Sociology of Education

Trends and determinants of intergenerational educational inequality in sub-Saharan Africa for birth cohorts 1974–2003

Journal:	*Sociology of Education*
Manuscript ID	SOE-22-0106.R1
Manuscript Type:	Research Article
Keywords:	educational inequality, social stratification, trends and contextual explanations, Poverty and Education, material deprivation, Teachers, sub-Saharan Africa

Abstract: This article expands the scope of comparative social stratification research in education to rapidly developing, largely low-income sub-Saharan Africa. First, we investigate trends in the association between parental socioeconomic status (SES) and children's chances to attend and complete primary education, exploring whether and where educational expansion of the early twenty-first century led to equalization of educational opportunities. Drawing on data from 153 DHS and MICS surveys (1990–2017) from 40 countries, findings indicate that inequality in attendance declined, while inequality in completing six grades largely persisted. Cross-country analyses reveal a large variation in inequality levels and trends. We explore the role of national contextual factors and find that underweight prevalence, fertility rates, school fees, public spending on education, and pupil-teacher ratio systematically explain variation in SES-gaps across countries and cohorts. Findings underline the importance of absolute material deprivation and school teaching resources in the stratification of educational opportunities in this region.

Note: The following files were submitted by the author for peer review, but cannot be converted to PDF. You must view these files (e.g. movies) online.

Inequality_SSA_contextual_2nd_stage_analysis_anonymized.do

Trends and determinants of intergenerational educational inequality in sub-Saharan Africa for birth cohorts 1974–2003

Trends and country differences in intergenerational educational inequality (IEI) and their national contextual explanations have been studied extensively, albeit with a limited geographic scope and time coverage focusing mainly on cohorts born in the second half of the twentieth century in industrialized and transition economies (Barone and Ruggera 2018; Breen et al. 2009; Torche 2010). Fostered by vigorous policy debate and large national and international investments, a remarkable educational expansion has recently occurred in low-income countries including those in Africa (UNESCO 2015). Little is known, however, about the consequences of this expansion for inequality determined by social background, and the role of national contextual characteristics in explaining cross-country and over-time differences. In this article, we aim to fill these gaps by analyzing trends and variation in inequality in children's chances to attend and complete basic education according to parental socioeconomic status (SES) for cohorts born over the last four decades in sub-Saharan Africa.

A dominant theory for explaining trends in IEI in the 1990s was that inequality has a tendency to persist due to enduring relative differences in cognitive development, family resources, and motivation to avoid downward mobility (Becker 2003; Blossfeld and Shavit 1993; Breen and Goldthorpe 1997). In recent years, this paradigm has shifted, acknowledging that inequality can change under certain conditions. A large body of literature has investigated whether and which variations in social environments explain differences in social stratification of children's educational opportunities. The most widely discussed national contextual factors include living conditions that affect children's physical and mental development, and educational institutions that determine costs of schooling and student sorting by school type and quality (Ballarino et al. 2009; Breen et al. 2009; Gruijters and Behrman 2020).

Previous research on trends and contextual explanations of IEI has generated a mixed set of findings and is far from conclusive, indicating that the direction of change (if any) is context- and cohort-specific. In highly advanced western economies, the influence of parental SES on children's educational opportunities declined for cohorts born in the post-Second World War period, especially at lower levels of education (Ballarino et al. 2009; Barone and Ruggera 2018; Breen et al. 2009). During this period, most western societies experienced unique circumstances of economic and political stability, welfare state expansion, and unprecedented improvements in living conditions, limiting generalizability of the proposed explanations mainly to the highly-advanced economies. Some of the research in middle-income and transition economies where public safety nets are weaker suggests that educational inequality has increased, especially at higher levels of education (Torche 2010). In low and lower-middle income countries where welfare states are underdeveloped, and school enrollments are considerably lower, comparative sociological research on IEI is scarce. Some notable exceptions include Gruijters and Behrman (2020) who study individual- and school-level factors driving inequality in scholastic achievement in Francophone Africa, and Chmielewski (2019) who studies trends and contextual drivers globally, albeit with a small coverage of low-income countries. In the economics discipline, studies on intergenerational educational mobility in African countries find mostly a persisting correlation in parent-child educational attainment implying no change in absolute mobility since the 1960s (Alesina et al. 2019; Azomahou and Yitbarek 2016). These studies capture cohorts born before the educational expansion of the early twenty-first century. Consequently, we know very little about recent trends and contextual drivers of educational inequality in less developed regions in the world where educational expansion is a recent phenomenon and where societies have their own unique contextual specificities.

In this article, we make several contributions to inequality research in Africa and to social stratification research more broadly. First, we expand the geographic and contextual scope of sociological social stratification research to rapidly developing, but still largely low-income, sub-Saharan Africa (SSA). This case selection allows to study trends and country differences in IEI by social background in societies of historically low educational attainment and diverging macroeconomic and societal development. Second, we study cohorts born between 1974 and 2003, providing key insights to the policy debate on the effectiveness of recent mass educational expansion in Africa to reduce socioeconomic inequalities. As will be described in more detail below, net primary school enrolment rates in SSA on average stagnated at around 54 per cent in the 1980s and 1990s but increased thereafter reaching almost 80 per cent by 2015, varying by country (UN 2015). Third, we explore the role of the national context in explaining variation in IEI between countries and cohorts. To our knowledge, no comparative sociological research on trends in IEI and its determinants has been carried out in low-income countries undergoing recent educational expansion.

The analyses draw on individual-level household data from 153 Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) in 40 countries between 1990 and 2017, in combination with national-level data retrieved from various international sources. We focus on IEI by parental SES in attendance and completion of primary education since, in the context of Africa, primary school attainment is far from universal and is socially stratified. SSA is the region with the lowest primary school completion rates in the world, with the weighted average of 65 per cent in 2018 and around only 30 per cent among the poorest quintile (UNESCO 2023). Our findings reveal that while inequality by SES in *attending* primary school declined, inequality in *completing* six or more grades largely persisted. We find that variation in IEI across countries and cohorts is systematically explained by national characteristics related to material deprivation, demography and schools.

In the next section, we give contextual background on educational expansion in sub-Saharan Africa in the last decades. We then introduce the main theoretical perspectives on educational inequality by social background, in light of socioeconomic developments in SSA and how these may affect trends and variation in IEI. This is followed by a methods section, a discussion of the empirical findings and conclusions.

EDUCATIONAL EXPANSION IN SUB-SAHARAN AFRICA

Sub-Saharan Africa's path to educational expansion has been slow and until the last decade lagged behind other regions in the world. In the 1960s and 1970s, although many of the countries that had recently gained independence from previous colonial dominance committed to improving access to education, the educational sector was underfunded and international organizations and high-income countries failed to provide any substantial financial support (Mundy and Manion 2015). Until the mid-1980s, net primary school enrolment in the region was on average low and increased only marginally, reaching 58 per cent in 1984 (World Bank 2020; see Figure 1). Gross primary completion rate followed the same pattern. Between 1985 and 1990, enrolment and completion rates declined and continued stagnating throughout the 1990s. These disappointing trends have been attributed to prolonged economic recession and Structural Adjustment Programs (Reimers 1994).

The turn of the millennium marked significant changes in Africa's education sector. Between 2000 and 2015, most SSA countries experienced sustained economic growth, with yearly GDP growth rates exceeding 5 per cent. This period coincided with an intensified push from the international community to universalize primary school enrolments as indicated by the Millennium Development Goal agenda and the Education for All initiative (Mundy and Manion 2015; UN 2015). About one third of all SSA countries abolished primary school fees

to increase enrolments (UNESCO 2015). The average public spending on education increased, although in many cases this increase was outpaced by educational expansion leading to classroom overcrowding and a lack of trained teachers (UNESCO UIS 2011). During this period, many African countries made remarkable progress as net primary school enrolments increased on average from 54 to 77 per cent between 1996 and 2015 (UN 2015).

[Figure 1 about here]

The overall positive trends mask large cross-country variations. Several countries made steeper progress than others. For instance, Ghana, Ethiopia and Lesotho abolished school fees and mobilized to attract both local funding and external aid to invest in rapid enrolment growth (UNESCO UIS 2011). In Ghana, net primary enrolment rates increased from 59 to 84 per cent between 1999 and 2018; in Ethiopia, the increase was from around 30 to 78 per cent between the late 1980s and 2012; and in Lesotho, enrolments reached an almost universal level by 2018 (World Bank 2020). Other countries were not as successful, such as Central African Republic, Congo, and Nigeria where enrolment rates continued stagnating throughout the 1990s and 2000s. Primary school completion rates also vary considerably (UNESCO 2023). Whether the educational expansion led to an equalization of children's educational opportunities and how different contextual factors might have shaped this process remain empirical questions. Due to high heterogeneity in the speed of educational expansion and contextual circumstances among SSA countries, a notable cross-country variation in levels and trends of IEI is to be expected.

THEORETICAL AND CONCEPTUAL FRAMEWORK

Until the early 2000s, the dominant theoretical framework in sociology concerning inequality of educational opportunity was that of persistent inequality (Blossfeld and Shavit 1993).

According to this paradigm, educational inequality has a tendency to persist because of persisting differences in perceived costs and benefits of education, and probability to succeed between socioeconomically advantaged and disadvantaged groups (Becker 2003; Breen and Goldthorpe 1997; Erikson and Jonsson 1996).

The origins of this framework can be traced back to a widely used theory in the sociology of education – that of primary and secondary effects of social origin as theorized by Raymond Boudon (1974). The primary effects refer to the effects of social origins on children's school performance that, in turn, affects their educational attainment. The secondary effects are differences in the educational choices families make, after accounting for scholastic performance. The core assumption of Boudon's model is that educational choices are driven by the ambition to avoid downward social mobility. The argument is that higher SES students have a stronger motivation to achieve a higher level of education compared to low SES students, to avoid the risk of downward mobility. Based on this theoretical argument, the Maximally Maintained Inequality (MMI) hypothesis posits that inequality in the attainment of a given educational level declines only when the attainment among children from the more advantaged social groups is close to being saturated (Raftery and Hout 1993).

In more recent years, emphasis has shifted to identify contextual and institutional factors that can alter the general tendency towards inequality persistence and that can explain cross-country differences in educational inequality (Ballarino et al. 2009; Breen et al. 2009; Chmielewski 2019; Gruijters and Behrman 2020). This research strand points at a number of contextual factors that determine the strength of the relationship between family SES and educational attainment, affecting the primary and secondary effects of social origin. Redistributive welfare state policies, parental employment security, and demographic developments can alter disparities in disposable household resources and living conditions between social groups and thus alter differences in children's school performance (primary

effects) and perceived educational costs and benefits (secondary effects) between higher- and lower-SES families (Ballarino et al. 2009; Barone and Ruggera 2018; Breen et al. 2009; Erikson and Jonsson 1996). Changes in school selectivity and other school characteristics, such as physical resources, school fees, teaching practices and school governance, can affect the way pupils are stratified within educational systems by school type and learning quality, and thus affect differences in school performance and parental decision-making regarding educational choices (Bhalotra, Harttgen, and Klasen 2015; Breen et al. 2009; Chmielewski 2019; Erikson and Jonsson 1996; Foster 1980; Gruijters and Behrman 2020).

Based on this theoretical framework and given the context of Africa, we develop and test a conceptual framework that examines the role of four national contextual factors predicted to explain variation in IEI across countries and cohorts. These are: (1) material deprivation; (2) demographic developments; (3) school fees; and (4) public investments in school and teaching resources. In line with the theoretical framework, these factors are expected to shape IEI through the primary effects of social origin, affecting children's physical and cognitive development and thus their school performance and grade progression, and through secondary effects, determining families' disposable resources and perceived educational costs and benefits, and thus their decision to complete a given educational level or to drop out. As will be explained in more detail below, these contextual factors are expected to play an important role in social stratification in primary education in SSA. Overall the region is characterized by high levels of extreme poverty and deprivation among children (Gordon et al. 2003; de Milliano and Plavgo 2018), fertility rates considerably above replacement level (World Bank 2020), persisting school tuition fees (Harding and Stasavage 2013; Tomasevski 2006), and poor school resources and shortage of teachers (Tomasevski 2006; UNESCO UIS 2011), while cross-country and over-time variation in these factors is substantial.

Material Deprivation

Unequal living conditions are commonly regarded as an important mechanism behind educational stratification since they shape differences in children's development and lead to differentials in cognitive ability (Cunha and Heckman 2007). The effect of family SES on educational attainment via health and physical and mental well-being is theorized to be particularly relevant for low-income contexts due to widespread absolute poverty, malnutrition and illness (Gruijters and Behrman 2020:261). In such contexts, living conditions are commonly considered in absolute terms since extreme poverty and deprivation of basic goods and services to sustain life, such as nutrition, water and healthcare, are widespread and overlap (Gordon et al. 2003; de Milliano and Plavgo 2018). Improvements in living conditions and related health and nutritional outcomes are theorized to reduce socioeconomic disparities in educational attainment by closing the gap in school performance (Breen et al. 2009:1479; Erikson and Jonsson 1996).

Recent developments in SSA point at moderate improvements in living conditions. Examples include a decline of underweight prevalence from 30 to 18 per cent and a decline of under-five mortality from 181 to 76 deaths per 1,000 live births between 1990 and 2015 (UN 2015). Nevertheless, absolute poverty is still common, with children being overrepresented in the poorer segments of the society and experiencing multiple deprivations simultaneously (Gordon et al. 2003; de Milliano and Plavgo 2018). We also know that material deprivation affects children's health outcomes and their educational attainment, and that risk of experiencing material deprivation is higher in low educated households (Fink and Rockers 2014; KNBS and UNICEF 2017). We can then expect that variation in the incidence of material deprivation explains variation in educational inequality across countries, and advance the following hypothesis:

H1: The lower the prevalence of material deprivation in a country, the lower the IEI by parental SES.

Demographic Developments

Fertility rates affect the amount of family resources available for consumption of goods and services such as housing and schooling. Empirical research in Africa shows that lower fertility rates and better family planning are associated with higher school enrolments (Lloyd, Kaufman, and Hewett 2000; Longwe and Smits 2012). Since poorer families spend a higher share of disposable household resources on consumption of basic goods and services, changes in birth rates may be particularly consequential for the demand for education among poorer families, thus altering inequality of educational opportunity by social background (Breen et al. 2009:1479; Erikson and Jonsson 1996).

The demographic path of SSA has been challenging due to high fertility (Caldwell, Orubuloye, and Caldwell 1992). Between 1990 and 2016, fertility rates in SSA on average decreased from 6.4 to 4.8 births per woman (World Bank 2020). Fertility transition, however, remains slow due to persistently high levels of desired ideal family size and the unmet need for contraception (Bongaarts and Casterline 2013). In countries where fertility rates declined, it can be expected that the pressure on household disposable resources declined, opening space for more demand for education, especially for lower-SES families:

H2: The lower the national fertility rate, the lower the IEI.

School Fees

Schooling costs are among the most widely identified factors affecting social background differences in children's educational opportunities. Lowering school fees can have an equalizing effect on socioeconomic disparities in education (Bhalotra et al. 2015; Breen et al. 2009:1479).

In Africa, primary school tuition fees and other school-related costs pose an important financial barrier to access to and remaining in education, especially among poorer families (Tomasevski 2006; World Bank and UNICEF 2009). About one third of sub-Saharan African

countries officially abolished primary school fees in the late 1990s and 2000s (UNESCO 2015). It is very likely that lifting this financial barrier somewhat equalized children's chances to access and complete basic education for cohorts in countries where school fees were removed:

H3: School fee abolition leads to a decline in IEI.

Public Investments in Education and Teaching Resources

School quality is theorized to be especially important for inequality of educational opportunities in low-income countries (Heyneman and Loxley 1983). Recent research studying scholastic achievement inequality in ten francophone African countries finds that access to quality school resources is socially stratified and that most of the family background effect on learning outcomes is explained by differences in school quality (Gruijters and Behrman 2020). In many sub-Saharan African countries, recent educational expansion was not accompanied with a proportional increase of spending on education, leading to lack of school material and shortage of trained teachers (UNESCO UIS 2011; World Bank and UNICEF 2009). Lack of school resources and classroom overcrowding can have a negative impact on teaching and learning outcomes, and diminish parental demand for primary education (Bennell 2002). Conversely, we can expect that public investments in education and teaching resources will improve learning outcomes and thus reduce SES inequalities in children's educational performance (primary effect of social origin) and parents'/households' perceived costs and benefits of schooling (secondary effect):

H4: In countries and cohorts where public investment in schools and teachers is higher, IEI is lower.

METHODOLOGY

Data

The empirical analyses draw on DHS and MICS data, selecting all available nationally representative cross-sectional household surveys collected between 1990 and 2017.[1] The surveys, designed to assure cross-national comparability and implemented by national bureaus of statistics in collaboration with international partners, are carried out every three to five years covering most countries in SSA. A total of 153 surveys from 40 countries were merged (1–7 surveys per country). The selected analytical sample consists of individuals aged from 14 to 16, allowing observation of trends in IEI for children born between 1974 and 2003. After excluding observations missing relevant information (5 per cent of the sample),[2] the final analytical sample size is 541,856 individuals.

