Three-generation educational mobility in six African countries: the role of grandparents

World Development 195 (2025) 107114

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Regular Research Article

Three-generation educational mobility in six African countries: The role of grandparents

Giovanni Razzu [a,*], Ayago Wambile [b]

[a] Department of Economics, University of Reading, UK
[b] Poverty and Equality Global Practice, The World Bank, Washington, DC, USA

ARTICLE INFO

JEL codes:
J62
J16
I24

Keywords:
Multigenerational social mobility
Education
Gender
sub-Saharan Africa

ABSTRACT

Using nationally representative survey data, we provide estimate of three generation educational mobility in six African countries: Ethiopia, Gambia, Ghana, Liberia, Nigeria and Tanzania. We explore whether the extent of educational mobility over three generations varies by gender and whether the grandparent's influence differs depending on their residency status. Our findings indicate that grandparents play a significant role, and that intergenerational effects can persist beyond two generations in Africa. These effects are however one-fifth as strong as those observed between two generations. The grandparents influence is generally higher for granddaughters than grandsons and is stronger if grandparents live with their grandchildren than if they do not.

1. Introduction

In this article, we examine three generation educational mobility in six sub-Saharan African countries – Ethiopia, Gambia, Ghana, Liberia, Nigeria and Tanzania – placing particular attention to potential gender differences and to the direct exposure between grandparents and grandchildren via their co-residency in the same household. Given the demographic context, the rapid expansion of educational attainment and the shifting economic structures across sub-Saharan Africa since the mid-20th century, questions of persistence of status across multiple generations are of increasing importance (Bengtson, 2001).

Sub-Saharan demographic path has differed from the rest of the World, due to the largest global share of children aged 5–14, a fertility rate double the global average and the expected largest increase in old population by 2050. The latest World Population Ageing report by UNDESA shows that sub-Saharan Africa is amongst the regions that are expected to witness the largest relative increase (+220 percent) in the number of older people by 2050 (UNDESA, 2019). Increases in longevity result in longer spans of lifetimes shared between children and grandparents. The strength of this inter-generational association and, in particular of some of the mechanisms, will differ depending on various circumstances, including whether grandparents are geographically proximate or not, whether they reside with grandchildren and whether they are healthy or not. The effects could also be less direct and more culturally and socially framed, in the way that grandparents shape, through family histories, the educational or occupational choices made by grandchildren.

The sub-Saharan region has experienced uneven progress in educational attainment in the past decades. While the pace of progress towards universal primary education in the region has been faster since 2000 than in the 1990s, some countries have lagged behind and some of the key objectives of the United Nations Education for All framework, particularly adult literacy and gender inequalities, have not received sufficient attention (UNESCO, 2015; Jones & Ramchand, 2016). While educational policy objectives often assume a regional dimension, there are important national contexts. The six countries we analyse in this paper have similar education systems, in terms of years pupils spend on both primary and secondary educational stages, and also have similar official ages – between 6 and 7 – at which compulsory education starts. Over the last two decades, and like most other countries in Africa, the six countries have made efforts to increase enrollment rates, especially at the primary level. However, gender disparities in enrollment still exist.

Within these demographic and educational contexts, the main purpose of this paper is to provide an answer to the following question: are there significant grandparent effects on children's educational outcomes in Africa? We do this by asking three related questions: (i) what is the extent of multigenerational educational mobility? (ii) are there any differences by gender? and (iii) to what extent does the relationship

* Corresponding author.
E-mail addresses: g.razzu@reading.ac.uk (G. Razzu), awambile@worldbank.org (A. Wambile).

https://doi.org/10.1016/j.worlddev.2025.107114
Accepted 23 June 2025
Available online 2 July 2025

depend on the residency status of grandparents, meaning whether they live in the same house with the grandchildren or not?

The way grandparents affect grandchildren's educational outcomes is not the same everywhere and in every context; a first helpful categorisation distinguishes between direct and indirect channels of transmissions. In the direct one, the transfer of advantages goes to children's generation (G1) directly from the grandparents' generation (G3); in the second one, the advantage goes from G3 to G1 through the intermediate parents' generation (G2). Examples of the first channel are when grandparents directly transfer resources, such as money and time, but also social contacts and cultural capital. They may also have a role in the formation of preferences and attitudes, for instance in terms of risk aversion and time preferences (Coall & Hertwig, 2011). The strength of this multi-generational association and, in particular, of some of the mechanisms, will differ depending on various circumstances, but a "strong form of mutual exposure is actual co-residence in three-generation households" (Song and Mare, 2019).[1] Multi-generational co-residence is still a norm in sub-Saharan Africa, despite its reduced role over the past decades due to a range of factors, including increased women's empowerment and its related increase in delayed marriages; increased emigration and its associated increase in family dissolutions; and increased urbanisation and its associated fertility decline (Odimegwu et al., 2020). For instance, considering the six countries we analyse here, three-generation households represented 11 percent of households in Ethiopia in 2019; 31 percent in Gambia in 2020; 16 percent in Ghana in 2019; 20 percent in Liberia in 2019, 8 percent in Nigeria in 2018 and 18 percent in Tanzania in 2015. According to latest available data, the average household size ranged from 3.8 in Ghana in 2019 to 8.1 in Gambia in 2020, with the other countries having an average household size of just below 5 (UNDESA, 2022). This means that grand-parents have a potentially larger role to play in the child's upbringing than in other societies and cultures. African countries, therefore, should represent an advantageous context for the study of multigenerational effects, as the role of the extended family is more prominent than in other contexts. If grandparents' effects on children's educational outcomes are effectively present, this is likely to be the case in African more than in other societies.

The analysis draws on nationally representative survey data for the six countries, all carried out at very similar points in time between 2014–15 and 2016–17, and the only ones for which we have information on educational attainment for three generations. These six countries, taken together, represent almost 40 percent of the sub-Saharan total population.[2] They also encompass a wide spectrum of economic, cultural, and educational landscapes, making them ideal for comparative analysis of multigenerational mobility patterns in Africa. Ethiopia with its ambitious education reforms, Gambia for its efforts to enhance access and quality, Ghana for its relatively strong education system, Liberia for its post-conflict reconstruction efforts, Nigeria for its large and complex education landscape, and Tanzania for its unique policies and challenges, all provide a comprehensive perspective on the varying aspects of education across different socio-economic contexts in Africa. These countries also represent a spectrum of demographic patterns, including varying population sizes, growth rates, age structures, and urbanization levels, which significantly impact their education systems and policies. Therefore, collectively they represent a relatively important sample of the overall sub-Saharan African population, with some important commonalities but also heterogeneous experiences.

We rely on the retrospective information about parents education and the reported information from the household roster on the relationship to the head of household in order to identify the linked three generations of grandparents, parents and children, the latter aged between 18 and 40 at the time of the survey. We outline three key main findings: i) grandparents education matters for the education of grandchildren, over and above the education of parents; ii) this influence appears more pronounced for women than men in all countries but Nigeria; iii) finally, this influence is more pronounced when grandparents reside in the same household with their grandchildren, pointing to the importance of more direct and continuous interactions between the generations.

2. Background and related literature

Evidence on social mobility in the sub-Saharan African context is extremely sparse. Examples of analyses of two-generations mobility in Africa are those of Dendir (2023); Razzu and Wambile (2022); Alesina et al. (2021); Narayan et al. (2018); Piraino (2015); Bossuroy and Cogneau (2013); Hertz et al. (2008).[3] Overall, these studies found that the educational status of parents is a strong determinant of their children's educational outcomes, but the strength of this link has diminished in Africa over time, particularly since the 1980s. Studies that cover a range of countries, areas within countries, and have data by gender, reveal considerable cross-country and within-country differences, while assessment of gender differences are less definitive. Recently, in a major study, Van der Weide et al. (2024) employs a new dataset on intergenerational mobility around the world, including 43 sub-Saharan African countries, and concludes that sub-Sahara stands out as the region where children have been least successful at surpassing their parents.

The evidence on three-generation mobility, which is the focus of our analysis, is even more exiguous (Chan and Boliver, 2013; Modin et al., 2013; Lindahl et al., 2015; Zeng and Xie, 2014; Warren and Hauser, 1997; Wild and Gaibie, 2014; Celhay and Gallegos, 2023).[4] Great impetus has been provided by demographic approaches, also following Mare's 2010 Population Association of America presidential address (Mare, 2011; Brand and Xie, 2023). Indeed, Mare (2011) originally called for a multigenerational view of inequality, on the basis that social stratification is unlikely to be fully explained by the effects of parents on children's outcomes. A two-generational influence misses the wider channels beyond the most immediate ancestors and, consequently, important demographic aspects (Maralani, 2023). Within this line, Song and Mare (2019) analyse five mechanisms by which multigenerational exposure relates to educational attainment and mobility, including two of specific relevance to our analysis: first, in any given generation, more highly educated grandparents provide greater potential benefits to their grandchildren; second, grandparents effects on grandchildren are likely to be greater when grandparents and grandchildren have shared lifetimes.

