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The Gendered Impacts of COVID-19 on Adolescents' School Attendance in Sub-Saharan Africa

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Abstract

As the COVID-19 pandemic led to a historic and widespread shutdown of schools across the world, including in Sub-Saharan Africa, there were general concerns that girls would be disproportionately affected. This study analyzes the effects of the pandemic on the school attendance of adolescent girls and boys in six African countries. The study uses individual-level data on children's school attendance collected as part of high-frequency phone surveys. Contrary to expectations, the study reveals that there is no evidence to suggest that gender gaps widened during the pandemic. If anything, gender gaps appear to have narrowed in some countries. Further in-depth analysis shows that while being a descendent of the household head, having parents with at least primary education, and above-median household wealth were associated with a higher probability of school attendance among adolescents before the pandemic, these factors lost their salience in explaining school attendance in the aftermath of the pandemic. These results suggest that some traditionally protective forces were eroded during the COVID-19 crisis.

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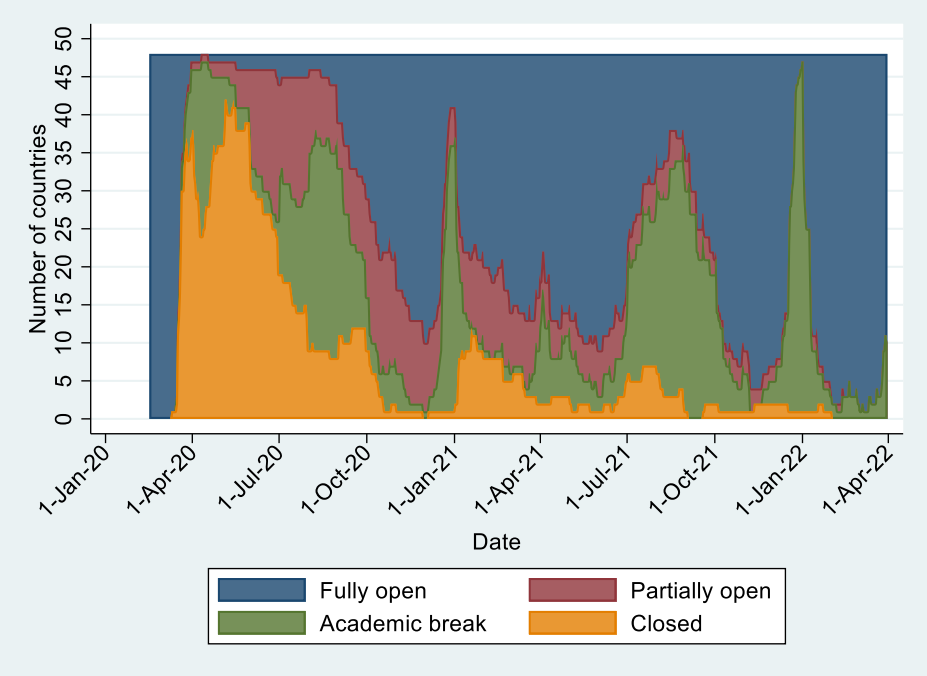
1. Introduction

In the early months of 2020, the world experienced the largest school closure in history. Within a period of six weeks, from February 16 to April 1, 2020, 172 countries globally closed their schools due to the emerging COVID-19 pandemic. Sub-Saharan Africa was no exception to this trend. By April 1, 2020, 38 countries in the region had closed their schools due to COVID-19, while in an additional eight countries schools were closed due to a scheduled academic break. Only two African countries, Burundi and Seychelles, kept their schools fully or partially open, respectively.[1] Schools stayed largely closed in most African countries until mid-September 2020, after which re-openings accelerated (Figure 1). However, throughout 2021 and into early 2022, school closures continued to be used as a public health measure to promote physical distancing and curb the spread of the pandemic. In Uganda, for example, students were only allowed back into class in January 2022, making it one of the world's longest pandemic school closures.

Figure 1: School closures in Sub-Saharan Africa, Feb 16, 2020, to April 1, 2022



Notes: Based on UNESCO (2022).