The selection of children aged 14 to 16 as the unit of analysis is both data-driven and conceptually grounded. First, DHS and MICS surveys link children with their parents only up to age 17. Sample restriction to individuals under age 17 is applied also in other recent work on intergenerational educational mobility to account for selection on cohabitation (Alesina et al. 2019). Second, the definition of school completion closely follows UNESCO's definition used for household survey data. Since in Africa most children start formal education late and repeat grades, UNESCO takes a cohort aged 3, 4 and 5 years above the intended age for the last grade of primary education to calculate this completion share. For countries where primary school duration is six grades, the intended age for the last grade is 11 years and the reference age group to calculate the completion rate is 14–16 (UNESCO 2020).

Aggregate data for the socioeconomic, demographic and institutional context of the analyzed countries are retrieved from the World Bank (2020). Data on school fees are retrieved primarily from Harding and Stasavage (2013). All time-varying indicators are measured with a lag, expressed as an average of eight years before survey data was collected to reflect the time when children were of school age. As an example, for children aged 14–16 surveyed in

2009, time-varying macro-level indicators are derived calculating the average between 2001 and 2008.

Individual-level Variables

Educational attainment at primary school is operationalized using three binary indicators: primary school attendance equal to 1 if a child has ever attended school and 0 otherwise; completion of lower-level basic education equal to 1 if a child has completed six or more grades and 0 otherwise; and completion conditional on attendance, excluding children who have never attended school. Completion of at least six years of primary school is selected for cross-country comparative purposes, given that this is the official duration of primary education for the vast majority of SSA countries (UNESCO UIS 2011:22).[3]

Socioeconomic background (SES) is measured by parental educational attainment, a commonly used SES measure in intergenerational educational mobility research in SSA (Alesina et al. 2019; Azomahou and Yitbarek 2016) and in social stratification research in education overall (Feinstein, Duckworth, and Sabates 2004). It is expressed as a binary variable equal to 1 if at least one of the child's parents completed six or more years of schooling, following a dominance principle.[4] When parents' educational attainment is unavailable, household head's education is considered if the household head is the child's relative. In the final sample, 40 per cent of all parents or caretakers completed six or more grades. In a robustness check for the analysis of IEI trends we have also employed a more detailed classification of parental educational attainment with four categories. The results of this different specification confirm the findings based on a dichotomous distinction. Additional insights stemming from this more detailed analysis are reported in the findings section.

Cohorts of birth are divided into four groups representing distinct historic periods when cohorts reached primary school age: 1974–1983 (economic downturn and educational contraction); 1984–1990 (economic stagnation and the first attempts to advance EFA); 1991–

1997 (the initial phase of economic recovery and mobilization of the international community to reach EFA); and 1998–2003 (sustained economic growth and educational expansion when cohorts reached school age). The section above on educational expansion provides a brief description of these periods (see Plavgo (2021) for more detail). In a sensitivity analysis we have also grouped birth cohorts into half-decades: 1974–1979, 1980–1984, 1985–1989, 1990–1994, 1995–1999, and 2000–2003. The results on trends in IEI using this more detailed cohort grouping confirm those based on the four cohort groups and are presented in Figure A1, Appendix.

Individual-level controls include child's gender and age.

Macro-level Variables

Material deprivation is measured using an indicator of underweight prevalence, a composite measure capturing both chronic and acute malnutrition, expressed as the percentage of children under age 5 whose weight-for-age is more than two standard deviations below the median for the international reference population (WHO 2010). In the sample, mean underweight prevalence is 22 per cent.

Demographic developments are captured by fertility rates expressed as the number of children born to women of childbearing age. In the sample, the average fertility rate around the time when cohorts were of school age is 6.4 births per woman, ranging from 4.1 in Zimbabwe to 8.4 in Rwanda.

School fee abolition refers to cases where there is clear evidence that governments have implemented laws or ministerial decrees abolishing tuition or parent-teacher association fees. The variable takes the value of 1 for cohorts for whom fees were abolished prior to or during primary school age, and 0 otherwise.[5] Among the 40 countries analyzed, 17 abolished fees between 1994 and 2008, while for the other 23 countries school fees were still in place during the observed period (see Table 1 for sources).

Public investments in school resources are assessed by indicators of public spending on education and pupil-teacher ratio in primary schools. *Public spending on education* is measured by the total general government expenditure on education as a percentage of GDP. In the sample, the average of public spending on education over eight years prior to the survey year was 3.9 per cent of GDP, ranging between 1.4 per cent in Zambia and 11.3 per cent in Lesotho. *Pupil-teacher ratio* accounts for teaching resources when children were of school age, expressed as the average number of pupils per teacher in primary schools. In the sample, pupil-teacher ratio was the lowest in Gabon, Ghana and Liberia (25–30 pupils per teacher) and the highest in Central African Republic, Malawi and Mali (70–100 pupils per teacher on average).

Economic development is used as a control, measured by national gross domestic product (GDP) per capita based on Purchasing Power Parity (PPP), expressed in constant international dollars. For regression models, GDP is transformed into its natural logarithm. In supplementary analyses, following previous literature on social mobility in Africa (e.g. Alesina et al. 2019), we used urbanization and employment in services and manufacturing as alternative indicators to capture the level of economic development. They yielded similar findings and are not reported here but can be made available upon request.

Descriptive statistics of all the variables at the aggregate level are provided in Table 1. Detailed information by country and survey year listing data sources, sample size, and estimated educational indicators is provided in Table S1, supplementary material.

[Table 1 about here]

Research Strategy

Educational Inequality at the Aggregate Level: Analysis of Levels and Trends

The overall levels and trends of IEI are studied by fitting linear probability models (LPMs) using a pooled dataset from 153 DHS and MICS surveys from 40 countries in SSA. Given the binary nature of our dependent variables, we employ a LPM because the estimation of average marginal effect is more straightforward compared to logit models (Breen, Karlson, and Holm 2018). The estimated coefficients of LPM are almost identical to the average marginal effects of a logit model, particularly when the dependent variables, as it is in our case, do not have extremely low or high values (Mood 2010). The LPMs are estimated using ordinary least squares regressions (OLS) with country fixed effects and cluster-robust standard errors. The model takes the following form:

$$E_i = \alpha + \beta_1 SES_i + \beta_2 Gender_i + \beta_3 Age_i + \beta_4 Cohort_i + \beta_5 SES_i \times Cohort_i + \beta_6 Gender_i \times Cohort_i + \mu Country_i + \varepsilon_i \quad (1)$$

where E_i is the education outcome of a child *i* equal to 1 if the child attended school (analysis of attendance) or completed six or more grades (analysis of completion) and 0 otherwise. We perform the analysis of completion on all subjects, including those who never attended school (unconditional analysis), and a separate analysis only on those respondents who have attended school (conditional analysis).

SES_i is parental socioeconomic status equal to 1 if the child's parent or caretaker completed six or more grades and 0 otherwise; $Cohort_i$ stands for the cohort of birth. β_1 is the estimated regression coefficient that shows the strength of association between parental SES and children's educational outcome, net of age and gender. An interaction term between SES and cohorts is introduced to estimate trends in educational inequality. β_5 shows estimated differences across cohorts in inequality by SES. Since social disparities in education tend to be gendered and change over time (Buchmann, DiPrete, and McDaniel 2008), an interaction term

is introduced also between cohorts and gender. Standard errors are clustered at a country, survey, and household level, amounting to 153 clusters at a country-survey level and 166,746 clusters at a household level. Estimates are weighted by household weights to account for survey design, and by the inverse of sample size to treat each country-year equally since country-years are the principal units of interest. The latter avoids over-representation of larger surveys in the pooled dataset.

Several supplemental analyses are performed to explore the sensitivity and robustness of the baseline estimates to weighting decisions, model specification, operationalization decisions and sample selection. First, analyses are performed without assigning equal weights to each country-year. Second, models are re-estimated as logit models extracting average marginal effects. Third, since large proportions of primary school pupils in SSA are over-age for their grade (Lewin and Sabates 2012), we exclude younger children aged 14–15 to allow for delay in completion. Fourth, the sample is restricted to countries with available data for three consecutive decades, reduced to 21 countries. Fifth, to see if the estimated trends are sensitive to certain country-groups or outliers, we exclude certain country groups, such as the largest countries and country-groups geographically located in different regions due to potential differences in institutional forms of education.

Educational Inequality at a Country-year Level: Analysis of the Role of the National Context

In the second part of the empirical analyses, we study the relationship between macro-level characteristics and IEI. We use a two-stage regression approach that has also been employed in other social stratification research (Bernardi and Ballarino 2014; Hertel and Groh-Samberg 2019). In the first stage, inequality coefficients are calculated using individual level datasets for each country-year cohort *ck* (each of the 153 surveys) with children aged 14–16 using a LPM presented in Equation 2:

$$E_{ick} = \alpha_{ck} + \delta_{ck} SES_{ick} + \gamma_{ck} X'_{ick} + \varepsilon_{ick} \quad (2)$$

where E_{ick} is the education outcome of a child i for each country cohort ck; SES_{ick} is the socioeconomic status of origin; X'_{ick} is a vector of control variables (gender and age); and δ_{ck} is the parameter of interest estimating the inequality coefficient – the SES gap in the probability to attend (complete) basic education between children whose parents/caretakers have completed six or more grades and those who have not. Estimates are weighted by household weights to account for survey design.

In the second stage, we fit pooled cross-sectional OLS regression models at a country cohort level regressing the estimated inequality coefficients extracted from the first stage on the different macro-level indicators. The equation takes the following form:

$$d_{ck} = \omega + \lambda_{ck} M_{ck} + \tau Y_{ck} + \varepsilon_{ck} \quad (3)$$

where d_{ck} is the estimated educational inequality coefficient extracted from Equation 2; M_{ck} is the macro-level indicator under consideration; λ_{ck} is the coefficient of interest estimating the expected variation in the inequality coefficient d_{ck} given one unit change in M_{ck}; Y_{ck} are survey year dummies; and ε_{ck} is the error term. Standard errors are clustered by country. Following King (1997), to account for the uncertainty in the first stage estimates, Equation 3 is based on weighted least squares with weights proportional to the inverse of the squared standard errors for inequality coefficients estimated in Equation 2. In this way, greater weight is given to observations with more precise estimates of the IEI measure d_{ck}.

Correlations between inequality coefficients and each of the macro-level variables are reported in Table S2, online supplement. Out of a total of 153 country-year cohorts *ck*, the final sample with data on all six macro-level indicators is 111 *ck* from 34 countries.[7]

The two-stage approach generates a panel dataset with inequality coefficients at a country-year level, allowing for replicability and investigation of other contextual factors

beyond the analyses presented here. The full dataset including the first stage inequality coefficients and macro indicators will be made available for download in the EUI Research Data repository (see Plavgo 2023). Table A1 offers an excerpt of two countries to illustrate the type of information available in the dataset. The syntax of the second-stage analysis is provided by the authors in supplementary material.

As a robustness check, we also estimate multilevel models combining individual-level data from all available surveys together with macro-level data as an alternative research strategy to the two-stage regression approach. The estimates of the multilevel models are highly consistent with those of the two-stage regressions and are available in Tables S3–S5, supplementary material.

LEVELS AND TRENDS IN INTERGENERATIONAL EDUCATIONAL INEQUALITY

This section presents estimates of levels and trends in IEI in attendance and completion of six grades of primary education by social background in sub-Saharan Africa using pooled data from 40 countries, followed by estimates by country.

Figure 2 graphically plots predicted probabilities in attendance and completion of primary education for children from lower- and higher-SES families across cohorts at the aggregate level, net of gender, age, and country effects. Table A2 shows model estimates. Findings show that over the last decades, children's chances to attend primary education in SSA have become less dependent on families' social background (left-hand panel). The SES gap in attendance decreased by 10 percentage points (p.p.), dropping from 20 p.p. for children born in 1974–1983 to 10 p.p. for those born in 1998–2003. This decline was driven by increasing chances of attendance for lower-SES families, as most higher-SES children already

had access to primary school. This positive trend coincided with a decline in gender differences in attendance (see Table A2).

[Figure 2 about here]

By contrast, inequality in unconditional completion (middle panel) remained high at around 29 p.p. despite educational expansion and partial equalization in attendance. The SES gap marginally declined in the 2000s, but the estimated decline was small at 3 p.p. and not statistically significant (Table A2). Likewise, inequality in completion conditional on attendance (right-hand panel) remained stable and sizeable over the years. For cohorts born between 1974 and 1990 and attending school, the SES gap was approximately 23 p.p. The completion probability for children from lower- and higher-SES families net of gender and age differences on average remained low at around 37 and 60 per cent, respectively. This was to be expected as these cohorts experienced prolonged economic downturn and contraction in educational budgets. A more detailed cohort breakdown shows that conditional completion probability for birth cohorts 1980–1984 decreased compared to earlier cohorts, for all SES groups (Figure A1). Starting from the 1990s, chances to complete lower-level primary education conditional on attendance increased equally steeply for children from lower- and higher-SES families, reaching around 51 and 73 per cent, respectively, for cohorts born in 1998–2003, but the gap between the two groups remained at around 22 p.p.

A more detailed categorization of SES by parental educational attainment shows that the decline in inequality in attendance was driven by 'first generation learners' – children whose parents had not attended school, while SES gaps in completion probability persisted across all parental educational attainment levels (Figure A2, Appendix). Additional sensitivity analyses show that estimated trends are not altered by weighting decisions, model specification,

operationalization, and sample selection. Trends follow the same pattern, whether excluding survey size weights, or using logit models, or excluding the younger age groups, or restricting the sample to 21 countries with time-series data, or excluding several country groups (Figures S1–S7, supplement).

Since aggregate findings inevitably mask country differences, we now turn to country estimates. Maps in Figure 3 report inequality estimates using the latest available surveys for all 40 countries to demonstrate cross-country variation in inequality in the most recent observation period. Figures 4 and 5, in turn, present levels and trends of SES gaps in attendance and unconditional completion for 33 countries with available data for older and younger birth cohorts: those who reached school age during economic recession (1974–1990), and those who were of school age during a period of educational expansion (1991–2003).[8] Countries are ranked in descending order by the level of IEI (panel a) and absolute change in IEI (panel b). Figures A3–A4 in the Appendix report the same for IEI in conditional completion. Note that these are period averages. In some cases, inequality fluctuated within periods, resulting in high confidence intervals in period averages reported here. Online dataset and Table S1 in the supplement report inequality coefficients for all analyzed country-years.

In primary school attendance, the countries with the highest SES gaps are in West and Central Africa, while the lowest SES gaps are in southern Africa (Figure 3). The highest inequality coefficients are in Chad, Burkina Faso, Mali, Niger and Senegal, with gaps between 30 and 43 p.p. for the younger cohorts (Figure 4, panel a). The lowest SES gaps are in Lesotho, Malawi, Namibia, Zambia and Zimbabwe in southern Africa, in Congo and Gabon in central Africa, and Rwanda and Uganda in east Africa, with estimated gaps between 0 and 5 p.p.

[Figure 3 about here]

Echoing the overall trends, inequality by social background in school attendance declined in most countries, especially in Ethiopia, Niger, Mali, Burkina Faso, Benin and Senegal with an estimated decline of 12 to 24 p.p. (Figure 4, panel b). In about one third of the countries, the estimated change was close to zero. These are countries that already had low initial inequality in attendance (Congo, Gabon, Kenya, Namibia and Zimbabwe), and some of the West and Central African countries with persistently high inequality (Cameroon, Central African Republic, Chad, and Nigeria). It should also be noted that children's chances to attend school have not yet equalized. SES gaps remained substantial (above 10 p.p.) in about a half of the countries analyzed.

[Figure 4 about here]

Inequality in completing six grades has a less clear geographical concentration. The highest SES gaps are in West and Central Africa – Benin, Burkina Faso, Cameroon, Chad, Mali, Nigeria, Niger, and Senegal, and in Madagascar and Mozambique, with gaps between 35 and 47 p.p for the younger cohorts. The lowest SES gaps are in Comoros, Lesotho, Liberia, Namibia, Rwanda, Tanzania, Uganda, and Zimbabwe, between 11 and 22 p.p. (Figure 3, right-hand panel; Figure 5, panel a).

In about a half of the 33 countries analyzed, inequality in completing six grades remained stable corresponding with the overall trends. The remaining half are equally divided into countries where inequality declined and those where it increased. The SES gap declined by between 8 and 11 p.p. in Ethiopia, Madagascar, Namibia, and Sierra Leone, while it increased by between 5 and 9 p.p. in Cameroon, Democratic Republic of Congo, Nigeria, Rwanda, and Tanzania (Figure 5, panel b). A decreasing trend in completion inequality (by 5–8 p.p.) is estimated also in Burkina Faso, Comoros, Mali, and Niger, while an increasing trend (by 5–7 p.p.) is observed in Central African Republic, Chad, Congo, Gabon, and

Mozambique, but these estimates have a high level of uncertainty (see supplement for trends by country-year).