We do not know of any study of three-generation mobility that specifically focuses on the African context. A brief discussion in Narayan et al. (2018) on economic mobility across generations around the World presents evidence for 39 countries considered all together, without a specific regional focus: it shows that grandparents also matter, but not as

[1] In many African countries, the basic unit is the family house, the lineage, sometimes dispersed in different dwellings. For instance, take the Ga people of Accra, in Ghana. Their family house is called *we*. It is this unit that gives also the name to the family: the new-born children, regardless of whether they are male or female, receive automatically a well-defined name, often in a generational-rotating system. There are four sets of names in each *we*, two for male and two for female descendants, which are automatically given to the new child in a such a way that, if male, he is given his grandfather's set of names. This means that, if you meet a Ga person in Chicago, for instance, it is automatic, given their name, to understand from which house and quarter he/she comes from in Ga Mashie, the historical district of Accra (Razzu, 2005).

[2] As of 2023, the estimated population for the six countries was about 450 m, according to The World Development Indicators (WDI)

[3] In this section we focus not just on evidence of educational mobility but refer also to studies of multigenerational mobility in other key outcomes, such as occupations and income or earnings.

[4] A relevant review and assessment of the research agenda is in Pfeffer (2014).

much as parents and mostly in developing economies.[5] This very sparse evidence is not due to a lack of interest but to limitations of the data available to assess the links in socio-economic outcomes between more than two generations. In fact, whether there is high or low social mobility is difficult to measure precisely for two generations, let alone for more than two. One of the difficulties arises from the need to have detailed information on parental circumstances when individuals are growing up. Another is that the links between generations relate to a long period of time; in the case of the link between parents and children this is a whole generation, in the case between grandparents and children this is two generations: by the time we know what the association is between grandparents' education and that of their grandchildren, 40 or more years will have passed. This lack of suitable data is particularly pronounced in African countries, which do not have the privilege of well developed data collection infrastructures or ecosystems in place.

The findings of the existing evidence on three-generation mobility in other countries and regions are inconclusive on the extent to which grandparents influence grandchildren's outcome over and above parents' mediation. One recent comprehensive systematic review from Anderson et al. (2018), which also considered studies for outcomes other than education, such as earnings and occupation, found that 58 percent of 69 studies report that grandparents' socioeconomic characteristics are associated with children's educational outcomes, independently of the characteristics of parents, while the rest of the studies found no, or very little evidence of grandparents' influence on children's outcomes. For instance, Becker and Tomes (1986) suggest that the endowments from ancestors tend to disappear in only three generations and that, in open societies, grandparents have little effect on the earnings of grandchildren and successive descendants. Various other studies, including Clark et al. (2015); Lucas and Kerr (2013); Stuhler (2012); Erola and Moisio (2007); Warren and Hauser (1997); Peters (1992); Becker and Tomes (1986); Behrman and Taubman (1985); Stuhler (2012); Hodge (1966); Ridge (1974); Lucas and Kerr (2013), all found that the transmission of social status between parents and offspring is *not assisted* by grandparents. Other more recent studies find a significant direct influence of grandparents; most focus on the US, Europe and Australia, including Braun and Stuhler (2018) for Germany; Hill and O'Neill (1994); Ferguson and Ready (2011); Jæger (2012); Wightman and Danziger (2014); Daw and Gaddis (2016) and Ferrie et al. (2021) for the US; Modalsli (2015) for Norway; Møllegaard and Jæger (2015) for Denmark; Dribe and Helgertz (2016) and Hällsten and Pfeffer (2017) for Sweden; Hancock et al. (2016) for Australia. Very few focus on Asia, including Li and Cao (2023), Mare and Song (2023) and Zeng and Xie (2014) for China, Chiang and Park (2015) for Taiwan and Kundu and Sen (2023) for India. A very recent and comprehensive study of three-generational mobility in Latin America, based on sample of 50,000 triads of grandparents-parent-children born between 1890 and 1990, also shows that multigenerational persistence is high in Latin America (Celhay and Gallegos, 2024).

Overall, the evidence on positive direct effects between grandparents and grandchildren suggests that grandparents matter around a quarter as much as parents, but this influence could be as much as a half. In particular, grandparents appear to be especially important where parents' socioeconomic resources are low. This is consistent with the evidence in Narayan et al. (2018) we referred to above, which concludes that the disadvantages of birth in a family with low educational attainment are more likely to persist across several generations in poorer economies than in richer ones, and also with the more recent evidence from analysis of educational mobility in Latin America (Celhay and Gallegos, 2024). Moreover, studies on the strength of multigenerational links when there is more direct contact with grandparents are also very sparse. For instance, the role of proximity in living arrangements is reported by Zeng and Xie (2014) for rural China, which found that the education of absent (non-resident or deceased) grandparents has little or no effect on grandchildren's educational outcomes, while the effect of co-resident grandparents was significant. They conclude that the causal effect of three-generation impacts happens within the household through daily interaction. Similarly, in a national sample of junior high school students in China, Zhang and Wu (2021) finds that households in which grandparents cohabit invest significantly more in the social capital of children than those who do not have grandparents cohabiting. Finally, Solon (2014) concludes that grandparents' influence varies across different cultures and societies and might be different by ethnicity. These findings are particularly relevant to our context and indeed inform one of our research questions.

Some studies analyse potential gender differences. In a study on the role of cash transfer on child nutritional status in South Africa, Duflo (2003) shows that, for children under age five living with a pension recipient, the extension of the Old Age Pension Programme to everyone since the collapse of Apartheid, resulted in a substantial improvement in the health and nutrition of girls, but not that of boys. Song and Mare (2017) look at both the short and long-term perspectives and conclude that, for the short term, grandparents' educational attainments have a direct association with grandchildren's education as well as an indirect association that is mediated by parents' education and demographic behaviors. For the long term, instead, the educational advantages may accrue to as many as three subsequent generations, but are later offset by the lower fertility of highly educated persons. These studies are again relevant to our analysis and inform another of the questions we aim to address here on the possible gender differences in the grandparents' transmission of advantage or disadvantage.

The evidence on multigeneration mobility we have assessed above, alongside the specific contexts we have described in the previous section, suggests contradictory findings. On one hand, the very recent educational gains and, in some cases, the aggressive education policies, do suggest that grandparents' education may have limited relationship with grandchildren's educational outcomes, in line with those studies that consider parents to be mediating all possible multigenerational influences on children. On the other hand, the relatively stronger form of mutual exposure associated with co-residence of grandparents and grandchildren, typical of African households, suggests that grandparents may have a significant direct influence on grandchildren's education.

3. Model and data

3.1. Model specification

In *A Treatise on the Family*, Becker (1981) generalised the endowment transmission model beyond the first order autoregressive process AR(1) specification, typical of the links between parents (G2) and children (G1), to more complex specifications that could incorporate influences from other relatives, including grandparents (G3). The theoretical development, particularly amongst economists that followed regression-based approaches to assessment of intergenerational mobility, followed the original model of Becker and Tomes (1986), whereby children's human capital depends not just on parent's conscious investment decision but also on an endowment that captures genetic, cultural traits and role modeling. When this approach is extended to three generations, by specifying the endowment relation with a second order autoregression, the result is a negative coefficient on the link between grandparents and children. As pointed out by Solon (2014), a negative grandparents

[5] Countries covered in Africa by Narayan et al. (2018) on three-generation mobility are not specified. However, the Global Database on Intergenerational Mobility (GDIM) developed after the report publication and subsequently updated in 2021 captures about 43 African countries for two-generational mobility, and 16 African countries for multigenerational mobility, four of which are covered in this paper. In our analysis, however, we rely on more recent survey data than covered in the GDIM and in Narayan et al. (2018), except for Gambia, for which we employ the same survey. For a detailed description of the GDIM, please see Van der Weide et al. (2024).

coefficient means that an increase in grandparent's income (G3) does not harm the child's income (G1) but indicates that the parent (G2) did not benefit from the genetic and cultural endowment and this passes, to some degree, on the child. The realism of this model's prediction has been questioned with the increased availability of survey and administrative data across multiple generations of family members, which has meant that researchers have been able to interrogate whether there are other potential ways in which grandparents may influence the outcomes of their grandchildren, including through direct investment on their human capital and direct involvement in children's lives resulting in increased cultural inheritance (Mare, 2011; Solon, 2014). Indeed, as the empirical evidence we have reviewed in Section 2 suggests, the grandparent's additional contribution is in some cases positive.

Therefore, following Solon (2014), the positive contributions from grandparents beyond the contributions mediated through the parents, is captured in the right-hand side of Eq. (1):

$$Ed_i^{G_1} = \alpha + \beta_2 Ed_i^{G_2} + \beta_3 Ed_i^{G_3} + + \varepsilon_i \quad (1)$$

where Ed^{Gt} is educational attainment (years of schooling) of individual i of generation G, with $i \in (1,\ldots\ldots N)$; t represents the three generations as follows: $t = G_1$, $t-1 = G_2$ and $t-2 = G_3$; ε_i is a white-noise error term; and β s are the heritability coefficients, which empirical evidence generally shows to lie between 0 and 1 and, more precisely, $0 \leq \beta_3 \leq \beta_2 \leq 1$. Specifically, β_2 and β_3 represent the OLS estimates of intergenerational persistence, or the strength of the links, between the educational attainment of G_1 and G_2 and G_1 and G_3 respectively.