From the outset of the pandemic, there were concerns that girls would be disproportionately affected by COVID-19 induced school closures. A survey of frontline organizations in Sub-Saharan Africa conducted in March 2020 shows that 71 percent of respondents believed that girls were more likely than boys to be negatively affected by closed schools (Akmal et al. 2020). Many international organizations also expressed concerns that, in the context of developing countries, adolescent girls' school attendance and achievements would be more negatively affected than boys' (e.g., Azevedo et al. 2020; de Paz et al. 2020; Giannini and Albrectsen 2020; Malala Fund 2020). As mentioned by de Paz et al (2020) as well as UNESCO (2021), girls were expected to be more strongly affected by the increased burden of unpaid work within households, including greater responsibilities in household chores and caring for younger children (now

[1] Throughout this paper, Africa refers to Sub-Saharan Africa.

possibly out-of-school), the elderly or the sick (in increased numbers due to the pandemic). On the other hand, boys were expected to participate more in income-generating activities to substitute for pandemic-related reductions in household income. Both mechanisms could potentially affect school attendance and the likelihood of dropping out.[2]

Another concern is girls' school dropout due to child marriage, which has been observed as a coping mechanism in times of economic vulnerability. The decrease in household income during a pandemic or other economic shock can incentivize families to marry their children early, who will then leave the household and thus reduce the household spending needs. An increase in child marriage is in turn related to an increase in early pregnancies, and a high likelihood of permanently leaving school. This notion is partly based on the experiences from the 2014-16 Ebola epidemic in West Africa, where Bandiera et al. (2020) documented a large decline in adolescent girls' school enrollment post crisis, partly linked to an increase in sexual exploitation and abuse and early pregnancies.[3] By now, schools have fully reopened across Sub-Saharan Africa, yet evidence on the impacts of the COVID-19 pandemic on adolescent girls' and boys' school attendance remains scarce.

A comprehensive 2021 study by UNESCO, informed by expert opinions, a literature review and detailed research in five developing countries, finds that the gendered impacts of COVID-19 are rather context-specific, with girls being more at risk of dropping out in some contexts and boys in others. The study emphasizes that although disparities in returning to school emerged between adolescents by gender, the report did not find any conclusive evidence of increases in gender-based violence, early marriage, and pregnancies. In a desktop review, Moscoviz and Evans (2022), argue that "girls in Sub-Saharan Africa were particularly vulnerable during school disruptions". However, these findings are based on a few case studies, some of which have samples that are not nationally representative (e.g., Zulaika et al. 2022 for Kenya).

While several other studies have documented declines in children's school attendance during the first months of the pandemic (e.g., Dang et al. 2021; Bundervoet et al. 2021), none of these investigate gender differences specifically. Although Bundervoet et al (2021) and Furbush et al (2021) both use empirical methods and data that are similar to the ones used in this paper, they focus only on household-level school attendance data (more widely available than individual-level data), and do not analyze the differences in the COVID-19 pandemic's impact by gender or other individual-level characteristics.

To the best of our knowledge, this study presents the most comprehensive analysis of individual-level school attendance of adolescent girls and boys over the course of the COVID-19 pandemic in Sub-Saharan Africa. We draw on specialized rounds of high frequency phone surveys conducted over the course of the pandemic in six African countries that collect sex-disaggregated data on school attendance. This allows us to piece together a picture of how adolescent boys' and girls' school attendance evolved between,

[2] While evidence on the impacts of aggregate shocks in low-income countries is limited, the existing studies suggest that in poorer environments, investments in human capital such as education and health are pro-cyclical and tend to decline during economic crises. Several studies have also found that the effect of crises on adolescents' health or education tends to be worse for girls (Ferreira and Shady, 2009).