[Figure 5 about here]

Overall, while recent educational expansion was accompanied by a reduction in inequality in attendance in almost all cases, trends in inequality in completion went in different directions depending on the country. The latter was observed also for trends in completion conditional on attendance (Figure A4, Appendix). Importantly, there is a large variation in IEI levels in both attendance and completion across countries and cohorts. In the next section, we establish whether this variation is systematic and which contextual factors explain it.

THE ROLE OF NATIONAL CONTEXT IN EXPLAINING VARIATION IN INTERGENERATIONAL EDUCATIONAL INEQUALITY

We now turn to exploring whether and which national contextual factors explain variation in IEI across countries and cohorts. Tables 2–4 report estimates from second-stage regressions where we assess the association between cohort by country measures of IEI and different macro indicators. The dependent variables are the estimated inequality coefficients – SES gaps in attendance (Table 2), completion (Table 3), and completion conditional on attendance (Table 4) – extracted from the first-stage regression at the individual level for each country-year cohort. All continuous macro-level variables are scaled to have a mean of 0 and a standard deviation of 1. Models 1–6 analyze each of the macro indicators separately, while model 7 includes all of them simultaneously.

Model 1 estimates show that, as expected, differences in living conditions are relevant for IEI. Underweight prevalence explains a substantial share of country cohort variation in IEI in attending and completing six years of schooling (R^2 = 0.39-0.50). This share is higher than

for all other analyzed contextual factors. Underweight prevalence higher by one standard deviation (equal to around 8 p.p.) is associated with a higher SES gap by 7 p.p. in attendance, 6 p.p. in completion, and 4 p.p. in completion conditional on attendance. The effect remains when accounting for all other covariates (Model 7). These estimates confirm Hypothesis 1 which predicted material deprivation to be associated with IEI also beyond other factors such as economic development.

Model 2 captures the effect of demographic differences. Higher fertility rates when children were of school age are associated with higher IEI (Hypothesis 2 confirmed), especially for attendance and unconditional completion. A fertility rate higher by one standard deviation (equal to 1 child) is associated with higher IEI coefficients by 4 p.p. in attendance, 5 p.p. in unconditional completion, and 3 p.p. in completion conditional on attendance. For attendance and unconditional completion, the association remains substantial (4 p.p.) and statistically significant ($p<0.10$) also when controlling for other potential pathways that may link fertility with IEI, such as underweight, pupil-teacher ratio, and GDP per capita (Model 7). This corresponds with the theoretical predictions that higher fertility rates dilute family resources and affect demand for education differently for lower- and higher-SES families. Regarding IEI in completion conditional on attendance, the effect declines and loses statistical certainty in the full model. Auxiliary analyses show that the effect is absorbed by the underweight measure. This is not surprising since fertility rates and underweight prevalence are highly correlated (corr.=0.65; Table S2 in supplement).

We now turn to the characteristics of educational systems and their effect on social stratification in education. Estimates from Model 3 show that school fee abolition reforms are associated with lower IEI in attendance, but not in completion (Hypothesis 3 partially confirmed). Cohorts in countries where primary school fees were abolished before or during primary school age are estimated to have a 6 p.p. lower SES gap in school attendance ($p<0.10$).

The effect remains when controlling for all other covariates such as GDP per capita and public spending on education (coef.=-0.05, $p<0.10$). By contrast, school fee abolition is weakly associated with IEI in completion. This was to be expected since the removal of fees addresses direct financial barriers to access school but does not reduce other disparities between social groups that affect school performance and progression.

In line with Hypothesis 4, higher public spending on education is associated with lower IEI in all three measures (Model 4), with a larger negative effect on IEI in completion. The estimated association holds when controlling for most other macro-level covariates, but is absorbed when controlling for fertility rates. Country cohorts with higher fertility rates also tend to spend a smaller percentage of GDP on education (corr.=-0.57; Table S2). This underlines the importance of countries' demographic developments in explaining variation in educational inequality.

Model 5 reveals that the pupil-teacher ratio – a proxy for teaching resources – has no sizeable effect on IEI in attendance and unconditional completion. By contrast, higher pupil-teacher ratio is substantially and statistically significantly associated with higher IEI in completion conditional on attendance. Net of all other covariates, one standard deviation higher pupil-teacher ratio (equal to 13 pupils) is associated with a 3 p.p. higher SES gap in completion among those attending ($p<0.05$). This is in line with Hypothesis 4, implying that teaching resources affect school progression in particular. Although we do not directly measure learning outcomes, this corresponds with previous research which found that school quality plays an important role in social stratification of pupils' scholastic achievement in low-income countries (Gruijters and Behrman 2020; Heyneman and Loxley 1983).

We also test the relationship between economic development and IEI and how it affects other model estimates. Analyses show no relationship between the level of economic development and IEI, whether it is measured by GDP per capita (Model 6) or by share of

urbanization or employment in manufacturing and services (not reported here and available upon request). This result is consistent with previous comparative research identifying a weaker relationship between economic development and SES gaps in educational achievement in lower income countries (Baker, Goesling, and LeTendre 2002; Chmielewski 2019). In the full model (Model 7), GDP has a positive effect on IEI. This suggests that in contexts with equal levels of material deprivation, educational investments and other controlled factors, a higher GDP benefits the educational attainment of high SES children more and enlarges the SES gap in primary school outcomes. Importantly, controlling for GDP per capita (Model 7) does not absorb the estimated associations between IEI and underweight, fertility rates, school fee abolition, government expenditure on education and teaching resources, implying that these national characteristics explain variation in IEI independently from economic development.

[Table 2 about here]

[Table 3 about here]

[Table 4 about here]

CONCLUSIONS

The aim of this paper was to analyze change and country-cohort differences in inequality of educational opportunities by SES during recent educational expansion in sub-Saharan Africa, and to assess the role of the national context in explaining variation in IEI across countries and cohorts.

First, we provided estimates of trends in IEI in primary education in the region for cohorts born between 1974 and 2003, based on a total of 40 countries. Findings revealed that inequality in school attendance declined, while inequality in school completion, both unconditional and conditional on attendance, on average persisted. In the case of attendance, higher-SES children had already reached a level close to saturation in the older cohorts. Further expansion in attendance predominantly by lower SES children led to a decline in inequality in the subsequent cohorts. In the case of completion, saturation is still far from being achieved among children from all SES groups. Expansion occurred with no overall change in inequality in completing six or more grades of primary education, pointing at a tendency for inequality in completion to persist.

Second, we analyzed country differences in levels and trends of IEI and found remarkable variation in both. Regarding changes in inequality across cohorts, the identified aggregate-level persistence in inequality in attaining six years of schooling did not hold for several country cases. We found some notable exceptions where IEI in completion either declined, such as for Ethiopia, Namibia and Sierra Leone, or increased over time, such as for Cameroon, the Democratic Republic of Congo and Tanzania.

Third, we investigated whether the observed variation across countries and cohorts in levels of IEI reflect national contextual differences. Underweight prevalence, fertility rates, school fee abolition reforms, public spending on education and teaching resources explain a considerable share of the country-cohort differences in IEI. Findings imply that it is not so much the level of economic development, but rather the absolute living conditions, demographic developments, school costs, and in the case of IEI in conditional completion also teaching resources that matter for educational opportunities by parental SES in this region.

In the introduction we have motivated the present study arguing that most sociological theory on the relationship between educational expansion and educational inequalities has been

developed in high income countries and that there are very few available studies for SSA, especially for the most recent cohorts exposed to the recent educational expansion. How do our findings stand regarding major theories in social stratification conceived to explain trends and patterns in educational inequality in developed countries?

Our finding that an equalization in attendance has occurred driven by an increase in school participation of low SES students when already almost all high SES students were attending, is line with the prediction of MMI thesis that equalization at a given level of education can be achieved when high SES students are close to a saturation level in attainment (Raftery and Hout 1993).

At the same time, more recently a consensus in studies of trends in educational inequalities in developed countries has emerged on the relevance of contextual and institutional factors to explain the reduction of IEI at the lower levels of educational attainment and cross-country differences in patterns of educational inequality (Barone and Ruggera 2018; Breen et al. 2009). Our results for SSA confirm that contextual and institutional factors matter for levels of IEI. Our findings also point to environmental conditions specific to SSA such as malnutrition, high fertility levels and classroom overcrowding that, if not taken into consideration, undermine any understanding of IEI in this region. Contextual factors associated to lower levels of IEI vary somewhat depending on whether we consider inequality in attendance or completion. A large share of variation in IEI in school attendance in our study is explained by material deprivation, fertility rates and school tuition fees. At the same time national teaching resources (and material deprivation) seem to be particularly relevant for explaining variation in IEI in completion among those attending.

Over the analyzed period in SSA, financial barriers to access primary education were partially removed and fertility rates somewhat declined leading to moderate improvements in disposable household resources. Health and nutritional outcomes on average improved.

Despite these improvements, the identified trends suggest that while inequality in attending primary education declined, the demographic and institutional changes in most country cases were not sufficient to produce any sizeable declining trend in inequality in completing six grades of primary school.

Some exceptions include Namibia and Sierra Leone where primary school enrolments increased and inequality in completion declined. In both cases, according to our macro-data, material deprivation and fertility rates decreased, and pupil-teacher ratio remained relatively low at 30–32 pupils per teacher on average. In other country cases, such as Cameroon and the Democratic Republic of Congo, IEI in completion increased. In these cases, while school enrolments increased, pupil-teacher ratio was high and public expenditure on education remained low, below 3 per cent of GDP, coupled with high levels of material deprivation. Overall, child poverty, classroom overcrowding and other school quality issues are worrisome in most of the SSA countries analyzed, and are likely to negatively affect learning outcomes.

An important policy implication from our analyses is that reduction of material deprivation and higher public investments in school and teaching resources are key for reducing inequality in primary school completion in this region. The idea that equalization in school attendance has led to an educational bottleneck for completion suggests focusing on inequality in learning as a line of future research. Following arguments by Baker, Goesling, and LeTendre (2002), expanding school access to an increasingly diverse student population may increase scholastic achievement inequality. Based on our findings, this should vary depending on the national context and indeed can be expected, particularly at higher levels of material deprivation and lower levels of adequate teaching resources.

Studying trends in learning outcomes was beyond the scope of this research, also because the data we have analyzed do not have information on pupils' cognitive outcomes. If

poor learning disproportionately affected children from low SES families, it can be expected that an increase of inequality in learning outcomes did indeed occur, creating a learning bottleneck at further educational transitions. An important next step in unpacking inequality of educational opportunities in SSA is to study trends in inequality in learning outcomes and in accessing post-primary educational levels, since learning bottlenecks in primary education might affect children's chances to transit to secondary school and other life outcomes.

RESEARCH ETHICS STATEMENT

The research did not constitute human subjects research. The data used in the study consisted of de-identified datasets. Permission for data usage was granted by DHS Program (https://dhsprogram.com/) and UNICEF MICS (http://mics.unicef.org/).

ENDNOTES

[1] DHS are implemented with technical assistance from ICF International through the USAID-funded DHS Program (https://dhsprogram.com/). MICS are carried out in collaboration with UNICEF (http://mics.unicef.org/).

[2] The sample is restricted to children living with biological parent(s) or being related to the household head. Children with the following relationship to the head were excluded (4.8% of the sample): spouse, domestic servant, not related, missing. Note that this is likely to introduce a downward bias in inequality estimates. According to two-sample t-tests, the excluded children are significantly less likely to have attended and completed primary school. The findings should thus be regarded as conservative since the most disadvantaged children are not captured. A further 1.02 per cent of the sample were excluded due to missing data on schooling.

[3] One exception is Madagascar where completion of basic education is defined as having completed five grades to match primary school duration. Note that the choice of six grades as a threshold is only a proxy for primary school completion since in a handful of countries in SSA, primary school duration is eight years (UNESCO 2020).

[4] Where both parents are present, following the dominance principle parental educational attainment is mostly determined by that of fathers due to their higher educational attainment. Mothers have a higher educational attainment only for 5 per cent of the analytical sample with both parents in household. When father is not present, only mother's education is considered, which is the case for 16 per cent of the sample.

[5] We have also used a more restrictive cut-off for the timing of school fee abolition reforms, assigning a value of 1 for cohorts for whom fees were abolished prior to or at school entry age, and 0 otherwise. Estimates were highly similar and are available upon request.

[6] Countries excluded: Comoros, Gabon, Nigeria, Somalia, South Sudan, Sudan (20 country cohorts). Exclusion primarily due to missing information regarding public spending on

education, followed by underweight. An additional 22 country cohorts were excluded due to missing information for some but not all of the observed time periods per country. Most of the time periods with missing information on contextual factors are from the 1980s and 1990s.

[7] Two-sample t-tests were performed comparing mean inequality coefficients between the final sample (111 *ck*) and the excluded sample (42 *ck*). For inequality in attendance, differences are small and are not statistically distinguishable from 0. For inequality in completion, the final sample has a slightly higher mean coefficient (Difference 0.04; p-value 0.02). See syntax of second-stage analysis in supplementary material for more detail.

[8] Exceptions with different cut-offs: Guinea-Bissau (1992), Liberia (1993).

REFERENCES

Alesina, Alberto, Sebastian Hohmann, Stelios Michalopoulos, and Elias Papaioannou. 2019. "Intergenerational Mobility in Africa." *National Bureau of Economic Research*.

Azomahou, Theophile T., and Eleni Abraham Yitbarek. 2016. "Intergenerational Education Mobility in Africa: Has Progress Been Inclusive?" *Policy Research Working Paper 7843* World Bank Development Research Group.

Baker, David P., Brian Goesling, and Gerald K. LeTendre. 2002. "Socioeconomic Status, School Quality, and National Economic Development: A Cross-National Analysis of the 'Heyneman-Loxley Effect' on Mathematics and Science Achievement." *Comparative Education Review* 46(3):291–312.

Ballarino, Gabriele, Fabrizio Bernardi, Miguel Requena, and Hans Schadee. 2009. "Persistent Inequalities? Expansion of Education and Class Inequality in Italy and Spain." *European Sociological Review* 25(1):123–38.

Barone, Carlo, and Lucia Ruggera. 2018. "Educational Equalization Stalled? Trends in Inequality of Educational Opportunity between 1930 and 1980 across 26 European Nations." *European Societies* 20(1):1–25.

Becker, Rolf. 2003. "Educational Expansion and Persistent Inequalities of Education: Utilizing Subjective Expected Utility Theory to Explain Increasing Participation Rates in Upper Secondary School in the Federal Republic of Germany." *European Sociological Review* 19(1):1–24.

Bennell, Paul. 2002. ''Hitting the Target: Doubling Primary School Enrollments in Sub-Saharan Africa by 2015.'' *World Development* 30(7):1179–1194.

Bernardi, Fabrizio, and Gabriele Ballarino. 2014. "Participation, Equality of Opportunity and Returns to Tertiary Education in Contemporary Europe." *European Societies* 16(3):422–42.

Bhalotra, Sonia, Kenneth Harttgen, and Stephan Klasen. 2015. "The Impact of School Fees on Schooling Outcomes and the Intergenerational Transmission of Education." *Background Paper Commissioned for the Education for All Global Monitoring Report 2013/14, Teaching and Learning: Achieving Quality for All*.

Blossfeld, HansPeter, and Yossi Shavit. 1993. "Persisting Barriers. Changes in Educational Opportunities in Thirteen Countries." Pp. 1–23 in *Persistent Inequality*, edited by Y. Shavit and H. Blossfeld. Boulder, Colorado: Westview Press.

Bongaarts, John, and John Casterline. 2013. "Fertility Transition: Is Sub-Saharan Africa Different?" *Population and Development Review* 38:153–68.

Boudon, Raymond. 1974. *Education, Opportunity, and Social Inequality: Changing Prospects in Western Society*. New York: Wiley.

Breen, Richard, and John H. Goldthorpe. 1997. "Explaining Educational Differentials: Towards a Formal Rational Action Theory." *Rationality and Society* 9(3):275–305.

Breen, Richard, Kristian Bernt Karlson, and Anders Holm. 2018. "Interpreting and Understanding Logits, Probits, and Other Nonlinear Probability Models." *Annual Review of Sociology* 44(1):39–54.

Breen, Richard, Ruud Luijkx, Walter Müller, and Reinhard Pollak. 2009. "Nonpersistent Inequality in Educational Attainment: Evidence from Eight European Countries." *American Journal of Sociology* 114(5):1475–1521.

Buchmann, Claudia, Thomas A. DiPrete, and Anne McDaniel. 2008. "Gender Inequalities in Education." *Annual Review of Sociology* 34:319–37.