In this paper we aim to estimate: (i) the extent of three generation mobility – reflected by the β_3 coefficient – both at the aggregate level with pooled data and then specifically for the six countries; (ii) the differences by gender and, finally, (iii) whether grandparents' residency status has a differential impact on grandchildren's education. In order to address these questions, we expand Eq. (1) as follows:

$$\begin{aligned} Ed_i^{G_1} =& \alpha + \beta_2 Ed_i^{G_2} + \beta_3 Ed_i^{G_3} + \beta_4 Ed_i^{G_3} P_i + \rho P_i + \delta Gender^{G_1} \\ &+ \mu Ncores^{G_3} \gamma C_i + \phi Z_i + \varepsilon_i \end{aligned} \quad (2)$$

where P_i captures whether the grandparent has been residing with the grandchildren or not. We also control for the gender of G_1 and for cases where households have more than one co-residing grandparent. Finally, C are country-survey fixed effects for the pooled data specification and Z is a vector of variables, which includes age and age squared. This extended specification allows us to also address some potential modeling issues. First, by introducing a dummy variable for whether grandparents are living in the same household with their grandchildren at the time of the survey we are able to assess whether co-residency affects education of G1, while the interaction term between grandparents' education and co-residency status allows us to assess whether co-residency affects intergenerational mobility. Second, when estimating Eq. (1), grandparent's coefficient β_3 could be positive and significantly larger than zero, because the variable included to measure the socio-economic status of grandparents captures an unobserved part of parents' socioeconomic status, such as abilities, preferences or cultural heritage, which is fundamental to the intergenerational transmission mechanism. Therefore, a test of the direct effects of grandparents requires an extension of the baseline model, as we do in Eq. (2). As suggested by Neidhöfer and Stockhausen (2019), information on the direct contact between grandparents and grandchildren helps to alleviate the omitted variable bias. The analysis of the pooled dataset, which combines all observations across countries, carries two implications. One one hand, it technically helps to reduce the omitted variable bias derived from differences in institutions and allows to abstract from characteristics that should be equally transmitted from G3 to G1 across countries (Neidhöfer & Stockhausen, 2019). On the other hand, the elasticities can conceal considerable heterogeneity between groups, suggesting the need to assess the degree to which individuals, within a given group, tend to fall above or below the sample mean, and not just the degree to which parents and children have similar outcomes (Hertz, 2005, 2008; Mazumder, 2014; Emran and Shilpi, 2019).[6] As shown by Torche and Corvalan (2018), fixed effect estimators act like within-group estimators of social mobility, therefore removing the spurious association driven by unobserved differences between countries. That is also why our extended specification for the pooled data includes county fixed effects.[7] In order to address the possible heterogeneity by gender, we also report the intercepts from the regressions of men and women, which shed light on whether the expected educational attainment of women (men) is unambiguously lower (higher) than that of men (women), conditional on parental education, across the entire range of parents' education distribution (Emran & Shilpi, 2019).

3.2. Data

We make use of the latest nationally representative survey data from six countries where individual information for three generations is available: Ethiopia 2015/16 ESS, Gambia 2015/16 HIS, Ghana 2016/17 GLSS, Liberia 2016 HIES, Nigeria 2015/16 GHSP; and Tanzania 2014 TZNPS. The surveys are available from the World Bank's SSAPOV database. This is a database of harmonized nationally representative household surveys managed by the Sub-Saharan Africa (SSA) Team for Statistical Development under World Bank's Poverty and Equity Global Practice. These surveys are multi-topic in nature, designed by the national agencies together with development partners with the purpose of improving understanding of the links between individuals' socioeconomic status and various activities and sectors of the economy, such as agriculture and non-farm income activities.[8] Importantly for our purposes, the surveys selected for this analysis collect information on educational attainment, including retrospective information on non-resident parents. In order to analyse three generational links, we identify G_1 through the reported relationship to the household head, their parents (G_2) and their grandparents (G_3). Similarly, we link the household head and spouses to their parents based on the retrospective information provided. Having complete information on the individual's relationship to the household head, the data allow for matching of grandparent, parent and child. Those aged between 18 and 40 are matched with their parents and grandparents who are either co-residents or non-residents. Family members who have moved out, particularly those who have married and established their own families, are regarded as non residents. Therefore, the analysis utilizes information from grandparents who are co-resident with both their children (G2) and grandchildren (G1), and those who are non-residents, but whose education information is retrospectively provided at the time of the survey. By combining information from both co-resident members and non-resident members, utilizing the household roaster and relationship status provided in the survey, the analysis can be done on a much larger sample than otherwise possible. We limit G_1 to individuals aged between 18 and 40, which is the age range within which we can maximize grandparent and grandchildren linkages in our sample. We

[6] We thank an anonymous reviewer for pointing this out.

[7] There could of course be other within-group effects that may bias the estimates of educational mobility, such as those related to socio-economic background. Unfortunately, we cannot further specify our model as data on socio-economic background are not collected. Any such differences between countries would be captured by country fixed effects.

[8] The analysis uses a harmonised set of key variables from nationally representative surveys in the World Bank Africa region. This ensures standardisation and comparability of the educational attainment variables. A full description is available in the World Bank Microdata catalogue and the Datilibweb Stata module to access microdata. The reference manual for harmonized data for Sub-Saharan Africa is at https://www.statistics.sl/images/StatisticsSL/Documents/SLIHS2018/SLIHS_2018_ New/SLIHS2018_Harmonised_Data/SSAPOV-Dictionary.pdf.

consider individuals who have completed their education.[9] Table 1 summarises some key characteristics of the data sets we use, including the total number of households and individuals covered in each of the surveys and, in the last three columns, the number of parents (G2) and grandparents (G3) matched with adult children (G1), also by gender.[10] Our analysis is based on G3-G2-G1 matches representing our samples for each country, i.e. number of cases where we can construct three generational links within each survey country. The size of the sample is mostly dependent on the extent to which grandparents' information (both co-resident and non-residents) is captured. It maybe that some surveys capture information for both grandparents and/or sets of grandparents, which results in sample exceeding the number of households in a survey. For instance, although Ethiopia, Nigeria, and Tanzania are large population countries, the survey sample is relatively small and particularly the G3-G2-G1 matches for the study sample. Moreover, our three generational link sample is is composed of cases where a link between the education of G1, G2 and G3 can be established: the presence of one grandparent will establish a three generational link and, therefore, enters our sample analysis. When we are not able to establish a three generational link, as for instance, in the case of no grandparents being alive or when their education has not been reported, then we do not have a three generational link and this does not enter our sample analysis.

Table 2 reports descriptive statistics about the pooled sample and information on educational attainment of the three generations, also by gender while Table 3 does so for the six countries separately. Educational attainment has increased over the generations, with grandparents completing on average less years of schooling than their children, who also completed less than their respective children. The table also shows that women's educational attainment has overtaken men's: while G_2 women completed on average less schooling than G_2 men, for G_1 this is reversed. The reported average age for grandparents is almost 66, for G_2 is 46.5 for men and 37.5 for women and for G_3 is 24.1 for men and 23.5 for women. Table 3 also shows the differences between countries.[11] Ghana and Nigeria report the highest average years of schooling, while Ethiopia, Gambia, Liberia and Tanzania report relatively lower years of schooling. There are also differences in educational attainment by gender, particularly for G_2. The large gender gap in educational attainment for G_2 is in Ghana and Gambia (respectively, 1.4 and 1.3 years more of schooling completed by men than women) and slightly less in Nigeria (0.9). For G_1, the gap has mostly reverted in Ethiopia, Tanzania and Nigeria, where women complete on average 0.6 years of schooling more than men. These patterns are of course the result of local context and national educational policies. For instance, since 2000, 15 sub-Saharan countries abolished school fees, including Ethiopia, Ghana and Tanzania in our sample, resulting in increased school enrollment. Similarly, countries that included a gender goal in their strategic plans made substantial gain towards gender equality in primary enrollment in the last two decades. This, for instance, included Gambia in our sample, where girls' enrollment rose to over half of total primary enrollment between 2000 and 2015 and where the gender gap in educational attainment almost disappeared between G_1, and G_2. Table B1 in the online Appendix reports some basic descriptive statistics, mostly about the education systems of the six countries we analyse here.

The education variable is "number of years of education completed", which is standardised using the ISCED 2011 classification.[12] It is, therefore, a continuous variable, which avoids the discontinuities in schooling distribution that are possible when relying on categorical variables, such as levels of educational qualifications obtained (Azam & Bhatt, 2015).[13] This is collected for each family members in the sample. For some of those members who are non-residents, this information is recalled through the head of household, which could lead to measurement error if the educational outcome reported is a noisy measure of the true value. However, educational attainment is a reasonably unambiguous concepts, also because formal education is generally fixed when one reaches adulthood. Indeed, various empirical evidence shows this measurement issue to be much less important in the case of educational outcome than, for instance, income (Hertz et al., 2008; Torche, 2021). In addition, the selected surveys in our analysis report both the levels of education attained, specific grades completed and the ages in years of all the household members, therefore making it possible to estimate precisely the years of education completed or attained for G_1, G_2 and G_3.