[3] On the other hand, new evidence by Yao et al (2021) shows that although the Ebola outbreak had clear short-term negative impacts, school attendance has returned to the long-term trend merely four years after the crisis. At this point in time, there were no more discernible effects on school attendance trends for children from vulnerable backgrounds.

approximately, mid-2020 and late 2021. Moreover, unlike other existing studies, this paper offers insights into what specific individual and household level characteristics correlate with girls' and boys' likelihood of returning to school after they reopened compared to before the pandemic. While the six countries with available survey data – Burkina Faso, Ethiopia, Kenya, Malawi, Nigeria, and Uganda – are by no means representative of Sub-Saharan Africa at large, they do represent 460 million of Africa's total population of 1.13 billion (41 percent) and capture a degree of the region's geographic diversity.[4]

This study makes the following contributions: First, we document the severe disruptions, but also large fluctuations, in school attendance of adolescents over the course of the pandemic. Second, we compare school attendance of adolescent girls and boys to assess the gender-specific impacts of the pandemic. Third, we conduct in-depth analysis to explore what individual- and household-level characteristics are associated with school dropouts of adolescent girls and boys in the context of the COVID-19 crisis.

This paper focuses on adolescent girls and boys aged 10 to 18 years. Adolescents are increasingly recognized as an important demographic group in international development programs, with needs and vulnerabilities that are distinct from both younger children and adults. Moreover, as most African countries have made progress towards universal primary education, pre-COVID-19 gender gaps in school attendance tended to be larger at the secondary level, which broadly overlaps with the age group considered in this study.[5]

Our findings challenge the commonly held belief that the COVID-19 pandemic has widened gender gaps. Instead, our analysis indicates that in several countries, gender gaps have actually narrowed during the pandemic. Furthermore, our in-depth analysis shows that the pandemic has had a profound impact on factors that traditionally predict school attendance, such as being a descendent of the household head, parental education, and wealth. Specifically, our study reveals that these factors lost their salience in explaining school attendance post-pandemic, indicating that the pandemic has eroded some of the protective forces that were previously in place. These findings have important implications for policy makers seeking to address the impact of the pandemic, and aggregate shocks more broadly, on education and gender equality.

This paper is structured as follows. Sections 2 and 3 describe the data sources used in this study and the methodology. Section 4 presents descriptive evidence of adolescent girls' and boys' school attendance for six African countries – Burkina Faso, Ethiopia, Kenya, Malawi, Nigeria and Uganda. Section 5 conducts further in-depth analysis of the individual and household characteristics associated with not returning to school once they reopened, and tests specific hypotheses about what factors may affect adolescent girls' and boys' drop out. Section 6 concludes.

2. Data

The main data sources used in this paper are the high-frequency phone surveys (HFPSs) and rapid response phone surveys (RRPSs) conducted by the World Bank and its partners (mostly national statistical offices) in more than 100 countries worldwide to monitor the pandemic's evolving impacts on households

[4] Population data from the World Bank's Development Indicator (WDI) database. https://databank.worldbank.org/source/world-development-indicators

[5] Secondary school age is approximately 12-17 years, but with some variations across countries.

and individuals. These surveys were typically designed to be nationally representative but may undercover groups with poor network connection or limited access to mobile phones. In addition to the HFPS, corresponding LSMS baseline surveys are used from 2018-2020 as a reference of the pre-pandemic time period.

While HFPSs were conducted in 27 Sub-Saharan African countries, we had to restrict our analysis to surveys that (a) were accessible to the research team, and (b) collected at least in one round individual-level information on school attendance (as opposed to asking household-level questions about all the household's children combined). The latter criterion is extremely important for the purpose of this study because only individual-level data allow for sex-disaggregation and the analysis of potential intra-household heterogeneity in school attendance. Based on these two exclusion restrictions, we can draw on 13 rounds of HFPS data collection for five African countries (Burkina Faso, Ethiopia, Malawi, Nigeria, and Uganda) and 4 rounds of RRPS for Kenya (see Table A1, Appendix, for additional information on each survey).