Caldwell, John C., I. O. Orubuloye, and Pat Caldwell. 1992. "Fertility Decline in Africa: A New Type of Transition?" *Population and Development Review* 18(2):211–42.

Chmielewski, Anna K. 2019. "The Global Increase in the Socioeconomic Achievement Gap, 1964 to 2015." *American Sociological Review* 84(3):517–44.

Cunha, Flavio, and James Heckman. 2007. "The Technology of Skill Formation." *The American Economic Review* 97(2):31–47.

Erikson, Robert, and Jan O. Jonsson. 1996. *Can Education Be Equalized?: The Swedish Case in Comparative Perspective*. Boulder, Colorado: Westview Press.

Feinstein, Leon, Kathryn Duckworth, and Ricardo Sabates. 2004. *A Model of the Inter-Generational Transmission of Educational Success*. London: Centre for Research on the Wider Benefits of Learning, Institute of Education.

Fink, Günther, and Peter C. Rockers. 2014. "Childhood Growth, Schooling, and Cognitive Development: Further Evidence from the Young Lives Study." *The American Journal of Clinical Nutrition* 100(1):182–88.

Foster, Philip. 1980. "Education and Social Inequality in Sub-Saharan Africa." *The Journal of Modern African Studies* 18(2):201–36.

Gordon, David, Shailen Nandy, Christina Pantazis, Simon Pemberton, and Peter Townsend. 2003. *Child Poverty in the Developing World*. Bristol: The Policy Press.

Gruijters, Rob J., and Julia A. Behrman. 2020. "Learning Inequality in Francophone Africa: School Quality and the Educational Achievement of Rich and Poor Children." *Sociology of Education* 93(3):256–76.

Harding, Robin, and David Stasavage. 2013. "What Democracy Does (and Doesn't Do) for Basic Services: School Fees, School Inputs, and African Elections – Supplementary Materials." *The Journal of Politics* 76(1):1–11.

Hertel, Florian R., and Olaf Groh-Samberg. 2019. "The Relation between Inequality and Intergenerational Class Mobility in 39 Countries." *American Sociological Review* 84(6):1099–1133.

Heyneman, Stephen P., and William A. Loxley. 1983. "The Effect of Primary-School Quality on Academic Achievement across Twenty-Nine High-and Low-Income Countries." *American Journal of Sociology* 88(6):1162–94.

King, Gary. 1997. *A Solution to the Ecological Inference Problem: Reconstructing Individual Behavior from Aggregate Data*. Princeton, NJ: Princeton University Press.

KNBS and UNICEF. 2017. *Child Poverty in Kenya: A Multidimensional Approach*. Nairobi: Kenya National Bureau of Statistics.

Lewin, Keith M., and Ricardo Sabates. 2012. "Who Gets What? Is Improved Access to Basic Education pro-Poor in Sub-Saharan Africa?" *International Journal of Educational Development* 32(4):517–28.

Lloyd, Cynthia B., Carol E. Kaufman, and Paul Hewett. 2000. "The Spread of Primary Schooling in sub-Saharan Africa: Implications for Fertility Change." *Population and Development Review* 26(3):483–515.

Longwe, Abiba, and Jeroen Smits. 2012. "Family Planning Outcomes and Primary School Attendance in sub-Saharan Africa." *Studies in Family Planning* 43(2):127–34.

de Milliano, Marlous, and Ilze Plavgo. 2018. "Analysing Multidimensional Child Poverty in sub-Saharan Africa: Findings Using an International Comparative Approach." *Child Indicators Research* 11(3):805–33.

Mood, C. 2010. "Logistic Regression: Why We Cannot Do What We Think We Can Do, and What We Can Do About It." *European Sociological Review* 26(1):67–82.

Mundy, Karen, and Caroline Manion. 2015. "The Education for All Initiative: History and Prospects Post-2015." Pp. 49–68 in *Education and International Development: An Introduction*, edited by T. McCowan and E. Unterhalter. Bloomsbury Publishing.

Plavgo, Ilze. 2021. *Education for All, Graduation for Some: Trends and Determinants of Intergenerational Educational Inequality in sub-Saharan Africa*. EUI PhD Theses. Florence: European University Institute. https://hdl.handle.net/1814/70413

Plavgo, Ilze. 2023. "Intergenerational Educational Inequality in sub-Saharan Africa Dataset." EUI Research Data.

Raftery, Adrian E., and Michael Hout. 1993. "Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education, 1921–75." *Sociology of Education* 66(1):41–62.

Reimers, Fernando. 1994. "Education and Structural Adjustment in Latin America and sub-Saharan Africa." *International Journal of Educational Development* 14(2):119–29.

Tomasevski, Katarina. 2006. "Free or Fee: 2006 Global Report." *The State of the Right to Education Worldwide.* Copenhagen.

Torche, Florencia. 2010. "Economic Crisis and Inequality of Educational Opportunity in Latin America." *Sociology of Education* 83(2):85–110.

UN. 2015. *The Millennium Development Goals Report 2015*. New York: United Nations.

UNESCO. 2015. *Education for All 2000 - 2015: Achievements and Challenges*. 1. ed. Paris: Unesco Publications.

UNESCO. 2020. "UIS Statistics." *UNESCO Institute for Statistics*. Retrieved November 4, 2018 (http://data.uis.unesco.org/?ReportId=163#).

UNESCO. 2023. "World Inequality Database on Education (WIDE)." Retrieved January 8, 2023 (https://www.education-inequalities.org/).

UNESCO UIS. 2011. *Financing Education in sub-Saharan Africa: Meeting the Challenges of Expansion, Equity and Quality*. UNESCO Institute for Statistics. doi: 10.15220/978-92-9189-079-2-en.

WHO. 2010. *Nutrition Landscape Information System (NLIS): Country Profile Indicators: Interpretation Guide*. Geneva: World Health Organization.

World Bank. 2020. "World Development Indicators." Retrieved February 20, 2020 (http://databank.worldbank.org/data/source/world-development-indicators/preview/on).

World Bank and UNICEF. 2009. "Abolishing School Fees in Africa. Lessons from Ethiopia, Ghana, Kenya, Malawi, and Mozambique." The World Bank: Washington DC.

Table 1. Descriptive statistics of individual- and macro-level variables before transformation

	N	Mean	Standard Deviation	Min	Max
INDIVIDUAL LEVEL (children aged 14–16)[a]					
Child's education					
Ever attended primary school	541,856	0.83			
Completed 6 or more grades	541,856	0.46			
Completed 6 or more grades if attended	450,801	0.55			
Family's socioeconomic status (SES)					
Parent/caretaker completed 6 or more grades	541,856	0.40			
Individual characteristics					
Male (ref. female)	541,856	0.52			
Age	541,856	14.9			
COUNTRY-COHORT LEVEL (40 countries, 153 surveys)[b]					
Material deprivation					
Underweight (% of children under 5)	135	22.4	8.1	8.0	45.3
Demographic developments					
Fertility rate	153	5.7	1.0	3.3	7.8
Educational/institutional characteristics					
Primary school fee abolition reform[c]	153	0.24			
Public spending on education (% GDP)	128	3.9	1.8	1.4	11.3
Pupil-teacher ratio (primary)	144	46.7	12.5	24.5	94.5
Economic development					
GDP per capita, PPP (constant int. $)	150	2,261	2,354	386	19,740

Sources: [a] Authors' calculations based on DHS and MICS surveys
[b] Authors' calculations based on World Bank DataBank (World Bank 2020)
[c] Harding & Stasavage (2013); Tomasevski (2006); others (Dabanga Sudan, Gabonews, UNICEF Somalia)
Acronyms: GDP = Gross Domestic Product; N = Number of observations

Table 2: Association between national characteristics and inequality in attending primary education

	M1	M2	M3	M4	M5	M6	M7
Underweight	0.07**						0.07**
	[0.02]						[0.02]
Fertility rate		0.04+					0.04+
		[0.02]					[0.02]
School fee abolition			-0.06+				-0.05+
			[0.03]				[0.02]
Education spending				-0.02*			0.00
				[0.01]			[0.01]
Pupil-teacher ratio					-0.01		0.00
					[0.01]		[0.01]
GDP per capita (log)						0.01	0.04*
						[0.01]	[0.02]
Survey year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.17***	0.17***	0.20***	0.13***	0.13***	0.15***	0.26***
	[0.01]	[0.02]	[0.03]	[0.01]	[0.01]	[0.00]	[0.05]
R-squared	0.50	0.34	0.32	0.29	0.26	0.25	0.64
N (surveys)	111	111	111	111	111	111	111

Notes: ***$p < .001$; ** $p < .01$; * $p < .05$; + $p < .10$ (two-tailed)
All continuous indicators are measured with a lag, as an average of 8 years before survey data was collected corresponding to school age. Indicators are standardized to have a mean of 0 and a standard deviation of 1.

Table 3: Association between national characteristics and inequality in completing six grades of primary education (unconditional on attendance)

	M1	M2	M3	M4	M5	M6	M7
Underweight	0.06***						0.05**
	[0.01]						[0.02]
Fertility rate		0.05**					0.04+
		[0.01]					[0.02]
School fee abolition			-0.03				-0.01
			[0.03]				[0.03]
Education spending				-0.04**			-0.01
				[0.01]			[0.02]
Pupil-teacher ratio					0.01		0.02
					[0.01]		[0.01]
GDP per capita (log)						0.00	0.05*
						[0.01]	[0.02]
Survey year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.26***	0.28***	0.27***	0.21***	0.24***	0.23***	0.33***
	[0.01]	[0.01]	[0.03]	[0.01]	[0.01]	[0.00]	[0.05]
R-squared	0.41	0.37	0.22	0.31	0.20	0.20	0.56
N (surveys)	111	111	111	111	111	111	111

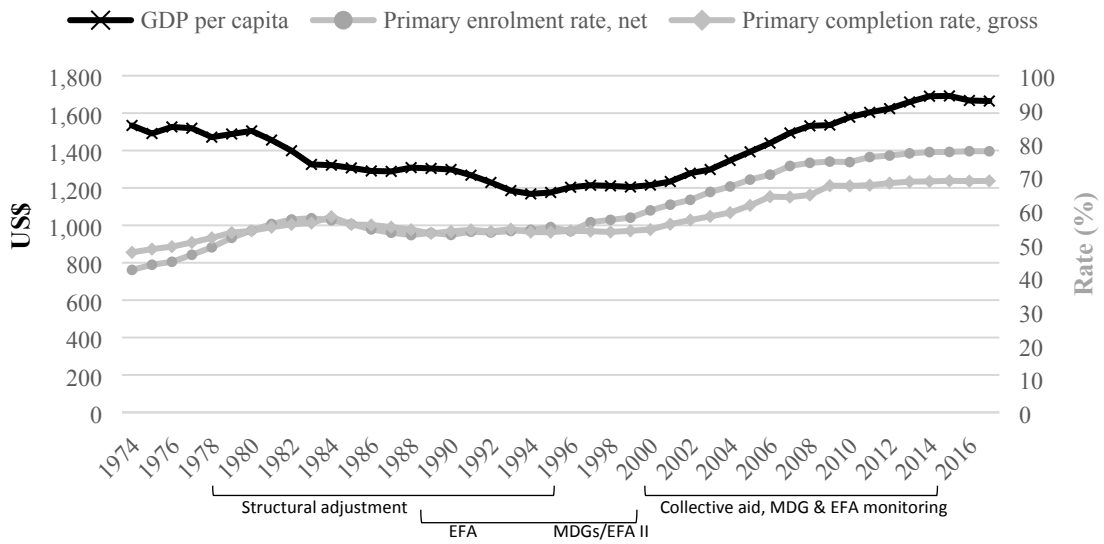
Notes: ***$p < .001$; ** $p < .01$; * $p < .05$; + $p < .10$ (two-tailed)

Table 4: Association between national characteristics and inequality in completing six grades of primary education, conditional on attendance

	M1	M2	M3	M4	M5	M6	M7
Underweight	0.04**						0.04**
	[0.01]						[0.01]
Fertility rate		0.03**					0.01
		[0.01]					[0.02]
School fee abolition			0.00				0.01
			[0.02]				[0.02]
Education spending				-0.03**			-0.01
				[0.01]			[0.01]
Pupil-teacher ratio					0.02**		0.03*
					[0.01]		[0.01]
GDP per capita (log)						-0.01	0.03+
						[0.01]	[0.02]
Survey year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.15***	0.16***	0.13***	0.12***	0.16***	0.13***	0.19***
	[0.00]	[0.01]	[0.02]	[0.01]	[0.01]	[0.00]	[0.04]
R-squared	0.39	0.38	0.28	0.38	0.34	0.29	0.52
N (surveys)	111	111	111	111	111	111	111

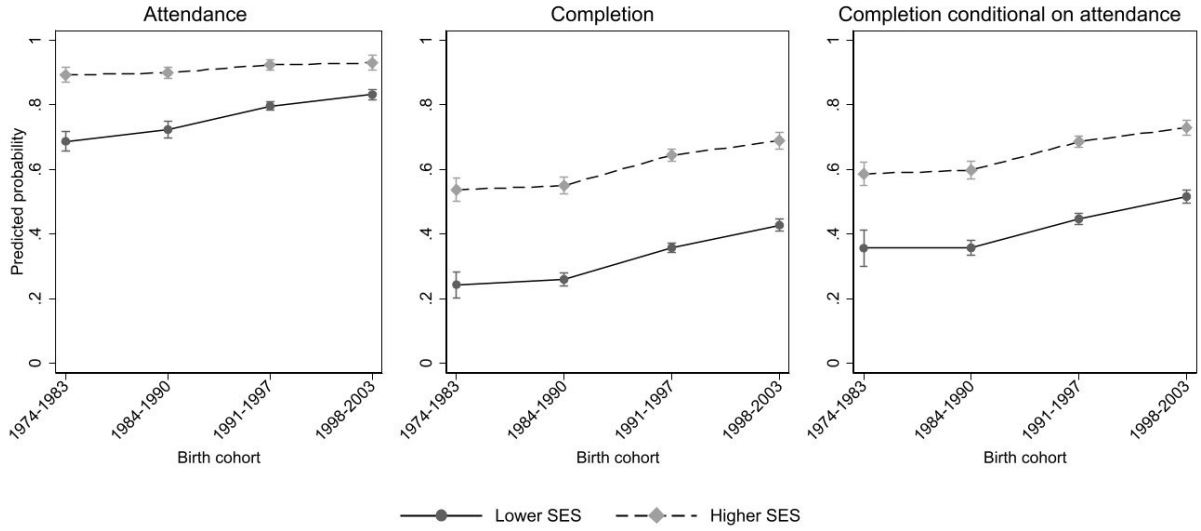
Notes: ***$p < .001$; ** $p < .01$; * $p < .05$; + $p < .10$ (two-tailed)

Figure 1. Economic development and educational expansion in sub-Saharan Africa, 1974–2017



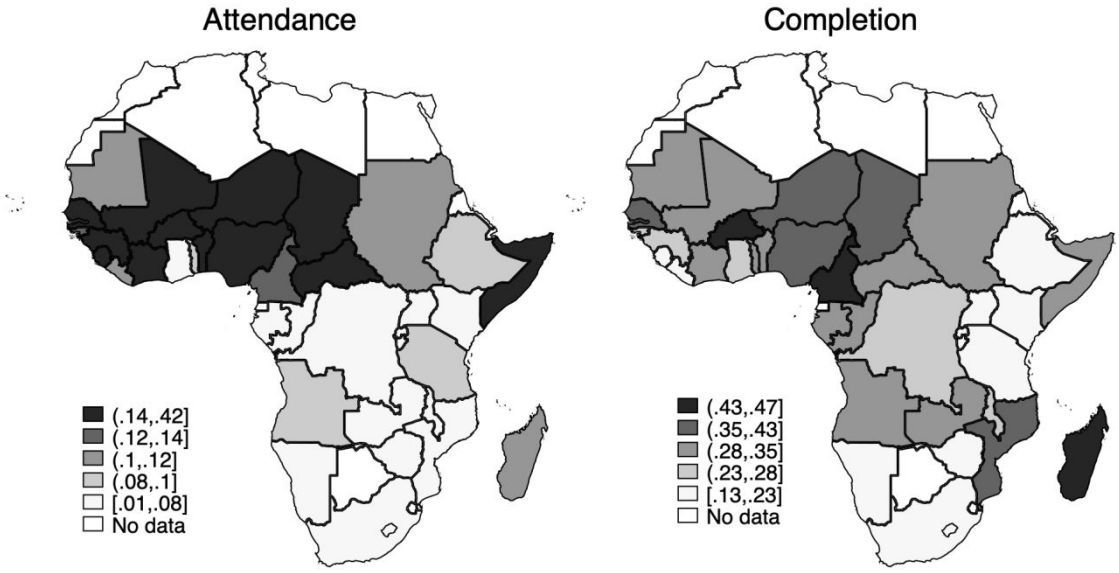
Source: Author's elaboration, data retrieved from World Bank DataBank (2020)
Acronyms: GDP = Gross Domestic Product; EFA = Education for All; MDGs = Millennium Development Goals