For parents' and grandparents' educational attainment we use the respective average years of schooling. This may pose two issues: one in relation to the use of average across all grandparents as opposed to the actual years of schooling of each grandparent, whether grandfather or grandmother, on the paternal and maternal side; the other in relation to potential differences in average education between grandparents who co-reside with their grandchildren and those who do not. As for the former, employing actual years of schooling for each grandparents rather the average across all grandparents would result in much reduced sample sizes in many cases. Moreover, some studies opt for the so-called dominance principle and use the education of the parent with the highest educational achievement. Theoretically, it is debatable what is the best measure of family educational background; however, statistically, taking only the information of the parent with the highest degree excludes information that contributes to the variation of the dependent variable, i.e. children's education (Neidhöfer et al., 2018). As for the latter, the questionnaire allows for collection of information on educational attainment, as well as age, of all grandparents, namely the parents of the head of household and the parents of the spouse, including non-resident grandparents. For robustness, we have also considered the years of education of only the resident grandparent. Indeed, it may be the case that an average educational attainment for all grandparents may offer a biased estimate of the relationship between G3 and G1′s education if resident grandparents are, for instance, generally those with education quite divergent from the average.[14].

Co-residency is measured with the standard definition employed in the welfare budget surveys or Living Standards Measurement Surveys (all the 6 country surveys in our analysis are welfare budget surveys or the LSMS surveys), according to which members of a household are typically defined as those who share social and economic relationships and live together in the same dwelling unit or housing structure for at least six months of the year, have common cooking and eating

[9] Individuals are selected if they have completed education, if they are not enrolled in school at the time of the survey and have been out of school over the previous 12 months. Generally, students are not out of school for more than 12 months.

[10] See online Appendix A for more details on the matching procedure.

[11] In considering differences between countries, note that the data are based on slightly different survey years, as reported in Table 1.

[12] The International Standard Classification of Education (ISCED) provides a comprehensive framework for organising and comparing educational attainment across countries, which is helpful given countries have different educational systems. This standardisation however does not adjust for the quality of education across schools or countries, information that we unfortunately do not have for the selected countries.

[13] More precisely, the surveys contain information on actual grades of schooling. For example, the completed years of education is 0 for pre-school, 1 for grade 1, 2 for grade 2 and so on.

[14] However, in this specification, the co-residency dummy and the interaction between educational attainment and co-residency would obviously be omitted because of collinearity. In any case, the key coefficients do not change substantially.

Table 1
Key Information on surveys and matching sample.

Country	Year/Type	National pop. (millions)	Households	Individuals	G2-G3 G1 match	G2-G3 G1 match (son)	G2-G3 G1 match (daughter)
Ethiopia	2015–16- ESS	102.4	4,947	12,160	7,016	3,275	3,741
Gambia	2015–16- IHS	1.9	13,281	43,457	24,602	10,474	14,128
Ghana	2017-GLSS7	26.3	14,008	32,211	17,388	8,235	9,153
Liberia	2016-HIES	4.6	8,346	17,583	10,349	4,593	5,756
Nigeria	2015–16-GHSP	181.2	4,582	13,819	7,053	3,232	3,821
Tanzania	2014-TZNPS	49.1	3,352	8,447	5,199	2,323	2,796

Notes: Year refers to the year the Survey was conducted. The population estimates are from World Development Indicators (WDI) mid-year population estimates at the respective year of the survey. The figures for the households, individuals and G1-G2-G3 match refer to analysis sample and not to the larger surveys from which the match is derived.

Table 2
Summary statistics by generation and gender.

	Obs.	Mean	Std.dev	Min	Max
G1 – DaughterAverage age	39,395	23.5	4.9	18	40
Education	39,395	9.5	3.56	0	23
G1 – SonAverage age	32,132	24.1	5.1	18	40
Education	32,132	9.4	3.6	0	23
G2 – MotherAverage age	23,389	37.5	11.9	32.4	99
Education	23,389	7.6	3.9	0	23
G2 – FatherAverage age	25,727	46.5	14.7	36.2	103
Education	25,727	9.03	4.4	0	23
G3 – GrandparentAverage age	15,614	65.9	12.6	54.5	110
Education	15,614	5.54	4.6	0	23

Table 3
Educational attainment and age across three generations by gender and country.

	Ethiopia	Ghana	Tanzania	Nigeria	Liberia	Gambia
G1 Daughter						
Average age	23.5	23.8	24.1	23.8	22.7	23.4
Education	8.8	10.6	8.0	11.4	7.4	8.7
G1 Son						
Average age	23.7	23.3	23.6	23.6	22.4	25.2
Education	8.2	10.6	7.4	10.9	7.6	8.9
G2 Mother						
Average age	37.4	39.4	36.2	34.4	35.9	36.7
Education	7.5	8.6	5.8	7.9	5.5	6.6
G2 Father						
Average age	46.4	46.3	44.4	52.9	42.2	48.0
Education	8.4	10.0	5.9	8.8	6.1	7.9
G3 Grandparent						
Average age	65.7	70.9	74.3	65.2	69.4	63.1
Education†	6.6	8.0	1.4	3.4	4.8	4.9

† Average of all grandparents for whom information is available in the surveys.

arrangements, have economic dependence sharing income, expenses, or resources such as food, housing, and utilities, and acknowledge that they belong to the household and identify the household head. Although this may not be precise, for instance in terms of the length of co-residency and, therefore, exposure between grandparents and grandchildren, it represents the best definition of co-residency we can employ given the data. In our sample, a larger share of the grandparents are non-resident rather than co-resident. For the co-residency sample, a larger share, representing between 75 and 85 percent of the co-resident grandparents is maternal. This is also consistent with the literature.

Sample selection bias in estimates of intergenerational elasticities have been extensively documented.[15] In particular, downward bias might result when relying on information from co-resident members only: if those who stay in the household and are captured by the survey

[15] For instance, see Azam and Bhatt (2015) and Emran and Shilpi (2019) for educational mobility, while Francesconi and Nicoletti (2006) provides evidence for occupational mobility.

are systematically different from those who do not reside within the household, then estimates will be biased. However, this is not our case, as the data we employ contain information about individuals even when these are not residing with the family at the time of the survey. The respondent, mostly the head of the household, is asked about the educational attainment of all household members, including children that are away for work or at a boarding school. Nonetheless, some non-residents, for instance G_1 individuals who get married and form another household, might not be captured. Consequently, the younger adults in their 20 s could be overrepresented in the sample while the other adults could be underrepresented. Similarly, bias could result from the fact that the relatively low educated daughters are more likely to marry and leave than those with relatively higher education. However, as said, in our estimation, we do not rely on information on solely co-residing adults, but employ retrospective information on parental educational attainment.[16] Finally, given the focus on gender differences, in our sample, as shown in Table 3, the average age and educational attainment is not significant by gender for G1. Although G1 daughters are less than G1 sons in the sample, there are no differences by educational attainment.[17]

Another source of bias in educational mobility might arise from the so-called ceiling effect at one end of the educational attainment spectrum and floor effects at the other end. Regarding the former, individuals (G_1) whose parents (G_2) have already attained the highest possible educational attainment would not possibly attain a higher educational attainment themselves and, therefore, cannot be shown to be moving up the educational ladder. In these cases, immobility is the only option. Although this is particularly problematic with absolute measures of mobility, it is shown to be important in relative measures of mobility as well.[18] In any case, in our data, this exclusion is trivial as it concerns around 6 percent of the G2 sample. Regarding the floor effect, a relatively high proportion of grandparents with zero years of schooling will automatically result in a lower standard deviation of grandparents' years of schooling and, therefore, higher coefficient. Indeed, in our sample, around 60 percent of grandparents have zero years of education; this proportion falls to 47 percent for parents and 23 percent for children. This is a reflection of the improved educational achievement over time in Africa.

Finally, and unfortunately, we don't have information on divorce, remarriage, polygamy status, nor on the vital status of the grandparent. We use information on whether they are co-resident or not but if they are not, we really don't know of their vital status. We do not have information on when the grandparent died to determine whether the child was born before or after the grandparents' death. It could therefore be the case that a grandparent will be present and might have relatively more influence on the child's educational outcomes, for instance, when they replace parents who may have died because of a pandemics, diseases such as AIDS/HIV or other causes.

4. Analysis and results

We estimate Eq. (2) for the pooled dataset, which allows us to offer an overview at regional level, and its version without country fixed effects for country-specific estimates. Considering the three research questions we aim to address, we focus on estimates of grandparent's coefficient β_3, and, when relevant, comment on the two-generation mobility estimates from regression that control for grandparents' education. Unfortunately, these estimates are not directly comparable to other studies, as specifications differ, particularly because of the use of control variables. Moreover, our research questions relate to three generation mobility, for which there is no comparable evidence in African countries.