The HFPSs conducted in Burkina Faso, Ethiopia, Malawi, Nigeria, and Uganda were implemented with support from the World Bank's Living Standard Measurement Study (LSMS) team. These five surveys share several common features – in particular, they all interviewed a subset of respondents from a previous in-person survey that was conducted under the umbrella of the Living Standard Measurement Study Integrated Surveys on Agriculture (LSMS-ISA) program.[6] This allows linking data collected on households and respondents in the HFPS to a rich set of pre-COVID 19 data (conducted between 2018 and early 2020). Moreover, the survey operations allowed for specific survey modules being rotated in and out over time to answer the most pressing policy-relevant questions (Zezza et al. 2021). For this study, it is particularly important that some HFPS rounds collected data on school attendance for all children aged 5 to 18 in the household, which allows for sex-disaggregated analysis.[7]

The Kenya COVID-19 Rapid Response Phone Survey differs from the HFPSs in several ways. First, it used a more complex sampling approach, with one part of the sample being drawn from the 2015/16 Kenya Integrated Household Budget Survey (KIHBS), and the other part of the sample being obtained through Random Digit Dialing. The latter involved a random selection of active phone numbers from the 2020 Numbering Frame of the Kenya Communications Authority (Sinha 2022). Because of this sampling approach, households in the Kenya RRPS cannot be easily linked to a pre-COVID 19 survey. The second difference concerns the questionnaire, which uses a different (though broadly comparable) set of questions and only collects information on school attendance for children aged up to 17 years.

Most HFPSs ask, for each age-eligible child, "Is [NAME] currently going to school?" to identify if a child is attending school or not (though with some variations across country-rounds, see Table A1.B). This, however, does not necessarily establish that children were attending school in person but could also imply, for example, continued engagement with school content (e.g., through distance learning).[8] Only in

[6] The Living Standards Measurement Study, and its Integrated Surveys on Agriculture extension project provide nationally representative, high-quality household survey data on Sub-Saharan African countries, with thematic modules on education, labor market participation, agriculture and other relevant topics.

[7] In Malawi, however, this information was only collected for children aged 15-18.

[8] Harmonized household-level indicators from the HFPS reveal significant variation in children's engagement in any learning activities during school closures, including attending remote teaching sessions or listening to educational

a few cases do the questionnaires allow identifying if a child attends school in person. This is an important caveat when interpreting the data presented in this study.

Besides the HFPS (and RRPS) and LSMS data, we also draw on UNESCO's Dashboard on the Global Monitoring of School Closures (already referenced in the introduction). The data show for each country and day of the pandemic (starting on Feb. 16, 2020), whether schools were closed due to COVID-19, closed due to an academic break, partially open or fully open (UNESCO 2022).[9]

3. Methodology

Our methodology consists of 1) a descriptive analysis of gender gaps before and after the COVID-19 pandemic,[10] and 2) multivariate regressions that analyze the main correlates of school attendance, and how these correlates differ by gender and time period (before and after-pandemic).

First, we test if there were any significant differences between the school attendance of adolescent girls and boys before and after the full reopening of schools (or during the last available round of data). In this analysis, we aim to capture the size of the gender gap before and after the pandemic, and especially whether there were any changes in the school attendance gender gap during the COVID-19 pandemic.

For all countries and rounds separately, we estimate the respective weighted[11] mean school attendance for boys and girls between the age of 10 and 18. An adolescent is defined as attending school if he or she has been reported to currently going to school at the time of the survey. Then we test whether these weighted means are significantly different from each other by gender in each survey round. We show the results of these tests in bar graphs, where the significance of the gender gap is captured by the color intensity of the bars. In appendix (A2), we also run simple regressions that estimate school attendance as a function of gender, a time indicator for the survey round, and an interaction of these two. The regression equation is as follows (equation 1):

$$SchoolAtt_{i,t} = \alpha + \beta\ Round_t + \gamma\ gender_i + \delta\ (gender_i \times Round_t) + \varepsilon_{i,t}$$

where $SchoolAtt_{i,t}$ is an indicator variable equal to 1 for children in school, and 0 for those out-of school, $Round_t$ is an indicator for the survey round, $gender_i$ is a gender indicator, equal to 0 for male school children / students and 1 for female school children / students, and $gender_i \times Round_t$ is an interaction of these latter two. γ captures the pre-pandemic gender gap, β the change in boy's school attendance post-pandemic, δ the change in the school attendance gender gap pre- vs. post-pandemic and $\gamma + \delta$ the

programs on the radio, across countries. For instance, in the countries examined in this paper, the proportion of households where children continued learning during school closure varies from 87.6% in Burkina Faso to 19.6% in Kenya, with the proportion reaching 66.6% in Kenya, 73.4% in Malawi, 61.8% in Nigeria, and 58.9% in Uganda (Bundervoet et al. 2021).