Figure 2. Trends by SES in predicted probabilities to attend primary education and complete six grades for birth cohorts 1974–2003 in sub-Saharan Africa



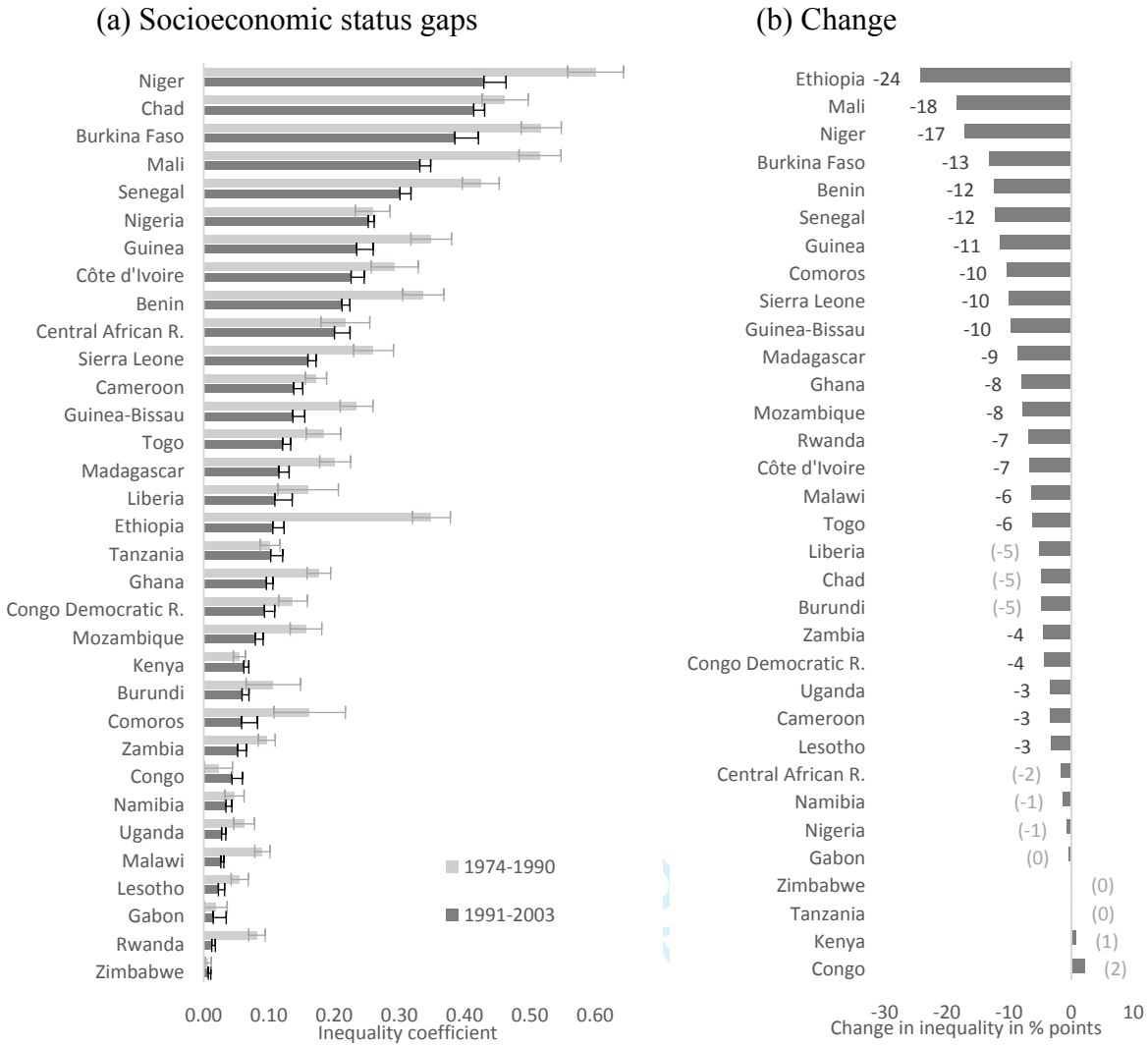
Notes: Predicted probabilities by socioeconomic status (SES) from linear probability models with controls for gender, age, and country fixed effects. Pooled data from 153 DHS/MICS surveys from 1990 to 2017 in 40 countries in sub-Saharan Africa. Clustered by household, country, and survey year

Figure 3. Cross-country variation in intergenerational educational inequality in sub-Saharan Africa



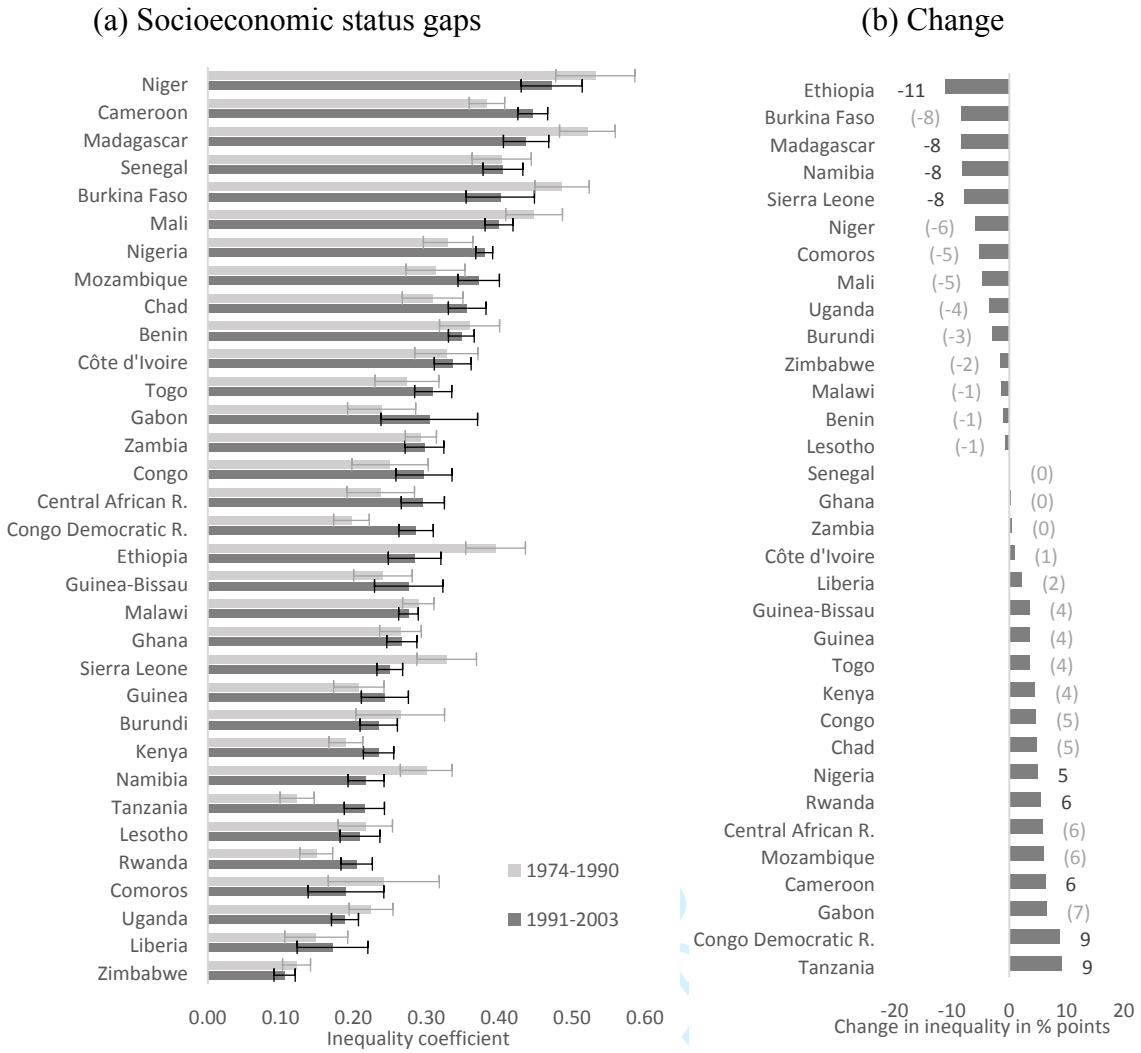
Note: numbers represent inequality coefficients –estimated socioeconomic status gaps, in percentage points
Source: Authors' calculations based on the latest DHS/MICS surveys in 40 countries in sub-Saharan Africa. Completion not conditional on attendance. See Figure A3 for IEI in completion conditional on attendance.

Figure 4. Inequality in attendance by country for birth cohorts 1974–1990 and 1991–2003



Note: Panel b estimates in brackets (in grey) indicate that confidence intervals overlap.

Figure 5. Inequality in completion by country for birth cohorts 1974–1990 and 1991–2003



Note: Panel b estimates in brackets (in grey) indicate that confidence intervals overlap.
Completion not conditional on attendance. See Figure A4 for IEI in completion conditional on attendance.

APPENDIX

Table A1. Estimated inequality coefficients and macro-level indicators for country cohorts by survey year: illustration of the dataset for the second-stage analysis for two countries

Country	Survey	Year	Birth cohort	Obs.	SES: high, % of total	Attendance: % of total	Ineq coef	Squared standard error	Completion: % of total	Ineq coef	Conditional completion: % of total	Ineq coef	Under-weight	Fertility rate	School fee abolition	Public spending on education (%GDP)	Pupil-teacher ratio	GDP per capita PPP$
Ethiopia	DHS	2000	1985	4,652	0.10	0.50	0.42	0.00063	0.12	0.41	0.24	0.39	41.9	6.9	No	2.6	35.3	581
	DHS	2005	1990	4,456	0.13	0.70	0.26	0.00028	0.20	0.37	0.29	0.34	42.0	6.4	1994	3.5	52.4	626
	DHS	2011	1996	4,631	0.18	0.87	0.12	0.00011	0.32	0.33	0.37	0.30	34.6	5.5	1994	5.1	58.1	830
	DHS	2016	2001	4,635	0.20	0.90	0.09	0.00017	0.37	0.23	0.42	0.21	27.2	4.7	1994	4.9	57.3	1,207
Ghana	DHS	1993	1978	1,307	0.43	0.85	0.21	0.00029	0.64	0.29	0.75	0.15	24.8	5.8	No	3.3	26.1	1,957
	DHS	1998	1983	1,357	0.52	0.90	0.16	0.00024	0.68	0.25	0.76	0.14	25.8	5.3	No		30.1	2,031
	DHS	2003	1988	1,660	0.52	0.90	0.15	0.00023	0.58	0.27	0.65	0.19	20.3	4.9	No	4.7	31.9	2,203
	MICS	2006	1991	1,848	0.55	0.90	0.17	0.00028	0.62	0.30	0.69	0.21	19.6	4.7	No	6.1	32.0	2,338
	DHS	2008	1993	3,089	0.60	0.94	0.11	0.00010	0.65	0.30	0.70	0.24	16.4	4.6	No	6.2	32.7	2,448
	MICS	2011	1996	3,713	0.56	0.96	0.07	0.00004	0.66	0.24	0.68	0.20	15.7	4.4	No	6.1	32.7	2,689
	DHS	2014	1999	2,875	0.57	0.97	0.05	0.00005	0.67	0.24	0.69	0.21	13.9	4.3	2005	6.2	32.6	3,120

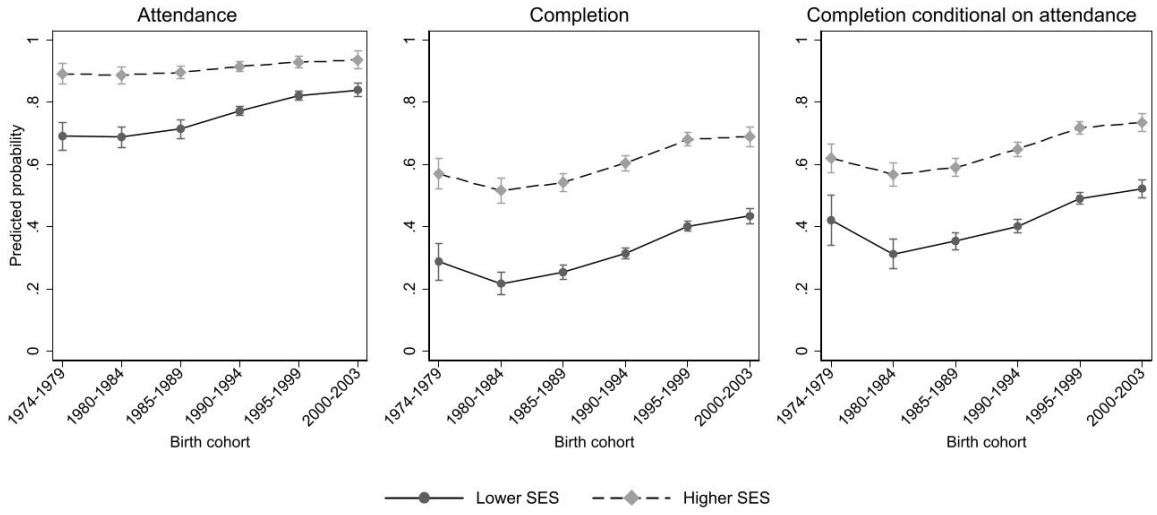
Notes: DHS = Demographic and Health Survey; MICS = Multiple Indicator Cluster Survey; Obs. = number of observations (children aged 14–16); SES = socioeconomic status; Ineq coef = inequality coefficient.

Table A2. Linear probability model estimates for the probability of primary school attendance and completion of six or more grades in sub-Saharan Africa, birth cohorts 1974–2003

	Ever attended school		Completed at least 6 grades		Completed at least 6 grades conditional on attendance	
	Coef.	[SE]	Coef.	[SE]	Coef.	[SE]
SES (1 if high)	0.21***	[0.02]	0.29***	[0.02]	0.23***	[0.02]
Male	0.08***	[0.01]	0.00	[0.01]	-0.04***	[0.01]
Age	0.01***	[0.00]	0.09***	[0.00]	0.11***	[0.00]
Cohort						
C1: 1974–1983 (omitted)						
C2: 1984–1990	0.05*	[0.02]	0.03	[0.03]	0.01	[0.03]
C3: 1991–1997	0.13***	[0.02]	0.12***	[0.03]	0.09**	[0.03]
C4: 1998–2003	0.18***	[0.02]	0.20***	[0.03]	0.16***	[0.03]
SES x Cohort						
SES x C1 (omitted)						
SES x C2	-0.03	[0.03]	-0.00	[0.02]	0.01	[0.02]
SES x C3	-0.08**	[0.03]	-0.01	[0.02]	0.01	[0.02]
SES x C4	-0.11***	[0.03]	-0.03	[0.02]	-0.02	[0.02]
Male x Cohort						
Male x C1 (omitted)						
Male x C2	-0.03	[0.02]	-0.02	[0.02]	-0.01	[0.01]
Male x C3	-0.04**	[0.01]	-0.02	[0.01]	0.01	[0.01]
Male x C4	-0.06***	[0.01]	-0.03	[0.02]	0.00	[0.01]
Constant	0.70***	[0.02]	0.19***	[0.02]	0.29***	[0.03]
Number of observations	541,856		541,856		450,801	
R-squared	0.23		0.24		0.20	

Source: pooled data from 153 DHS/MICS surveys (survey year: 1990–2017), 40 countries.
Notes: Standard errors clustered by household, country, and survey year. Controls not presented: country dummies.
P-test: *** $p < .001$; ** $p < .01$; * $p < .05$ (two-tailed).
Abbreviations: Coef. = coefficient; SE = standard error; SES = socioeconomic status (parental education)

Figure A1. Trends of the probability of attendance and completion by socioeconomic status: birth cohorts grouped into half-decades



Notes: Predicted probabilities by socioeconomic status (SES) from linear probability models with controls for gender, age, and country fixed effects. Pooled data from 153 DHS/MICS surveys from 1990 to 2017 in 40 countries in sub-Saharan Africa. Clustered by household, country, and survey year.