We start, in Table 4, with estimates of the association between grandparents' (G_3) educational attainment and the educational attainment of grandchildren (G_1) controlling for G_2, our preferred measure of the persistence between grandparents and grandchildren's education in the context of the questions we pose in this paper. This is estimated to be positive, with a coefficient β_3 of 0.135 The association between parent (G_2) and children's (G_1) educational attainment is strong, with an intergenerational elasticity estimate β_2 of 0.638. This is comparable with other estimates in the literature, for instance by Azomahou and Yitbarek (2016, 2021) for nine African countries and smaller than others, such as those from Hertz et al. (2008) for four African countries. The estimate is also higher than those generally found for developed economies in Western Europe and the United States and for Eastern Europe (Hertz et al., 2008).[19] Therefore, although smaller than two-generation estimates, we do report a significant three-generation elasticity: The influence of grandparents is evident but is around one-fifth smaller than that of parents. This suggests that, for the pooled sample overall, there is a strong relationship between grandparents' educational attainment and that of their grandchildren, independently of its transmission through the intermediate parental education. This is consistent with other findings, such as from Anderson et al. (2018), who report that grandparents' educational status is around one-fourth smaller than parent's educational status. Moreover, the analysis by cohorts, reported in the last five columns of Table 4, shows that the link between grandparents and grandchildren education has become stronger over time: It was relatively weaker for those born in the second half of the 1970s (β_3 of 0.076) than for those born in the 1990s (β_3 of 0.16)

Table 4 also shows that this relationship differs by gender. While estimates of β_2 are larger for sons than for daughters, those of β_3 are larger for daughters than for sons. Fig. 1 confirms this, but also shows that this gender difference is not present when the link between grandparents and grandchildren is not mediated by parent's educational influence. The coefficients of the regression of G3 on G1, without conditioning for G2 education, are substantially higher than those that control for G2 education, which is consistent with recent evidence from other contexts (Celhay & Gallegos, 2024), and are not different between sons and daughters.

This result – when considered alongside the result for the variable that captures whether the grandparent resides in the same households with grandchildren, which is substantially larger for daughters than for sons – suggests that the grandparents' effects are more pronounced on granddaughters than grandsons' educational attainment. This might be because grandparents may end up having more interaction with granddaughters than with grandsons: granddaughters might be more present in the daily activities of the household where grandparents are also present or there might be some other gender dynamics at play which we are not able to capture with our data. Overall, the presence of grandparents in the same households does have a significant effect on grandchildren's educational attainment. While the co-residency dummy shows the effect of grandparents' co-residency on the educational outcomes of grandchildren, the effect on educational mobility is captured by the interaction between grandparents' co-residency and their education as well as that of parents. We find that the interaction between grandparents residency and their education has a positive effect on

[16] As an additional check, when we compare the average educational attainment of all 18–40-year-old individuals in the sample with that of 18–40-year-old who are children of the head of household (G1), we find a very small difference of half a year of education: 5.6 and 6.6 respectively.

[17] This does not imply that there might be meaningful differences by gender between G1 individuals in the sample and G1 individuals who are not included in the sample. It does imply, however, that, for our sample of G1 individuals the gender differences are present across all the educational levels.

[18] See Narayan et al. (2018), and Annex 2A therein, for a discussion of this issue.

[19] It is important to note, however, that our model specification includes other variables for demographic characteristics and grandparents' (G_3) educational attainment.

Table 4
Three generational educational mobility, pooled dataset: by gender and cohort.

	All	G1 men	G1 women	1974–79	1980–84	1985–89	1990–94	1995–99
G2 Ed. β_2	0.635***	0.696***	0.585***	0.832***	0.790***	0.718***	0.515***	0.327***
	(0.004)	(0.006)	(0.005)	(0.0088)	(0.008)	(0.008)	(0.009)	(0.009)
G3 Ed. β_3	0.135***	0.104***	0.160***	0.076***	0.116***	0.163***	0.1673***	0.160***
	(0.004)	(0.007)	(0.006)	(0.010)	(0.009)	(0.010)	(0.010)	(0.010)
co-resid.	2.248***	1.915***	2.571***	2.608***	3.237***	2.954***	2.230***	1.387***
	(0.091)	(0.131)	(0.126)	(0.236)	(0.248)	(0.236)	(0.196)	(0.158)
co-res.*G_2 Ed.	−0.098***	−0.045***	−0.146***	−0.106***	−0.115***	−0.114***	−0.069***	−0.091***
	(0.010)	(0.015)	(0.013)	(0.020)	(0.020)	(0.021)	(0.023)	(0.026)
co-res.*G_3 Ed.	0.026**	0.006	0.050***	0.079**	0.045***	0.058**	0.036	−0.024
	(0.012)	(0.017)	(0.015)	(0.023)	(0.024)	(0.025)	(0.025)	(0.027)
Num. res. grandparents	−0.140***	−0.339***	−0.450***					
	(0.111)	(0.172)	(0.141)					
Gender (*son = 1*)	1.700***							
	(0.029)							
Ethiopia = 1								
Ghana	0.718***	0.402***	1.016***	0.167*	0.235*	0.267**	1.211***	1.543***
	(0.057)	(0.083)	(0.073)	(0.117)	(0.123)	(0.128)	(0.141)	(0.130)
Gambia	−0.791***	−0.957***	−0.652***	−0.424***	−0.489**	−0.850***	−1.043***	−1.149***
	(0.055)	(0.081)	(0.070)	(0.010)	(0.011)	(0.116)	(0.128)	(0.126)
Liberia	−1.282***	−1.043***	−1.501***	−0.909***	−0.813***	−1.120***	−1.442***	−1.651***
	(0.062)	(0.091)	(0.078)	(0.118)	(0.123)	(0.132)	(0.146)	(0.146)
Nigeria	1.612***	1.633***	1.654***	0.983***	1.117***	1.718***	2.017***	2.117***
	(0.069)	(0.101)	(0.088)	(0.131)	(0.139)	(0.149)	(0.157)	(0.157)
Tanzania	−0.118**	−0.990***	0.442***	0.275**	−0.138	−0.720***	−0.486**	−0.223
	(0.075)	(0.110)	(0.095)	(0.136)	(0.153)	(0.166)	(0.173)	(0.200)
G_1 age	−0.094***	0.324***	−0.350***	0.261	0.451	−1.048*	1.120**	1.221
G_2 aver. age	−0.087***	0.010	−0.151***	−0.169***	−0.248***	−0.214***	−0.057***	0.026**
	(0.005)	(0.007)	(0.007)	(0.012)	(0.011)	(0.011)	(0.011)	(0.010)
G_2 aver. age^2	0.001***	0.0002*	0.002***	0.002***	−0.003***	0.003***	0.001***	−0.001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
G_3 aver. age	−0.104***	−0.096***	−0.116	−0.090***	−0.0111***	−0.108***	−0.127***	−0.117***
	(0.004)	(0.007)	(0.006)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
G_3 aver. age^2	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	7.465***	−0.939***	10.559***	−7.734	−1.126	22.176**	−7.320***	−9.558***
	(0.325)	(0.502)	(0.406)	(22.905)	(10.925)	(8.590)	(5.920)	(8.645)
Adj.R^2	0.473	0.483	0.494	0.651	0.600	0.526	0.365	0.300
Obs.	71,527	32,132	39,395	11,562	14,198	15,195	16,497	14,076

*** Significant at 1 percent; Robust standard errors in parenthesis, clustered at household level.

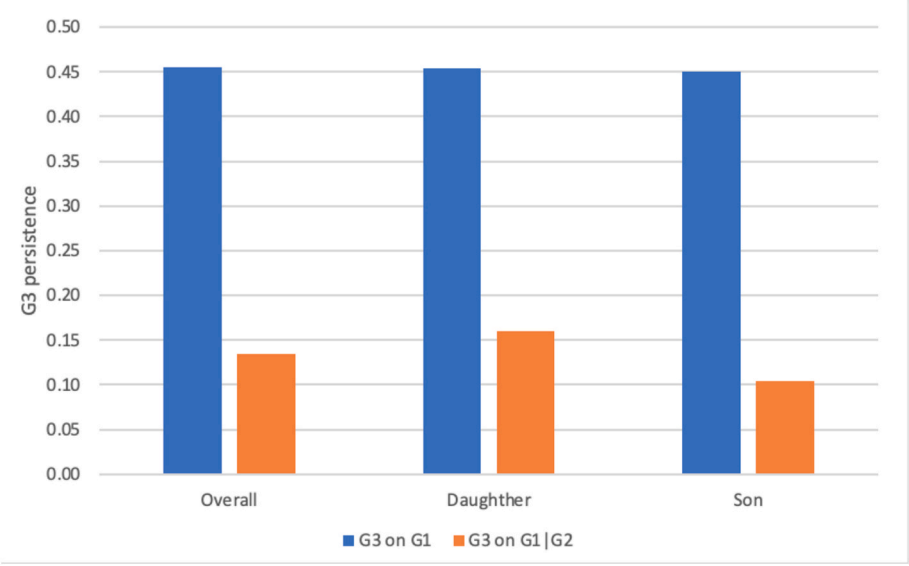

Fig. 1. Multigenerational persistence.

