	0.055

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C34: Tanzania–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.282***	0.099	-0.502***	0.062
1940-1944	-0.247**	0.113	-0.413***	0.044
1945-1949	-0.328***	0.065	-0.381***	0.053
1950-1954	-0.289***	0.054	-0.899***	0.156
1955-1959	-0.239***	0.036	-0.709***	0.124
1960-1964	-0.130***	0.027	-0.237***	0.079
1965-1969	-0.128***	0.022	-0.348***	0.062
1970-1974	-0.134***	0.023	-0.428***	0.043
1975-1979	-0.147***	0.024	-0.362***	0.039
1980-1984	-0.161***	0.021	-0.370***	0.035
Child: Primary				
1934-1939	0.243***	0.091	0.432***	0.077
1940-1944	0.216**	0.101	0.361***	0.054
1945-1949	0.225***	0.050	0.262***	0.050
1950-1954	0.192***	0.041	0.597***	0.125
1955-1959	0.117***	0.027	0.347***	0.087
1960-1964	0.052***	0.015	0.095**	0.039
1965-1969	0.045***	0.015	0.121***	0.042
1970-1974	0.026**	0.014	0.083**	0.045
1975-1979	0.011*	0.015	0.027*	0.036
1980-1984	-0.069***	0.018	-0.159***	0.038
Child: Secondary and above				
1934-1939	0.039**	0.018	0.070***	0.023
1940-1944	0.031**	0.016	0.052***	0.013
1945-1949	0.103***	0.024	0.119***	0.018
1950-1954	0.097***	0.022	0.303***	0.063
1955-1959	0.122***	0.021	0.361***	0.069
1960-1964	0.078***	0.019	0.142***	0.050
1965-1969	0.083***	0.015	0.227***	0.042
1970-1974	0.108***	0.019	0.344***	0.035
1975-1979	0.136***	0.021	0.334***	0.033
1980-1984	0.231***	0.027	0.528***	0.043

The reference group is parents with is no education.

Significance levels: $*$: 10% $**$: 5% $***$: 1%

Table C35: Uganda–Ordered probit: marginal effects for mothers's education

	Mother: Primary		Mother: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.509***	0.099	-2.768***	0.088
1940-1944	-0.334***	0.088	-0.418**	0.246
1945-1949	-0.197***	0.047	-0.319**	0.189
1950-1954	-0.193***	0.046	-0.546**	0.222
1955-1959	-0.252***	0.032	-0.384***	0.147
1960-1964	-0.187***	0.026	-0.699***	0.105
1965-1969	-0.190***	0.019	-0.502***	0.075
1970-1974	-0.166***	0.016	-0.431***	0.048
1975-1979	-0.124***	0.013	-0.290***	0.028
1980-1984	-0.054***	0.007	-0.136***	0.013
Child: Primary				
1934-1939	0.256***	0.068	1.393***	0.233
1940-1944	0.074**	0.030	0.093*	0.064
1945-1949	0.027*	0.018	0.043*	0.037
1950-1954	0.020*	0.015	0.058*	0.047
1955-1959	0.021*	0.016	0.032*	0.027
1960-1964	0.032**	0.013	0.118**	0.048
1965-1969	-0.027**	0.012	-0.071**	0.033
1970-1974	-0.062***	0.012	-0.162***	0.036
1975-1979	-0.111***	0.014	-0.260***	0.033
1980-1984	-0.179***	0.018	-0.449***	0.039
Child: Secondary and above				
1934-1939	0.253***	0.057	1.376***	0.183
1940-1944	0.259***	0.072	0.325**	0.191
1945-1949	0.170***	0.037	0.276**	0.163
1950-1954	0.173***	0.042	0.488**	0.199
1955-1959	0.231***	0.028	0.352***	0.135
1960-1964	0.155***	0.022	0.581***	0.091
1965-1969	0.217***	0.022	0.573***	0.085
1970-1974	0.228***	0.019	0.593***	0.066
1975-1979	0.235***	0.022	0.550***	0.052
1980-1984	0.233***	0.023	0.585***	0.046

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$

Table C36: Uganda–Ordered probit: marginal effects for father's education

	Father: Primary		Father: Secondary and above	
	Coef.	Std. Err.	Coef.	Std. Err.
Child : No schooling				
1934-1939	-0.386***	0.073	-0.796***	0.288
1940-1944	-0.315***	0.053	-0.323*	0.253
1945-1949	-0.216***	0.044	-0.521***	0.116
1950-1954	-0.229***	0.037	-0.610***	0.108
1955-1959	-0.229***	0.029	-0.617***	0.078
1960-1964	-0.179***	0.023	-0.599***	0.056
1965-1969	-0.157***	0.018	-0.397***	0.038
1970-1974	-0.120***	0.015	-0.380***	0.028
1975-1979	-0.096***	0.014	-0.266***	0.021
1980-1984	-0.038***	0.007	-0.121***	0.011
Child: Primary				
1934-1939	0.232***	0.057	0.479***	0.185
1940-1944	0.098***	0.031	0.101*	0.083
1945-1949	0.027*	0.020	0.065*	0.047
1950-1954	0.029*	0.020	0.077*	0.051
1955-1959	0.022*	0.016	0.058*	0.042
1960-1964	0.028**	0.013	0.094**	0.041
1965-1969	-0.022**	0.011	-0.056**	0.027
1970-1974	-0.054***	0.011	-0.171***	0.031
1975-1979	-0.089***	0.014	-0.245***	0.027
1980-1984	-0.147***	0.025	-0.460***	0.035
Child: Secondary and above				
1934-1939	0.154***	0.031	0.317***	0.121
1940-1944	0.216***	0.035	0.222*	0.174
1945-1949	0.190***	0.036	0.456***	0.101
1950-1954	0.200***	0.031	0.533***	0.096
1955-1959	0.208***	0.023	0.559***	0.074
1960-1964	0.151***	0.019	0.504***	0.050
1965-1969	0.180***	0.020	0.453***	0.044
1970-1974	0.173***	0.021	0.552***	0.038
1975-1979	0.185***	0.026	0.511***	0.036
1980-1984	0.185***	0.031	0.581***	0.039

The reference group is parents with is no education.

Significance levels: $*: 10\%$ $**: 5\%$ $***: 1\%$