Figure A2. Trends of the probability of attendance and completion by socioeconomic status: four categories of parental education

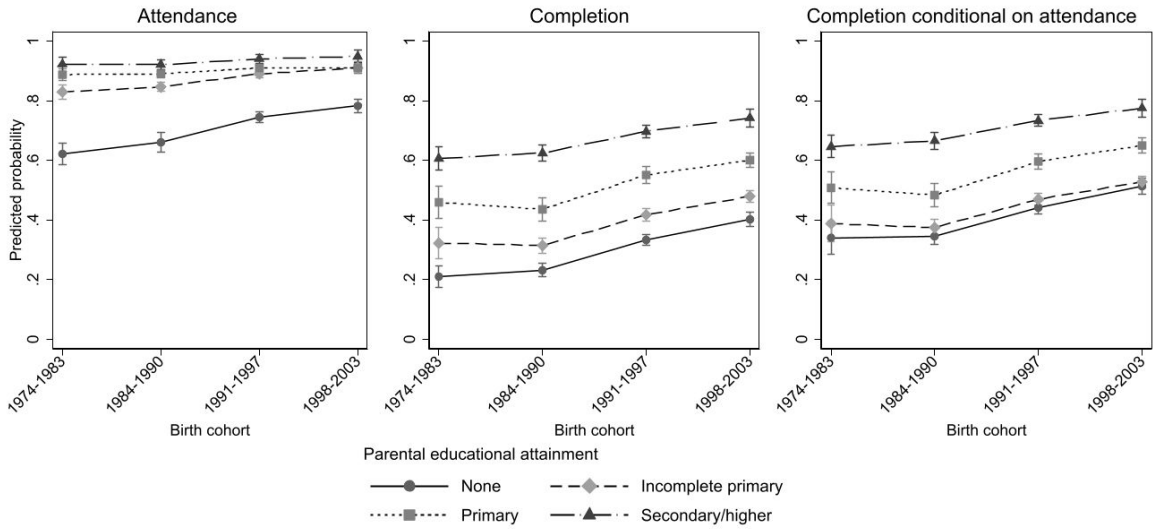
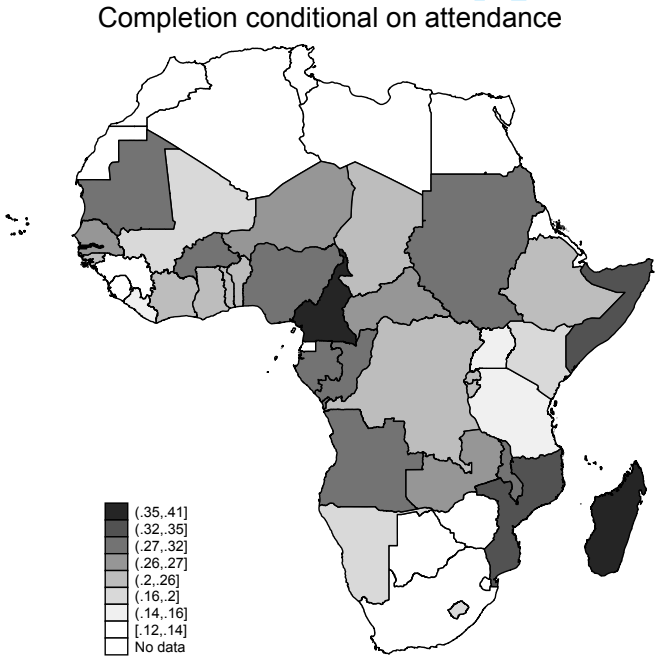
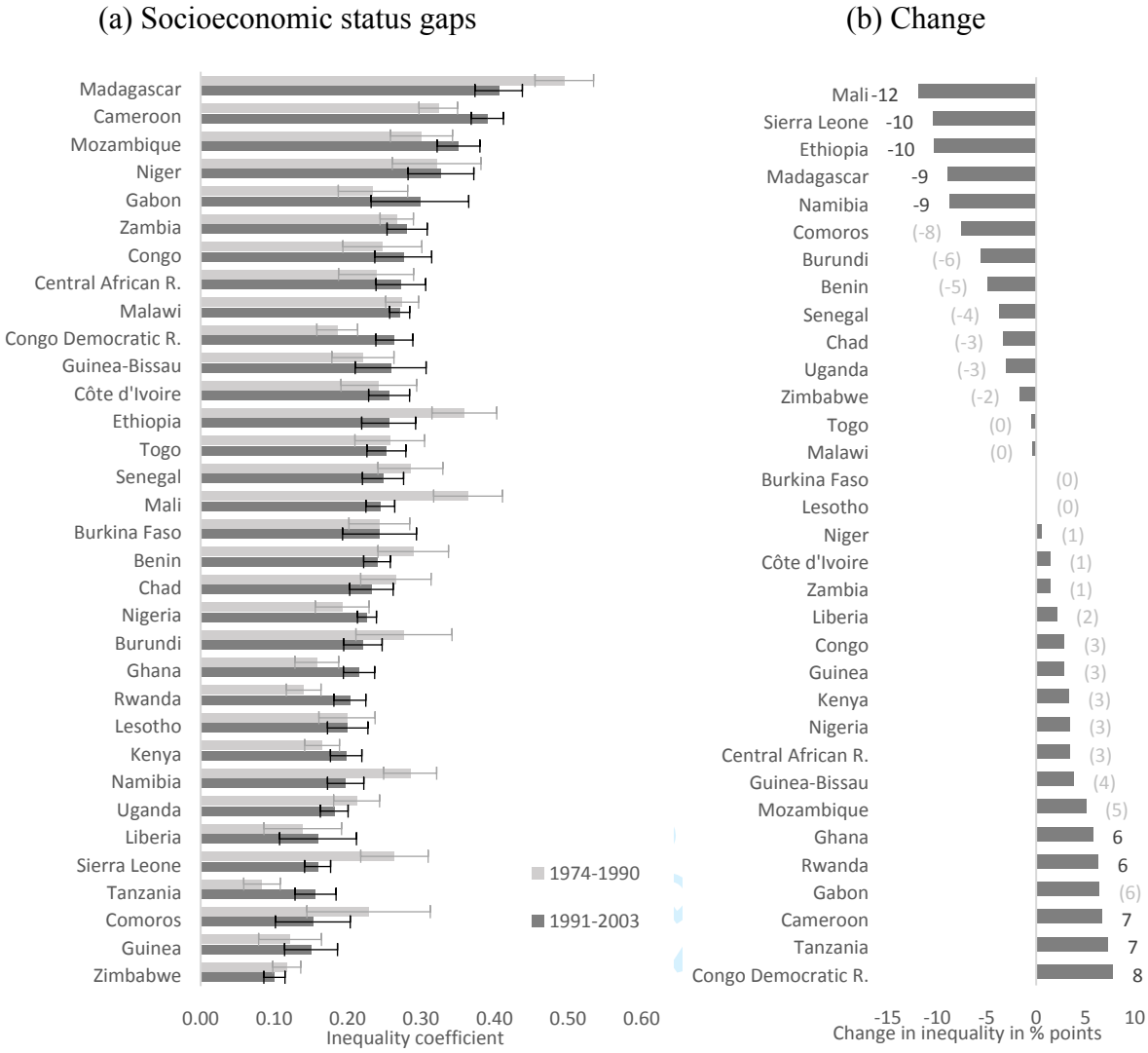


Figure A3. Cross-country variation in IEI in sub-Saharan Africa



Note: numbers represent inequality coefficients – estimated socioeconomic status gaps, in percentage points

Figure A4. Inequality in completion conditional on attendance by country for birth cohorts 1974–1990 and 1991–2003



Note: Panel b estimates in brackets (in grey) indicate that confidence intervals overlap.

Trends and determinants of intergenerational educational inequality in sub-Saharan Africa for birth cohorts 1974–2003

Supplementary material

Table S1. Summary statistics of data sources, educational outcomes and estimated inequality coefficients for country cohorts by survey year

Country	ID	Survey	Year	Birth cohort	SES	Attendance		Completion		Conditional completion		Obs.
					High %	%	ineq coef	%	ineq coef	%	ineq coef	#
Angola	AO	DHS	2015	2000	0.54	0.93	0.09	0.51	0.34	0.55	0.32	4,295
Benin	BJ	DHS	1996	1981	0.18	0.58	0.37	0.20	0.37	0.35	0.33	1,537
	BJ	DHS	2001	1986	0.25	0.67	0.30	0.31	0.33	0.45	0.25	1,595
	BJ	DHS	2006	1991	0.25	0.75	0.25	0.47	0.39	0.63	0.27	5,261
	BJ	DHS	2012	1997	0.27	0.77	0.22	0.56	0.32	0.73	0.19	5,429
	BJ	MICS	2014	1999	0.24	0.83	0.16	0.51	0.33	0.61	0.26	4,546
Burkina Faso	BF	DHS	1993	1978	0.09	0.34	0.52	0.21	0.50	0.61	0.27	2,156
	BF	DHS	1999	1984	0.09	0.33	0.56	0.19	0.56	0.57	0.34	1,964
	BF	DHS	2003	1988	0.10	0.39	0.49	0.24	0.45	0.63	0.19	4,036
	BF	MICS	2006	1991	0.14	0.46	0.39	0.26	0.31	0.56	0.14	2,710
	BF	DHS	2010	1995	0.11	0.55	0.39	0.30	0.47	0.54	0.31	4,627
Burundi	BU	MICS	2005	1990	0.08	0.83	0.11	0.09	0.26	0.11	0.28	3,436
	BU	DHS	2010	1995	0.22	0.92	0.06	0.23	0.21	0.25	0.20	2,864
	BU	DHS	2016	2001	0.31	0.95	0.05	0.40	0.22	0.42	0.21	4,962
Central African	CF	DHS	1994	1979	0.27	0.76	0.22	0.13	0.24	0.17	0.24	1,571
Republic (CAR)	CF	MICS	2006	1991	0.45	0.80	0.22	0.22	0.25	0.28	0.24	2,793
	CF	MICS	2010	1995	0.55	0.86	0.17	0.40	0.30	0.47	0.27	2,737
Cameroon	CM	DHS	1991	1976	0.34	0.85	0.20	0.47	0.32	0.55	0.24	1,226
	CM	DHS	1998	1983	0.45	0.88	0.19	0.45	0.40	0.51	0.34	1,494
	CM	DHS	2004	1989	0.55	0.92	0.15	0.52	0.40	0.56	0.35	3,263
	CM	MICS	2006	1991	0.55	0.94	0.13	0.55	0.44	0.59	0.40	2,719
	CM	DHS	2011	1996	0.56	0.93	0.15	0.62	0.45	0.66	0.38	4,082
	CM	MICS	2014	1999	0.57	0.93	0.13	0.69	0.45	0.74	0.39	2,840
Chad	TD	DHS	1997	1982	0.12	0.49	0.46	0.07	0.24	0.13	0.24	2,066
	TD	DHS	2004	1989	0.17	0.52	0.46	0.17	0.35	0.33	0.25	1,910
	TD	MICS	2010	1995	0.19	0.61	0.41	0.24	0.33	0.39	0.22	5,188
	TD	DHS	2015	2000	0.25	0.64	0.42	0.28	0.37	0.43	0.24	6,386
Comoros	KM	DHS	1996	1981	0.16	0.75	0.16	0.19	0.24	0.25	0.23	1,035
	KM	DHS	2012	1997	0.37	0.95	0.06	0.69	0.19	0.73	0.15	1,620
Congo	CG	DHS	2005	1990	0.72	0.97	0.02	0.54	0.25	0.56	0.25	2,185
	CG	DHS	2011	1996	0.80	0.98	0.03	0.75	0.27	0.76	0.26	2,809
	CG	MICS	2015	2000	0.81	0.98	0.06	0.79	0.32	0.81	0.29	3,037
Congo,	CD	MICS	2001	1986	0.56	0.87	0.14	0.24	0.20	0.28	0.19	4,115
Democratic	CD	DHS	2007	1992	0.64	0.91	0.11	0.39	0.27	0.43	0.26	3,104
Republic	CD	MICS	2010	1995	0.66	0.93	0.12	0.42	0.28	0.45	0.26	3,861
	CD	DHS	2013	1998	0.73	0.96	0.06	0.60	0.26	0.62	0.24	5,879
Côte d'Ivoire	CI	DHS	1994	1979	0.30	0.66	0.29	0.33	0.33	0.49	0.24	2,274
	CI	MICS	2006	1991	0.30	0.72	0.22	0.35	0.32	0.48	0.27	3,922
	CI	DHS	2012	1997	0.38	0.73	0.25	0.45	0.34	0.62	0.24	2,555
	CI	MICS	2016	2001	0.40	0.80	0.21	0.54	0.31	0.68	0.21	3,009
Eswatini	SZ	DHS	2006	1991	0.58	0.98	0.04	0.63	0.21	0.64	0.19	1,772
Ethiopia	ET	DHS	2000	1985	0.10	0.50	0.42	0.12	0.41	0.24	0.39	4,652
	ET	DHS	2005	1990	0.13	0.70	0.26	0.20	0.37	0.29	0.34	4,456
	ET	DHS	2011	1996	0.18	0.87	0.12	0.32	0.33	0.37	0.30	4,631
	ET	DHS	2016	2001	0.20	0.90	0.09	0.37	0.23	0.42	0.21	4,635
Gabon	GA	DHS	2000	1985	0.64	0.98	0.02	0.51	0.24	0.52	0.23	2,063
	GA	DHS	2012	1997	0.81	0.99	0.02	0.71	0.30	0.72	0.30	2,423