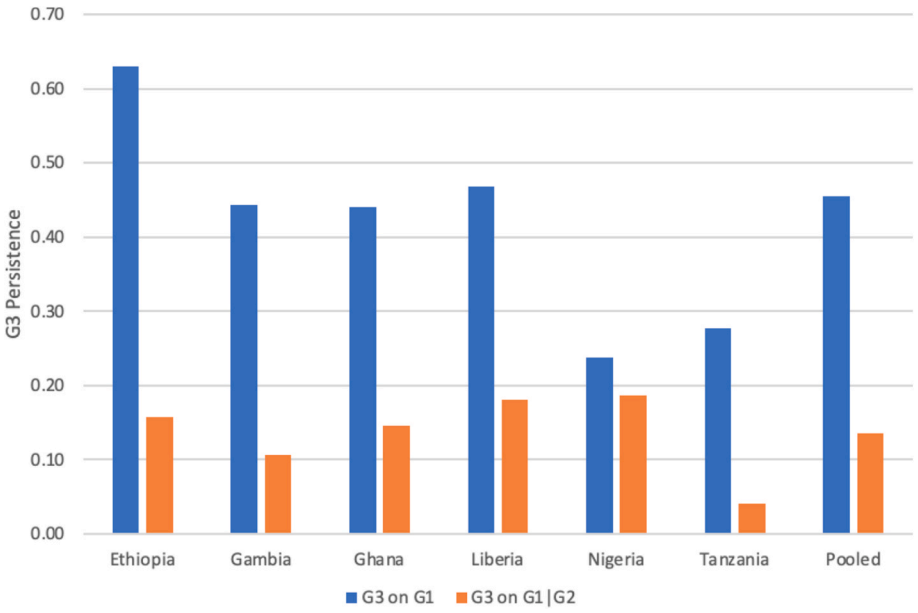

Fig. 2. Three generational persistence, by country.

grandchildren's education, particularly so on granddaughters. However, when grandparents residency is interacted with parents' education, the effects on grandchildren's education is negative. This suggests that when grandparents reside with their grandchildren, the educational influence of parents appears to decrease, this being again more pronounced for granddaughters. Therefore, while the co-residency of grandparents appears to have a positive impact on the educational attainment of grandchildren, it is also associated with a reduction on the influence of parents' education. Grandparents more regular presence in the life of grandchildren, through their daily interactions, seems to both enhance and mitigate educational influences within the household, highlighting the complex dynamics of multigenerational educational mobility.

Estimates from pooled datasets are of limited interest when considering that countries may well differ in their educational systems and in other socio-economic contexts. Fig. 2 shows country-specific estimates, both with and without conditioning for the education of parents.[20] The association between G_3 and G_1 is positive and significant for all six countries we analyse here. Results of regressions of grandchildren's years of schooling directly on grandparents, without controlling for G_2 effects, show substantially higher three-generation persistence than when parents' education is taken into account, but for Nigeria, where this gap is much smaller. Moreover, the results show that there are differences between countries: higher effects from G_3 to G_1, when conditioning for parents' education, are found in the data for Nigeria, Liberia, Ethiopia and Ghana and relatively lower effects are reported for Gambia and, even more so, Tanzania. Nigeria, in particular, appears to be the country where the direct influence of grandparents is relatively more pronounced, as the difference between the intergenerational persistence with and without the influence of parents (G_2) is minimal.

As for the pooled sample, in order to shed light on the possible social and cultural mechanisms at play in the association between grandparents' and grandchildren's educational attainment, we introduce a dummy variable to capture the joint residency of grandparents and grandchildren at the time of the survey. The results, also reported in Table C2 in the Appendix, show a positive and significant effect (but for Tanzania): they are relatively more pronounced in Liberia and Nigeria and less in Gambia. Table C2 in the Appendix includes the estimates of the effect of grandparents' residency on mobility in the six countries: it is positive in Tanzania and Gambia and negative in Liberia for both daughters and sons.

Finally, Fig. 3 shows the gender differences for the six countries we analyse as well as the regional level summary estimate.[21] There appears to be a stronger association between G_3 and G_1 for daughters than for sons for five out of the six countries. The relatively more pronounced gender differences, above the average for the pooled sample, are to be found in Liberia, Ethiopia and Gambia. In Nigeria, on the contrary, the association between grandparents and grandchildren's education is stronger for sons than for daughters, but the coefficient for daughters is not statistically significant.

However, as discussed in Section 3.1., we need to assess possible heterogeneity across gender. In fact, the evidence shown in Fig. 3 suggests that intergenerational persistence is lower in Tanzania than in the other countries for both daughters and sons. in order to ass whether it is indeed the case that Tanzania's children enjoy an educational advantage, we need to consider the intercept estimates of the regression equations of sons and daughters. These, reported in Table B3, show that, in Tanzania, the expected educational attainment for daughters is substantially lower than in the other countries at any given level of parental education, which means that daughters in Tanzania do not effectively enjoy better educational opportunities than daughters in the other countries, even though they experience relatively weaker intergenerational links. Overall, the analysis suggests that grandparents do matter in the educational attainment of grandchildren over and above the intermediate effects through parents. This is more so for daughters than for sons and when grandparents reside within the same household, therefore possibly having a more persistent interaction with the co-residing grandchildren. However, although the results show a pattern of educational transmission directly between grandparents and grandchildren, once parental education (G_2) is introduced, the direct effect of grandparents weakens, indicating that much of their influence is mediated through parents. Essentially, while grandparents impact their grandchildren's education, parents seem to play a more crucial role in educational reproduction.

[20] Detailed regression results are shown in Table C2 in the Appendix.

[21] Table C3 in Appendix C reports the detailed results from the three generational mobility estimates, by country and gender.

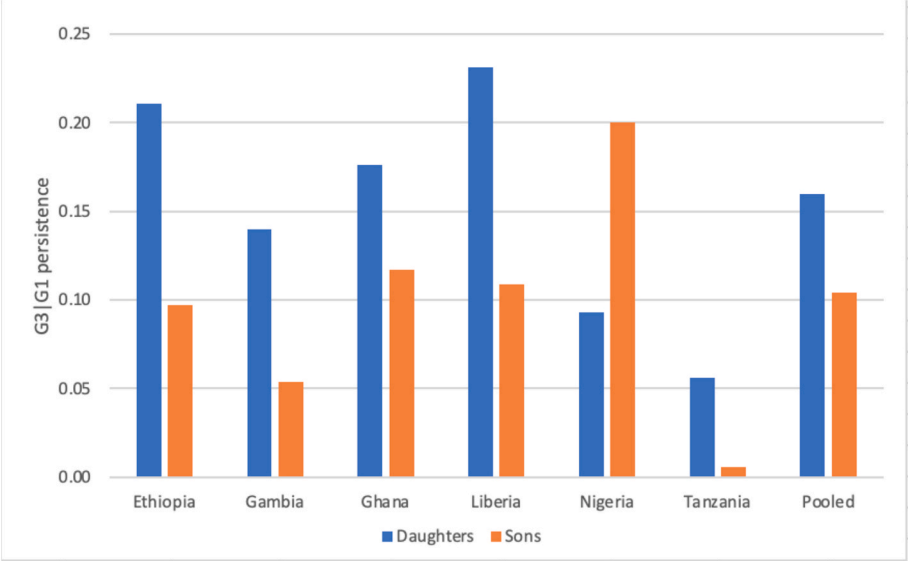

Fig. 3. Three generational persistence, by gender and country.

5. Concluding discussion

The existing evidence, which is mostly from developed countries, shows no clear consensus on the direct impact of grandparents' educational status on that of their grandchildren over and above the transmission that happens through the intermediate parental generation. Older studies generally reported no substantial grandparental effect in addition to those passing through parents, while more recent evidence does suggest that multigenerational educational links are solid and grandparents' educational status, in various ways, is directly and positively associated with that of grandchildren. This pattern might be expected, given that higher educational attainment among grandparents will provide more than just improved educational attainment in parents, (including improvements in occupational class, earnings, housing stability, cultural influences and norms that higher education alone cannot provide), which in turn are beneficial for the educational trajectories of their grandchildren. However, as Bol and Kalmijn (2016) observe, the variability in types of models, mobility measures, data, and regional, national, historical or cultural contexts will likely contribute to these inconsistencies. For example, when the controls for the middle generation (parents) become more stringent in the estimation models, for instance when they more fully account for the characteristics of parents and better measures of their resources, the remaining effect of grandparent's educational status becomes weaker.

In this paper, we set out to provide estimates of three-generation educational mobility for six sub-Saharan African countries, for which we have consistent and harmonised data for three generations: Ethiopia, Gambia, Ghana, Liberia, Nigeria and Tanzania. Informed by the existing evidence, we asked three questions. The first question aimed to measure the extent of three-generation educational mobility; the second question aimed to understand whether the extent of educational mobility across three generations differed by gender and the final question aimed to shed light on whether the impact of grandparents differed depending on their residency status.

We conclude that grandparents' matter and that the intergenerational effects can persist beyond two generations. We find that the grandparent's educational status directly influences their grandchildren's educational attainment, over and above the effect transmitted through parents: children's educational attainment is correlated not only with the education of their parents, but also with the educational status of their grandparents. When conditioning on parental education, the association between grandparents and grandchildren persists but decreases.

In each of the six countries, we find positive and significant net effects of the grandparent's educational status on the educational attainment of their grandchildren, conditional on their parent's educational status. The results also indicate that the influence on children reduces after the second generation. We find that the direct effect of grandparent's influence as measured by the three-generational persistence is one-fifth of the two-generational persistence. This suggests that our estimates of three-generational persistence do not follow the simple geometric extrapolation of the two generational transmission that has been assumed in some of the literature. There are, however, differences between the countries we analyse. We find that direct effects of grandparent's years of schooling on grandchildren's educational attainment, net of parent's influence, is higher in Nigeria and smaller in Tanzania, Gambia and Ethiopia. The grandparents' influence is, however, much smaller than that of the parent.

Regarding the second question, we find that the degree of grandparents' influence is higher for granddaughters than for grandsons at the regional level and across the countries, except in Nigeria, where the impact is higher for grandsons than granddaughters.

Concerning our third question on the impact of co-resident grandparents, we find that the coefficients from co-resident grandparents are significant and positive and particularly so for daughters in Nigeria. Overall, grandparents have an important influence on grandchildren's.

educational outcomes, and this is particularly the case if they live in the same households. To the extent that we can proxy the residency status to a more direct interaction and, therefore, to transmission of social and cultural capital as well as resources of other kinds, we do find, in our analysis similar results to those of Zeng and Xie (2014) for China, and consistent with theoretical predictions by Mare (2011), Song and Mare (2019) and Solon (2014). The daily interaction between grandparents and grandchildren in African societies is important. Social and cultural factors contribute to the multi generational transmission of social status: this can be through social norms for knowledge transfer, traditional resource allocation practices, as well as other cultural practices that enhance interactions across multiple generations. Indeed, grandparents effects on grandchildren are likely to be greater when grandparents and grandchildren have shared lifetimes, co-residency representing a strong form of this mutual exposure.

From our findings, Nigeria does appear to be somewhat different to the other five countries. In Nigeria, grandparents appear to have a relatively more direct influence on grandchildren's educational

outcomes, with less mediation taking place by the middle generation of parents. The effect of the co-residency of grandparents is also particularly pronounced in the case of grandsons, whereas in the other five countries, the transmission from grandparents is higher for granddaughters. The assessment of the underlying reasons as to the existence of these differences is beyond the scope of this research. However, when we look back at some key aspects in relation to the education system and demographic patterns, we can only speculate that underlying reasons may lie in specific social and cultural factors and norms unique to Nigeria. norms. In fact, although Nigeria is one of the most populated countries in the continent and the richest in terms of economic output, it does not have a relatively high presence of old population, nor of households with at least one old member, nor of three generation households, nor a relatively higher average household size compared to the other five countries. The prevalence of traditional gender norms in some regions might have shaped educational opportunities differently. In these contexts, extended family networks, including grandparents, may play a more direct role in supporting boys' education, especially in regions where instability disrupts formal schooling. Conversely, in the other five countries, the stronger influence of grandparents on daughters could reflect greater reliance on extended family support for girls' education, possibly compensating for gender disparities in parental investment or social expectations favouring male education. These findings certainly highlight the importance of contextual factors in shaping multigenerational mobility, suggesting that while broad trends exist, country-specific conditions must be considered when analysing intergenerational transmission of education.

Two further implications emerge from our analysis. First, the net effect of grandparents on grandchildren's educational outcomes indicates that that the two-generations specifications often used are likely to overestimate the extent of educational mobility between children and parents. If, due to cultural, social and other economic factors, there are grounds to believe that grandparents have solid direct or indirect interactions with grandchildren, which is now much more likely than it used to be a few decades ago, also because of demographic changes and ageing populations, then consideration of three generations estimates of mobility could well be revealing and helpful.

Second, because the disadvantage of birth in contexts and families with relatively low education is more likely to persist across more than two generations, then interventions that aim to address poor educational outcomes in those same contexts become even more necessary and possibly more complex.

This is important, particularly in light of the two wider demographic and educational patterns we have outlined in the Introduction, namely the increasing share of older people and the generalised relatively recent efforts of many African countries to improve educational outcomes. Despite important differences between the countries in educational contexts and, particularly, in the progress achieved on the educational attainment for the adult population and in addressing the gender inequalities in education, we find persistent multi-generational associations.

We do aim to add to the lack of evidence on three-generational mobility in Africa and, more precisely, in six African countries that differ in many ways. However, we are conscious of limitations to our study. The lack of evidence so far is mostly due to lack of suitable data. For instance, we are not able to shed light on causal mechanisms nor on the role of the different contexts and policies that regard the six countries. Furthermore, we are not able to incorporate other variables that could help to capture further demographic and behavioural dynamics, which could be relevant in African societies and could potentially change the transmission of educational advantages across generations. Regarding the impact of co-residency, although our measure is the best possible given the available data, we do not have information on the exact duration nor period during which grandparents co-reside with grandchildren, which means we capture the effect of living in a more traditional household, with closer ties between generations. For these reasons, considering the data we have been able to put together for the six countries, we believe that our analysis starts to fill an important gap and shed light on the extent of three generational mobility in part of the African continent.

CRediT authorship contribution statement

Giovanni Razzu: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Ayago Wambile:** Writing – review & editing, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.worlddev.2025.107114.

Data availability

Data will be made available on request.

References

Alesina, A., Hohmann, S., Michalopoulos, S., & Papaioannou, E. (2021). Intergenerational Mobility in Africa. *Econometrica, 89*(1), 1–35.

Anderson, L. R., Sheppard, P., & Monden, C. W. S. (2018). Grandparent effects on educational outcomes: A systematic review. *Sociological Science, 5*(6), 114–142.

Azam, M., & Bhatt, V. (2015). Like father, like son? Intergenerational educational mobility in India. *Demography, 52*(6), 1929–1959.

Azomahou, T. T., & Yitbarek, E. (2021). Intergenerational mobility in education: Is africa different? *Contemporary Economic Policy, 39*(3), 503–523.

Azomahou, T. T., & Yitbarek, E. A. (2016). *Intergenerational education mobility in Africa: Has progress been inclusive?* The World Bank.

Becker, G. S., and N. Tomes. 1986. "Human capital and the rise and fall of families." *Journal of Labor Economics*, 4(3, Part 2): S1–S39.

Becker, G. S. (1981). *A Treatise on the Family*. Harvard University Press.

Behrman, J., & Taubman, P. (1985). Intergenerational earnings mobility in the United States: Some estimates and a test of Becker's intergenerational endowments model. *The Review of Economics and Statistics, 67*(1), 144–151.

Bengtson, V. L. (2001). Beyond the nuclear family: The increasing importance of multigenerational bonds: The Burgess award lecture. *Journal of Marriage and Family, 63*(1), 1–16.

Bol, T., & Kalmijn, M. (2016). Grandparents' resources and grandchildren's schooling: Does grandparental involvement moderate the grandparent effect? *Social Science Research, 55*, 155–170.

Bossuroy, T., & Cogneau, D. (2013). Social mobility in five African countries. *Review of Income and Wealth, 59*, 84–110.

Brand, J. E., & Xie, Y. (2023). The legacy of robert d. mare. *Research in Social Stratification and Mobility*.

Braun, S. T., & Stuhler, J. (2018). The transmission of inequality across multiple generations: Testing recent theories with evidence from Germany. *The Economic Journal, 128*(609), 576–611.

Celhay, P. A., & Gallegos, S. (2023). *Educational Mobility Across Three Generations in Latin American Countries*. Caracas: CAF. Retrieved from https://scioteca.caf.com/handle/123456789/1906.

Celhay, P., and S. Gallegos. 2024. "Schooling Mobility across Three Generations in Six Latin American Countries." IZA Discussion Papers 17072, Institute of Labor Economics (IZA).

Chan, T. W., & Boliver, V. (2013). The grandparents effect in social mobility: Evidence from British birth cohort studies. *American Sociological Review, 78*(4), 662–678.

Chiang, Y.-L., & Park, H. (2015). Do grandparents matter? a multigenerational perspective on educational attainment in taiwan. *Social Science Research, 51*, 163–173.

Clark, G., Cummins, N., Hao, Y., & Vidal, D. D. (2015). *The son also rises: Surnames and the history of social mobility*. Princeton and Oxford: Princeton University Press.

Coall, D. A., & Hertwig, R. (2011). Grandparental Investment: A Relic of the Past or a Resource for the Future? *Current Directions in Psychological Science, 20*(2), 93–98.

Daw, J., & Gaddis, S. M. (2016). Education in 3g: Heterogeneity of intergenerational educational mobility in the us. *Social Science Research Network, 9*, 2017.