Ghana	GH	DHS	1993	1978	0.43	0.85	0.21	0.64	0.29	0.75	0.15	1,307
	GH	DHS	1998	1983	0.52	0.90	0.16	0.68	0.25	0.76	0.14	1,357
	GH	DHS	2003	1988	0.52	0.90	0.15	0.58	0.27	0.65	0.19	1,660
	GH	MICS	2006	1991	0.55	0.90	0.17	0.62	0.30	0.69	0.21	1,848
	GH	DHS	2008	1993	0.60	0.94	0.11	0.65	0.30	0.70	0.24	3,089
	GH	MICS	2011	1996	0.56	0.96	0.07	0.66	0.24	0.68	0.20	3,713
	GH	DHS	2014	1999	0.57	0.97	0.05	0.67	0.24	0.69	0.21	2,875
Guinea	GN	DHS	1999	1984	0.18	0.49	0.38	0.16	0.23	0.32	0.16	2,008
	GN	DHS	2005	1990	0.21	0.62	0.31	0.22	0.19	0.35	0.10	2,259
	GN	DHS	2012	1997	0.24	0.71	0.26	0.30	0.22	0.43	0.14	2,691
	GN	MICS	2016	2001	0.30	0.70	0.22	0.45	0.24	0.64	0.14	2,993
Guinea-Bissau	GB	MICS	2006	1991	0.23	0.79	0.23	0.13	0.24	0.17	0.22	2,737
	GB	MICS	2014	1999	0.33	0.90	0.14	0.22	0.28	0.25	0.26	3,012
Kenya	KE	DHS	1993	1978	0.41	0.97	0.02	0.57	0.15	0.59	0.14	2,691
	KE	DHS	1998	1983	0.54	0.97	0.04	0.60	0.20	0.61	0.18	2,722
	KE	DHS	2003	1988	0.57	0.94	0.11	0.55	0.23	0.59	0.18	2,590
	KE	DHS	2009	1994	0.64	0.98	0.06	0.69	0.24	0.71	0.21	2,553
	KE	DHS	2014	1999	0.74	0.98	0.06	0.74	0.23	0.75	0.19	11,027
Lesotho	LS	DHS	2004	1989	0.56	0.97	0.06	0.49	0.22	0.51	0.20	3,096
	LS	DHS	2009	1994	0.64	0.98	0.01	0.65	0.23	0.67	0.22	2,961
	LS	DHS	2014	1999	0.63	0.98	0.03	0.72	0.19	0.73	0.17	2,688
Liberia	LB	DHS	2007	1992	0.56	0.81	0.16	0.21	0.15	0.26	0.14	2,010
	LB	DHS	2013	1998	0.55	0.91	0.11	0.26	0.17	0.28	0.16	2,719
Madagascar	MD	DHS	1997	1982	0.18	0.80	0.21	0.23	0.53	0.29	0.51	1,930
	MD	DHS	2004	1989	0.28	0.82	0.19	0.36	0.50	0.44	0.46	2,355
	MD	DHS	2009	1994	0.33	0.90	0.12	0.45	0.44	0.51	0.41	5,435
Malawi	MW	DHS	1992	1977	0.35	0.79	0.22	0.24	0.24	0.31	0.20	1,698
	MW	DHS	2000	1985	0.39	0.95	0.05	0.30	0.26	0.32	0.25	4,058
	MW	DHS	2004	1989	0.45	0.95	0.06	0.39	0.32	0.42	0.31	3,673
	MW	MICS	2006	1991	0.43	0.96	0.04	0.33	0.27	0.34	0.26	8,097
	MW	DHS	2010	1995	0.45	0.97	0.04	0.44	0.29	0.46	0.28	8,218
	MW	MICS	2014	1999	0.46	0.98	0.02	0.44	0.25	0.45	0.25	8,227
	MW	DHS	2015	2000	0.49	0.98	0.01	0.47	0.28	0.47	0.28	8,465
Mali	ML	DHS	1996	1981	0.13	0.34	0.53	0.13	0.42	0.37	0.35	2,552
	ML	DHS	2001	1986	0.15	0.43	0.50	0.17	0.46	0.40	0.37	3,556
	ML	DHS	2006	1991	0.12	0.53	0.40	0.26	0.42	0.50	0.28	4,432
	ML	MICS	2010	1995	0.17	0.60	0.31	0.36	0.41	0.60	0.28	7,943
	ML	DHS	2012	1997	0.18	0.60	0.32	0.42	0.38	0.69	0.21	3,195
	ML	MICS	2015	2000	0.20	0.62	0.31	0.44	0.35	0.72	0.17	6,528
Mauritania	MA	MICS	2007	1992	0.17	0.90	0.07	0.28	0.36	0.31	0.36	3,612
	MA	MICS	2011	1996	0.21	0.93	0.05	0.37	0.35	0.40	0.35	3,706
	MA	MICS	2015	2000	0.19	0.88	0.11	0.42	0.35	0.47	0.31	4,207
Mozambique	MZ	DHS	1997	1982	0.15	0.79	0.17	0.14	0.27	0.17	0.27	2,754
	MZ	DHS	2003	1988	0.21	0.87	0.14	0.20	0.33	0.23	0.31	4,013
	MZ	MICS	2008	1993	0.26	0.93	0.08	0.37	0.37	0.40	0.35	3,977
	MZ	DHS	2011	1996	0.28	0.92	0.08	0.45	0.37	0.49	0.35	3,834
Namibia	NM	DHS	1992	1977	0.33	0.97	0.03	0.36	0.30	0.37	0.29	1,625
	NM	DHS	2000	1985	0.46	0.95	0.06	0.64	0.25	0.68	0.22	1,979
	NM	DHS	2007	1992	0.53	0.97	0.04	0.74	0.22	0.76	0.20	2,896
	NM	DHS	2013	1998	0.59	0.98	0.03	0.73	0.21	0.74	0.20	2,519
Niger	NI	DHS	1992	1977	0.03	0.27	0.62	0.07	0.43	0.26	0.34	1,911
	NI	DHS	1998	1983	0.08	0.35	0.58	0.22	0.53	0.64	0.21	1,933
	NI	DHS	2006	1991	0.08	0.40	0.49	0.16	0.53	0.41	0.42	2,527
	NI	DHS	2012	1997	0.10	0.53	0.38	0.28	0.42	0.53	0.27	3,296
Nigeria	NG	DHS	1990	1975	0.30	0.77	0.28	0.50	0.32	0.66	0.16	2,745
	NG	DHS	2003	1988	0.48	0.84	0.22	0.57	0.34	0.68	0.24	1,960
	NG	DHS	2008	1993	0.58	0.85	0.29	0.67	0.35	0.79	0.16	8,258
	NG	MICS	2011	1996	0.62	0.88	0.23	0.70	0.36	0.80	0.22	8,554
	NG	DHS	2013	1998	0.57	0.82	0.33	0.68	0.39	0.82	0.16	9,311
	NG	MICS	2016	2001	0.55	0.89	0.18	0.67	0.40	0.75	0.31	10,839
Rwanda	RW	DHS	1992	1977	0.17	0.85	0.11	0.42	0.23	0.49	0.19	1,921
	RW	DHS	2000	1985	0.22	0.88	0.09	0.16	0.22	0.18	0.22	3,328
	RW	DHS	2005	1990	0.25	0.94	0.05	0.07	0.10	0.07	0.10	3,218
	RW	DHS	2010	1995	0.35	0.98	0.01	0.22	0.16	0.22	0.16	3,793
	RW	DHS	2015	2000	0.46	0.99	0.01	0.37	0.22	0.37	0.21	3,408
Senegal	SN	DHS	1993	1978	0.16	0.46	0.56	0.28	0.56	0.61	0.29	2,052
	SN	DHS	2005	1990	0.17	0.60	0.36	0.22	0.33	0.36	0.26	4,549
	SN	DHS	2011	1996	0.17	0.66	0.33	0.40	0.41	0.60	0.25	4,777
	SN	DHS	2014	1999	0.14	0.71	0.29	0.43	0.38	0.61	0.22	5,105
	SN	DHS	2016	2001	0.16	0.72	0.29	0.44	0.43	0.61	0.27	5,308
Sierra Leone	SL	MICS	2005	1990	0.25	0.70	0.26	0.30	0.33	0.43	0.26	2,837
	SL	DHS	2008	1993	0.30	0.75	0.20	0.39	0.27	0.52	0.20	2,912
	SL	MICS	2010	1995	0.32	0.84	0.14	0.59	0.24	0.70	0.16	4,492
	SL	DHS	2013	1998	0.28	0.83	0.16	0.59	0.25	0.71	0.15	4,508
	SL	MICS	2017	2002	0.36	0.86	0.15	0.66	0.23	0.77	0.14	4,223
Somalia	SM	MICS	2006	1991	0.22	0.70	0.21	0.19	0.32	0.27	0.33	2,140

South Africa	ZA	DHS	1998	1983	0.56	0.99	0.01	0.84	0.13	0.85	0.13	3,809
South Sudan	SS	MICS	2010	1995	0.18	0.51	0.42	0.17	0.27	0.34	0.17	3,201
Sudan	SU	MICS	2010	1995	0.33	0.89	0.14	0.64	0.36	0.72	0.29	5,137
	SU	MICS	2014	1999	0.37	0.91	0.12	0.65	0.34	0.71	0.28	6,239
Tanzania	TZ	DHS	1991	1976	0.28	0.88	0.07	0.50	0.15	0.56	0.12	3,244
	TZ	DHS	1996	1981	0.34	0.87	0.10	0.31	0.13	0.35	0.11	2,595
	TZ	DHS	2004	1989	0.54	0.87	0.14	0.34	0.17	0.39	0.12	3,363
	TZ	DHS	2010	1995	0.63	0.93	0.11	0.68	0.22	0.73	0.16	3,309
	TZ	DHS	2015	2000	0.69	0.93	0.10	0.67	0.21	0.72	0.16	3,914
Togo	TG	DHS	1998	1983	0.31	0.83	0.18	0.22	0.27	0.26	0.26	2,482
	TG	MICS	2006	1991	0.42	0.90	0.16	0.52	0.29	0.58	0.22	2,144
	TG	MICS	2010	1995	0.41	0.91	0.11	0.58	0.35	0.63	0.30	1,874
	TG	DHS	2014	1999	0.40	0.93	0.09	0.61	0.30	0.66	0.25	2,629
Uganda	UG	DHS	1995	1980	0.42	0.91	0.08	0.30	0.20	0.33	0.19	2,023
	UG	DHS	2001	1986	0.48	0.97	0.04	0.40	0.23	0.41	0.22	2,508
	UG	DHS	2006	1991	0.50	0.97	0.04	0.36	0.22	0.37	0.21	3,160
	UG	DHS	2011	1996	0.51	0.98	0.03	0.34	0.19	0.35	0.18	3,140
	UG	DHS	2016	2001	0.51	0.97	0.02	0.39	0.17	0.40	0.16	5,828
Zambia	ZM	DHS	1992	1977	0.57	0.92	0.10	0.54	0.30	0.59	0.26	2,596
	ZM	DHS	1996	1981	0.59	0.93	0.08	0.45	0.29	0.48	0.28	2,867
	ZM	DHS	2002	1987	0.65	0.92	0.11	0.49	0.29	0.53	0.27	2,580
	ZM	DHS	2007	1992	0.72	0.97	0.06	0.57	0.32	0.59	0.30	2,371
	ZM	DHS	2013	1998	0.74	0.97	0.05	0.64	0.29	0.66	0.27	5,622
Zimbabwe	ZW	DHS	1994	1979	0.47	0.99	0.00	0.78	0.12	0.79	0.12	2,072
	ZW	DHS	1999	1984	0.57	0.99	0.01	0.83	0.12	0.84	0.11	2,302
	ZW	DHS	2005	1990	0.66	0.99	0.00	0.87	0.10	0.88	0.10	2,999
	ZW	MICS	2009	1994	0.71	0.99	0.01	0.89	0.13	0.89	0.13	4,056
	ZW	DHS	2010	1995	0.74	0.99	0.01	0.89	0.08	0.91	0.07	2,715
	ZW	MICS	2014	1999	0.73	1.00	0.00	0.89	0.09	0.89	0.08	4,459
	ZW	DHS	2015	2000	0.76	0.99	0.01	0.86	0.13	0.87	0.12	2,893

Acronyms: DHS = Demographic and Health Surveys; ineq coef = inequality coefficients – the estimated association between parental socioeconomic status and children's educational outcomes in primary school, net of age and gender, expressed as percentage point difference (SES gap) between low- and high-SES children in the probability to attend, complete, and complete conditional on attendance; MICS = Multiple Indicator Cluster Surveys; Obs. = number of observations; SES = parental socioeconomic status.

Notes: Sample comprises children aged 14–16. Birth cohort is the average birth year of children aged 14–16 surveyed in each survey year. Statistically non-significant coefficients (at 0.05 level) are marked in *grey*.
Full dataset including inequality coefficients' p-values, standard errors and confidence intervals is available online. Please cite:
Plavgo, Ilze. 2023. Intergenerational Educational Inequality in sub-Saharan Africa Dataset. EUI Research Data.

Table S2. Correlation matrix for educational inequality coefficients and macro indicators

	Attendance	Completion	Completion conditional on attendance	Underweight	Fertility rate	School fee abolition	Public spending on education	Pupil-teacher ratio	GDP per capita
Attendance	1.00								
Completion	0.65	1.00							
Completion conditional on attendance	0.19	0.79	1.00						
Underweight	0.61	0.52	0.39	1.00					
Fertility rate	0.62	0.44	0.25	0.65	1.00				
School fee abolition	-0.39	-0.22	-0.04	-0.18	-0.17	1.00			
Public spending on education	-0.33	-0.31	-0.24	-0.35	-0.57	0.17	1.00		
Pupil-teacher ratio	0.01	0.09	0.23	0.09	0.24	0.18	-0.31	1.00	
GDP per capita log.	-0.23	-0.09	-0.08	-0.56	-0.58	-0.10	0.30	-0.40	1.00

Notes: Attendance, completion, and completion conditional on attendance are the estimated inequality coefficients representing percentage point difference between low- and high-SES children in the probability to attend, complete, and complete conditional on attendance (SES gap). Sample: 111 observations (country surveys).

Sensitivity analyses for trends by SES in predicted probabilities to attend primary education and to complete six grades at the aggregate level

Figure S1. Weighting: no weights to account for survey size differences

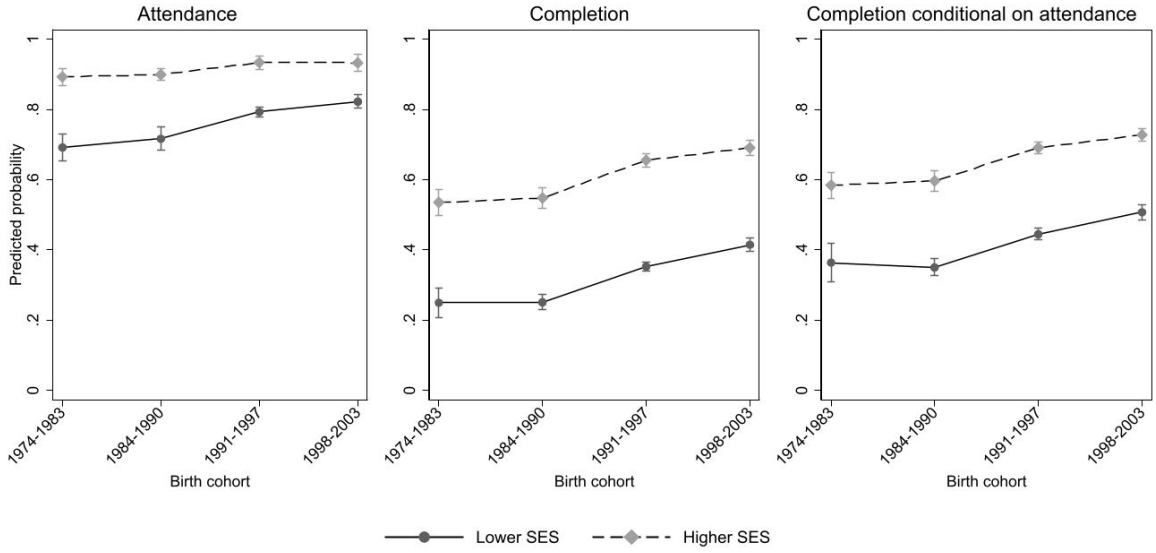


Figure S2. Model specification: average marginal effects estimated with logit models

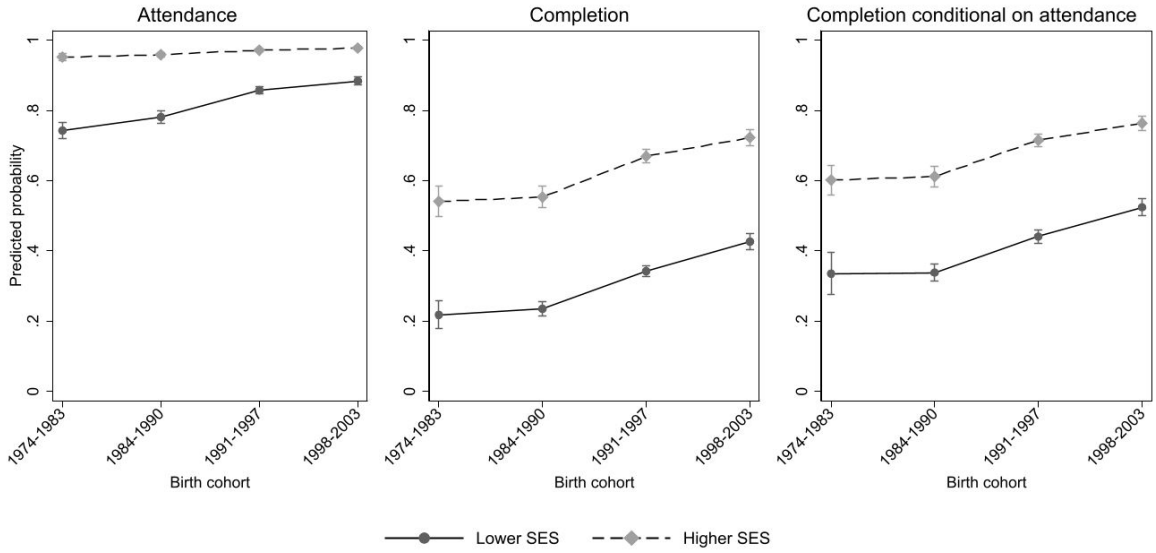
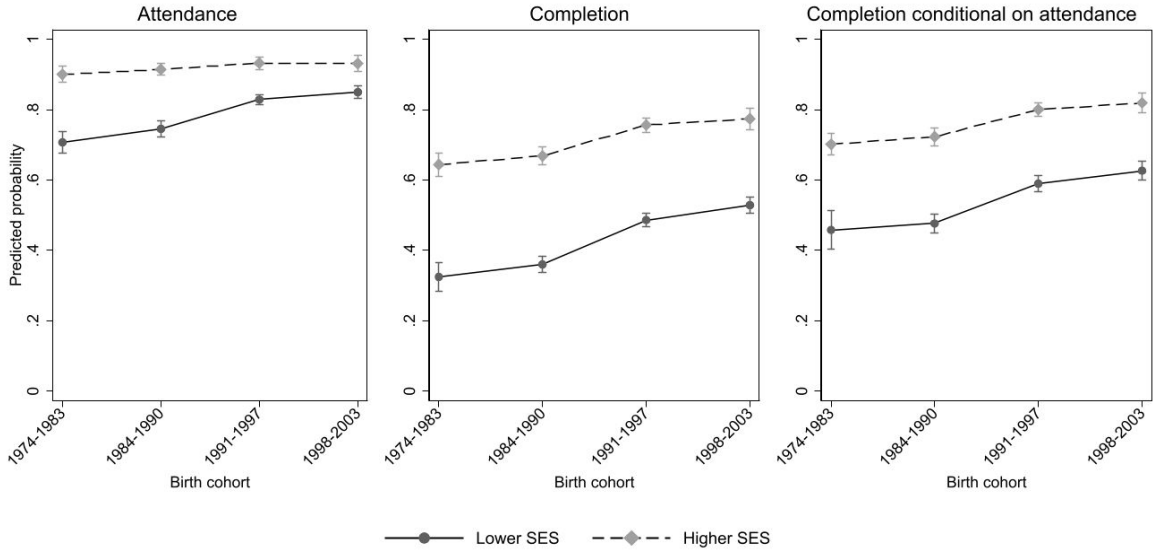
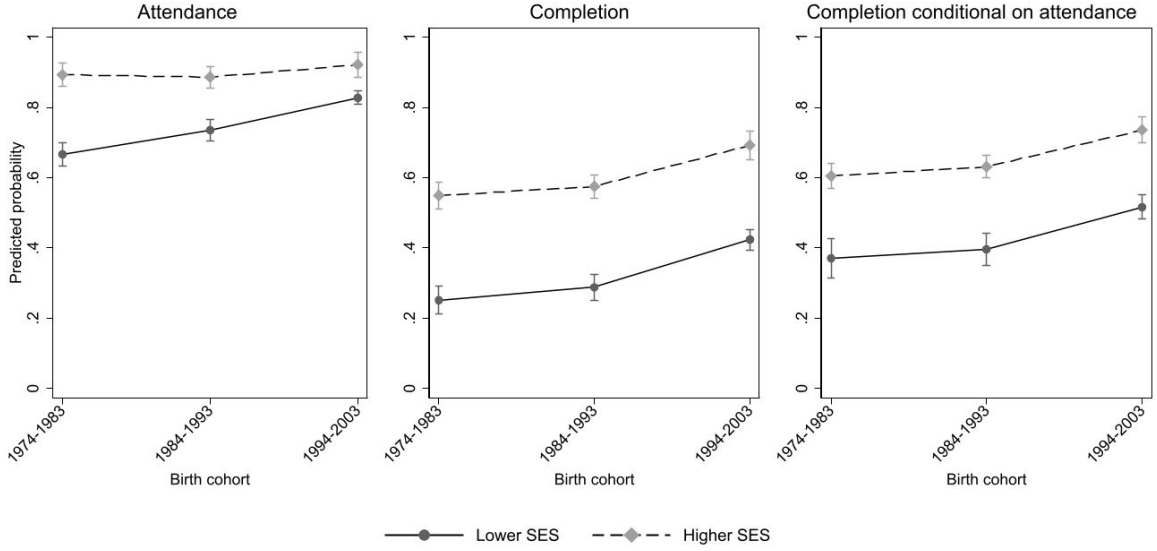