Dendir, S. (2023). Intergenerational educational mobility in sub-saharan africa. *World Development Sustainability, 2*, Article 100072.

Dribe, M., & Helgertz, J. (2016). The lasting impact of grandfathers: Class, occupational status, and earnings over three generations in Sweden 1815–2011. *The Journal of Economic History, 76*(4), 969–1000.
Duflo, E. (2003). Grandmothers and granddaughters: Old-age pensions and intrahousehold allocation in South Africa. *The World Bank Economic Review, 17*(1), 1–25.
Emran, M. S., & Shilpi, F. J. (2019). *Economic approach to intergenerational mobility: Measures, methods, and challenges in developing countries*. (2019/98): WIDER Working Paper.
Erola, J., & Moisio, P. (2007). Social mobility over three generations in Finland, 1950–2000. *European Sociological Review, 23*(2), 169–183.
Ferguson, J. L., & Ready, D. D. (2011). Expanding notions of social reproduction: Grandparents' educational attainment and grandchildren's cognitive skills. *Early Childhood Research Quarterly, 26*(2), 216–226.
Ferrie, J., Massey, C., & Rothbaum, J. (2021). Do grandparents matter? multigenerational mobility in the united states, 1940–2015. *Journal of Labor Economics, 39*(3), 597–637.
Francesconi, M., & Nicoletti, C. (2006). Intergenerational mobility and sample selection in short panels. *Journal of Applied Econometrics, 21*(8), 1265–1293.
Hällsten, M., & Pfeffer, F. T. (2017). Grand advantage: Family wealth and grandchildren's educational achievement in Sweden. *American Sociological Review, 82*(2), 328–360.
Hancock, K., Mitrou, F., Povey, J., Campbell, A., & Zubrick, S. R. (2016). Three-generation education patterns among grandparents, parents and grandchildren: Evidence of grandparent effects from Australia. *Life Course Centre Working Paper Series, 2016*(08), 1–41.
Hertz, T. 2005. "Rags, riches, and race." In *Unequal chances: Family background and economic success*. Eds. by S. Bowles, H. Gintis, and M. Osborne. New York: Russell Sage and Princeton University Press, 165–191.
Hertz, T. (2008). A group-specific measure of intergenerational persistence. *Economics Letters, 100*(3), 415–417.
Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., & Verashchagina, A. (2008). The inheritance of educational inequality: International comparisons and fifty-year trends. *The BE Journal of Economic Analysis & Policy, 7*(2), 1–46.
Hill, M. A., & O'Neill, J. (1994). Family endowments and the achievement of young children with special reference to the underclass. *Journal of Human Resources*, 1064–1100.
Hodge, R. W. (1966). Occupational mobility as a probability process. *Demography, 3*(1), 19–34.
Jæger, M. M. (2012). The extended family and children's educational success. *American Sociological Review, 77*(6), 903–922.
Jones, G. W., & Ramchand, D. S. (2016). Closing the gender and socio-economic gaps in educational attainment: A need to refocus. *Journal of International Development, 28*(6), 953–973.
Kundu, A., & Sen, K. (2023). Multigenerational mobility among males in india. *Review of Income and Wealth, 69*(2), 395–418.
Li, M., & Cao, J. (2023). Multi-generational educational mobility in china in the twentieth century. *China Economic Review, 80*, Article 101990.
Lindahl, M., Palme, M., Massih, S. S., & Sjögren, A. (2015). Long-term intergenerational persistence of human capital an empirical analysis of four generations. *Journal of Human Resources, 50*(1), 1–33.
Lucas, R. E., & Kerr, S. P. (2013). Intergenerational income immobility in Finland: Contrasting roles for parental earnings and family income. *Journal of Population Economics, 26*(3), 1057–1094.
Maralani, V. 2023. "Rob mare's legacy: The demography of inequality and social mobility."*Research in Social Stratification and Mobility*, p. 100808.
Mare, R. D. (2011). A multigenerational view of inequality. *Demography, 48*(1), 1–23.
Mare, R. D., & Song, X. (2023). Social mobility in multiple generations. *Research in Social Stratification and Mobility, 88*, Article 100806.
Mazumder, B. (2014). Black–white differences in intergenerational economic mobility in the united states. *Economic Perspectives, 38*(1).
Modalsli, J. (2015). Estimating occupational mobility with covariates. *Economics Letters, 133*(August), 77–80.
Modin, B., Erikson, R., & Vågerö, D. (2013). Intergenerational continuity in school performance: Do grandparents matter? *European Sociological Review, 29*(4), 858–870.
Møllegaard, S., & Jæger, M. M. (2015). The effect of grandparents' economic, cultural, and social capital on grandchildren's educational success. *Research in Social Stratification and Mobility, 42*, 11–19.
Narayan, A., R. Van der Weide, A. Cojocaru, C. Lakner, S. Redaelli, D. G. Mahler, Narayan, A., R. Van der Weide, A. Cojocaru, C. Lakner, S. Redaelli, D. G. Mahler, R. G. N. Ramasubbaiah, and S. Thewissen. 2018. Fair Progress?: Economic Mobility Across Generations Around the World. World Bank Publications.
Neidhöfer, G., Serrano, J., & Gasparini, L. (2018). Educational inequality and intergenerational mobility in Latin America: A new database. *Journal of Development Economics, 134*, 329–349.
Neidhöfer, G., & Stockhausen, M. (2019). Dynastic inequality compared: Multigenerational mobility in the United States, the United Kingdom, and Germany. *Review of Income and Wealth, 65*(2), 383–414.
Odimegwu, C. O., N. D. Wet, S. A. Adedini, and S. Appunni. 2020. "Family demography in sub-saharan africa: Systematic review of family research." *Family demography and post-2015 development agenda in Africa* 9–56.
Peters, H. E. (1992). Patterns of intergenerational mobility in income and earnings. *The Review of Economics and Statistics, 74*(3), 456–466.
Pfeffer, F. T. (2014). Multigenerational approaches to social mobility. A multifaceted research agenda. *Research in Social Stratification and Mobility, 35*(1), 1–12.
Piraino, P. (2015). Intergenerational earnings mobility and equality of opportunity in South Africa. *World Development, 67*, 396–405.
Razzu, G. (2005). Urban redevelopment, cultural heritage, poverty and redistribution: The case of Old Accra and Adawso House. *Habitat International, 29*(3), 399–419.
Razzu, G., & Wambile, A. (2022). Four decades of intergenerational educational mobility in sub-Saharan Africa. *The Journal of Development Studies, 58*(5), 931–950.
Ridge, J. M. (1974). *Mobility in Britain reconsidered* (Vol. 2). Oxford: Clarendon Press.
Solon, G. (2014). Theoretical models of inequality transmission across multiple generations. *Research in Social Stratification and Mobility, 35*(1), 13–18.
Song, X., & Mare, R. D. (2017). Short-term and long-term educational mobility of families: A two-sex approach. *Demography, 54*(1), 145–173.
Song, X., & Mare, R. D. (2019). Shared lifetimes, multigenerational exposure, and educational mobility. *Demography, 56*(3), 891–916.
Stuhler, J. (2012). Mobility across multiple generations: The iterated regression fallacy. *IZA Discussion Paper, 7072*.
Torche, F. 2021. "Educational mobility in the developing world." In *Social Mobility in Developing Countries: Concepts, Methods and Determinants*. Eds. by V. Iversen, A. Krishna, and K. Sen. Oxford: Oxford University Press, , Chap. 7: 139–171.
Torche, F., & Corvalan, A. (2018). Estimating intergenerational mobility with grouped data: A critique of clark's the son also rises. *Sociological Methods & Research, 47*(4), 787–811.
UNDESA. 2019. "World Population Prospects 2019: Highlights.United Nations, Department of Economic and Social Affairs, Population Division. New York, U.S.".
UNDESA. 2022. "Database on Household Size and Composition 2022. UN DESA/POP/2022/DC/NO.8.".
UNESCO, G. 2015. "Education for All 2000-2015: Achievements and Challenges; EFA Global Monitoring Report. 2015.".
Warren, J. R., & Hauser, R. M. (1997). Social stratification across three generations: New evidence from the Wisconsin Longitudinal Study. *American Sociological Review*, 561–572.
Van der Weide, R., Lakner, C., Mahler, D. G., Narayan, A., & Gupta, R. (2024). Intergenerational mobility around the world: A new database. *Journal of Development Economics, 166*, Article 103167.
Wightman, P., & Danziger, S. (2014). Multi-generational income disadvantage and the educational attainment of young adults. *Research in Social Stratification and Mobility, 35*, 53–69.
Wild, L. G., & Gaibie, F. (2014). Grandparental involvement and South African adolescents' psychological well-being. *Journal of Intergenerational Relationships, 12*(4), 425–441.
Zeng, Z., & Xie, Y. (2014). The effects of grandparents on children's schooling: Evidence from rural China. *Demography, 51*(2), 599–617.
Zhang, F., & Wu, Y. (2021). Living with grandparents: Multi-generational families and the academic performance of grandchildren in china. *Chinese journal of sociology, 7*(3), 413–443.