Figure S3. Sample specification: sample restricted to children aged 16



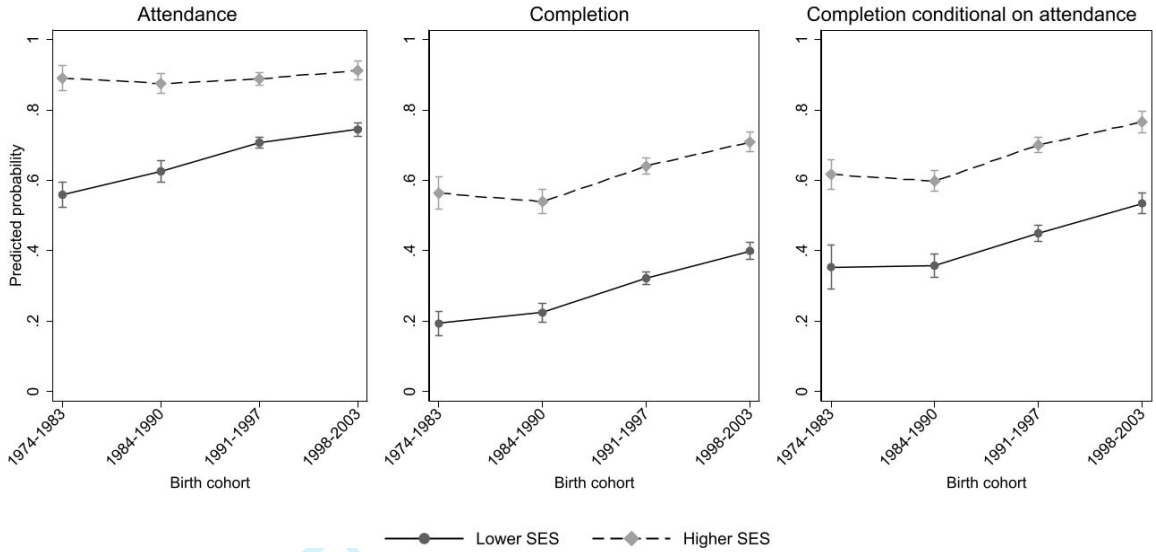
Notes: Sample excludes children aged 14–15.

Figure S4. Sample specification: sample restricted to 21 countries with data for three decades



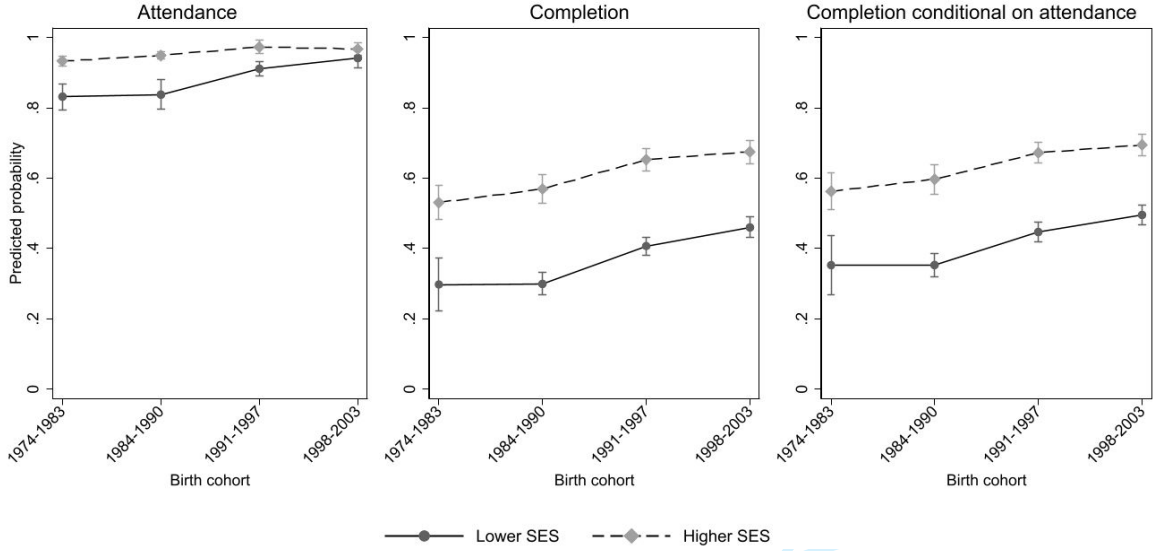
Notes: Sample restricted to countries with panel data available for three consecutive decades, resulting in 56 DHS and MICS surveys from 1990 to 2017 in 21 countries in SSA

Figure S5. Sample specification: restricted to countries in West and Central Africa



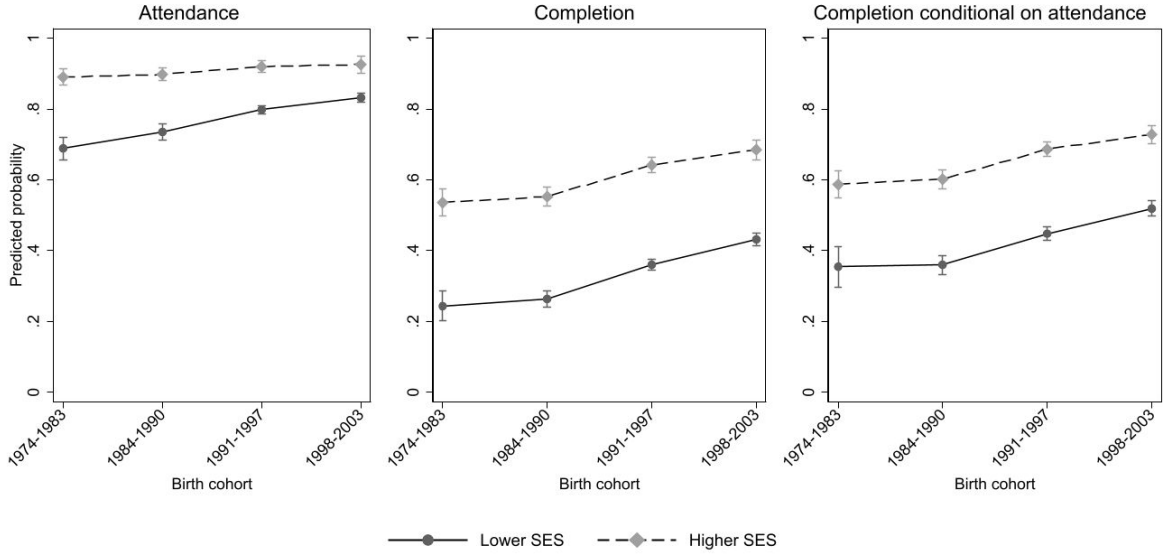
Notes: Sample restricted to 20 countries comprising 54 per cent of the analytical sample

Figure S6. Sample specification: restricted to countries in East and Southern Africa



Notes: Sample restricted to 20 countries comprising 46 per cent of the analytical sample

Figure S7. Excluding countries with the largest population size: Nigeria, Ethiopia, Congo DR



Multilevel linear probability model specification for estimating the effect of national contextual explanations.

The multilevel model includes individual-level variables in the first level and macro-level indicators in the second level. Full model is presented in Equation 1:

$$E_{ick} = \beta_0 + \beta_1 SES_{ick} + \beta_2 X'_{ick} + \gamma_1 M_{ck} + \eta_1 SES_{ick} \times M_{ck} + Y_{ck} + u_{0ck} + u_{1ck} SES + e_{ick} \quad (1)$$

where E_{ick} is the school outcome of child *i* in country cohort *ck*; β_0 is the overall mean of school outcome across countries and cohorts for children from low SES families and all else equal at 0; β_1 is the effect of SES (the difference in the probability to attend (complete) basic education between children from lower- and higher-SES families); parameter γ_1 is the effect of the macro-level indicator under consideration on children's probability to attend (complete) primary school; η_1 is the cross-level interaction effect between SES and the macro-level indicator; Y_{ck} are the survey year dummies; u_{0ck} is the effect of cohort-by-country on school outcome; u_{1ck} SES is a random variance component which allows the slope of the effect of SES to vary across countries and cohorts; and e_{ick} is a child-level residual. Estimates are weighted by survey design weights and standard errors are clustered by country. Interaction coefficients η are the focus of this multilevel analysis showing whether the effect of SES on children's educational opportunities differs by country cohort macro-level characteristics, and correspond to coefficients λ_{ck} from Equation 3 in the two-stage regression analysis in the main text.

Tables S3–S5 report findings from the multilevel linear probability models. Coefficients under category *Interaction with SES* represent estimated associations between macro variables and inequality (SES gap), corresponding with estimates reported in Tables 2–4, main text.

Table S3. Estimates of multilevel linear probability models: interaction between national characteristics and inequality in attending primary education

	M 0	M 1	M 2	M 3	M 4	M 5	M 6	M 7
Parental SES (1 if high)	0.17***	0.17***	0.17***	0.21***	0.17***	0.17***	0.17***	0.20***
	[0.03]	[0.02]	[0.02]	[0.03]	[0.02]	[0.03]	[0.03]	[0.02]
Gender: male (ref. female)	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Age (centered)	0	0	0	0	0	0	0	0
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Contextual factors								
Underweight		-0.11***						-0.08*
		[0.03]						[0.03]
Fertility rate			-0.11***					-0.09**
			[0.03]					[0.03]
School fee abolition				0.16***				0.09**
				[0.04]				[0.03]
Education spending					0.06**			-0.01
					[0.02]			[0.02]
Pupil-teacher ratio						0		0
						[0.03]		[0.02]
GDP per capita $PPP, log							0.04	-0.04+
							[0.03]	[0.02]
Interaction with SES								
Underweight		0.09***						0.06**
		[0.02]						[0.02]
Fertility rate			0.09***					0.07**
			[0.02]					[0.02]
School fee abolition				-0.12***				-0.07**
				[0.03]				[0.02]
Education spending					-0.05**			0.01
					[0.02]			[0.01]
Pupil-teacher ratio						0		0
						[0.02]		[0.01]
GDP per capita $PPP, log							-0.03	0.03*
							[0.02]	[0.02]
Survey years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.76***	0.77***	0.76***	0.70***	0.75***	0.76***	0.76***	0.74***
Variance								
Variance slope (SES)	0.02	0.012	0.012	0.017	0.018	0.02	0.019	0.009
Variance between (level2)	0.033	0.021	0.021	0.028	0.029	0.033	0.031	0.015
Variance within (level 1)	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106
Covariance intercept-slope	-0.026	-0.016	-0.016	-0.022	-0.023	-0.026	-0.024	-0.011
Observations								
Individuals (level 1)	405,759	405,759	405,759	405,759	405,759	405,759	405,759	405,759
Country-years (level 2)	111	111	111	111	111	111	111	111

Notes: Sample comprises 111 DHS/MICS surveys from 34 countries. Standard errors are clustered by country.
Significance test: *** $p < .001$; ** $p < .01$; * $p < .05$; $^{+}$ $p < .10$ (two-tailed).
All continuous contextual variables are standardized to have a mean of 0 and a standard deviation of 1.

Table S4. Estimates of multilevel linear probability models: interaction between national characteristics and inequality in completing six grades of primary education (unconditional)

	M 0	M 1	M 2	M 3	M 4	M 5	M 6	M 7
Parental SES (1 if high)	0.30***	0.30***	0.30***	0.32***	0.30***	0.30***	0.30***	0.31***
	[0.02]	[0.01]	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]	[0.01]
Gender: male (ref. female)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Age (centered)	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***	0.09***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Contextual factors								
Underweight		-0.07***						-0.01
		[0.01]						[0.01]
Fertility rate			-0.10***					-0.04*
			[0.01]					[0.02]
School fee abolition				0.02				0.05+
				[0.03]				[0.03]
Education spending					0.07***			0.01
					[0.02]			[0.01]
Pupil-teacher ratio						-0.07***		-0.03**
						[0.01]		[0.01]
GDP per capita $PPP, log							0.09***	0.04*
							[0.01]	[0.02]
Interaction with SES								
Underweight		0.05***						0.05***
		[0.01]						[0.02]
Fertility rate			0.04***					0.02+
			[0.01]					[0.01]
School fee abolition				-0.04+				-0.01
				[0.02]				[0.02]
Education spending					-0.03**			0
					[0.01]			[0.01]
Pupil-teacher ratio						0.01		0.02+
						[0.01]		[0.01]
GDP per capita $PPP, log							-0.01	0.04**
							[0.01]	[0.01]
Survey years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.11***	0.26***	0.28***	0.10***	0.12***	0.06***	0.18***	0.22***
Variance								
Variance slope (SES)	0.008	0.006	0.007	0.008	0.008	0.008	0.008	0.005
Variance between (level2)	0.015	0.011	0.009	0.015	0.012	0.012	0.009	0.007
Variance within (level 1)	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189
Covariance intercept-slope	-0.004	0.00	0.00	-0.004	-0.002	-0.003	-0.003	0.00
Observations								
Individuals (level 1)	405,759	405,759	405,759	405,759	405,759	405,759	405,759	405,759
Country-years (level 2)	111	111	111	111	111	111	111	111

Significance test: *** $p < .001$; ** $p < .01$; * $p < .05$; $^{+}$ $p < .10$ (two-tailed).

Table S5. Estimates of multilevel linear probability models: interaction between national characteristics and inequality in completing six grades of primary education, conditional on attendance

	M 0	M 1	M 2	M 3	M 4	M 5	M 6	M 7
Parental SES (1 if high)	0.24***	0.24***	0.24***	0.25***	0.24***	0.24***	0.24***	0.24***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Gender: male (ref. female)	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]	[0.01]
Age (centered)	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Contextual factors								
Underweight		-0.03						0.02
		[0.02]						[0.02]
Fertility rate			-0.05*					0.01
			[0.02]					[0.03]
School fee abolition				-0.04				0.01
				[0.04]				[0.03]
Education spending					0.05**			0.02
					[0.02]			[0.01]
Pupil-teacher ratio						-0.08***		-0.04**
						[0.01]		[0.02]
GDP per capita $PPP, log							0.08***	0.07***
							[0.01]	[0.02]
Interaction with SES								
Underweight		0.03**						0.04**
		[0.01]						[0.02]
Fertility rate			0.02**					0
			[0.01]					[0.01]
School fee abolition				0				0.01
				[0.02]				[0.02]
Education spending					-0.02*			-0.01
					[0.01]			[0.01]
Pupil-teacher ratio						0.02*		0.02*
						[0.01]		[0.01]
GDP per capita $PPP, log							-0.01	0.03*
							[0.01]	[0.01]
Survey years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	0.28***	0.32***	0.38***	0.28***	0.29***	0.22***	0.35***	0.24***
Variance								
Variance slope (SES)	0.006	0.005	0.005	0.006	0.005	0.005	0.006	0.004
Variance between (level2)	0.019	0.018	0.017	0.018	0.017	0.014	0.013	0.011
Variance within (level 1)	0.197	0.197	0.197	0.197	0.197	0.197	0.197	0.197
Covariance intercept-slope	-0.003	-0.002	-0.002	-0.003	-0.002	-0.002	-0.002	-0.002
Observations								
Individuals (level 1)	335,116	335,116	335,116	335,116	335,116	335,116	335,116	335,116
Country-years (level 2)	111	111	111	111	111	111	111	111

Significance test: *** $p < .001$; ** $p < .01$; * $p < .05$; $^{+}$ $p < .10$ (two-tailed).