[9] Partially open can imply that schools were open in some regions, for some grade levels, age groups, etc. or following a hybrid approach (e.g., a combination of in-person and distance learning).

[10] Throughout this paper, we refer to these as pre- and post-pandemic gender gaps. It is important to note that all survey rounds that were conducted after the start of the pandemic are described as post-pandemic. In other words, post-pandemic does not mean after the pandemic had ended, but rather refers to after the start of the pandemic.

[11] All our estimates reported in this paper use weights constructed in the processing of the survey data. The information reported by households is adjusted by sampling weights based on the baseline survey for each country. Weights are in addition adjusted for attrition, and post-stratified.

post-pandemic gender gap. While the results from this descriptive analysis do not strictly measure the causal impact of the COVID-19 pandemic on the gender gap, they provide compelling evidence for the direction of change in the educational gender gaps across different countries of our sample during the time of school closures. Given the salience of the pandemic in driving these school closures, it is highly likely that the observed pre- and post-pandemic changes are connected to the COVID-19 crisis.

Subsequently, we estimate multivariate regressions with interactions to analyze the correlations of individual- and household-level characteristics with school attendance, and the differences in these correlations by gender and time period (pre- and post-pandemic). In contrast to the regressions in the descriptive analysis, these regressions only include data from the baseline, and the last available round of the HFPS when schools were fully open, with the exception of Uganda, where the sample includes the last available HFPS round with education data, with schools still only partially open. This part of the analysis covers only five countries, Burkina Faso, Ethiopia, Malawi, Nigeria and Uganda. As the Kenyan RRPS dataset's sampling is not solely based on the KIHBS dataset we use as a baseline for Kenya in the descriptive analysis, we cannot match all RRPS households and individuals to their baseline data[12] and needed to exclude the country from the multivariate regressions.

We follow the literature in considering typical individual and household determinants of school attendance, conditional on availability in our data. In addition to gender, we look at correlations with the age of children, because we expect that older children have dropped out of school with a higher probability, for multiple reasons such as being above the compulsory school age or having a higher opportunity cost of schooling. The child's ranking in the household, i.e., whether they are the oldest sibling, could also influence school attendance, if parents are more or less likely to spend all their resources on the education of one chosen child (see, for example, Kaul 2018 in India). Similarly, children who are direct descendants (children or grandchildren) of the household head may be privileged in their school attendance if the household cannot afford to pay for the education of all children.

We also look at parental education, as children with a mother or father with more than primary education have been shown to attend school longer in most country contexts (e.g., Roby et al, 2016). Since parental education is not available in the post-COVID HFPS rounds we exploit the panel dimension of the surveys to complement the post-COVID data with information from the country-specific baseline. We consider parental education as generally time-invariant, so that it should not make much of a difference if the data are collected pre- or post-COVID.

In our analysis, we also examine the relationship between children's employment status and their school attendance. Based on previous research, we anticipate a negative correlation between employment and school attendance (e.g., Boozer and Suri, 2001; Heady, 2003). Like our approach for parental education, we use pre-COVID employment status to predict post-COVID school attendance, since we do not observe children post-COVID employment status. However, while parental education is essentially time variant, employment status is expected to change over time. Despite this limitation, we anticipate that the child's pre-pandemic employment status will have a direct and indirect impact on post-COVID school attendance.[13] To capture children's employment status, we use two indicator variables: having worked

[12] This means the following variables are not available for Kenya: pre-COVID employment of the adolescent, parental education (mother's and father's), and the pre-COVID asset index.

[13] For a discussion on the potential long-term effects of child labor on school attendance and achievement, see for example Beegle et al., 2008; and Udry, 2006.

for pay outside the household pre-COVID and having worked in the household enterprise or at the household farm pre-COVID (with or without pay).

In addition to individual level characteristics, we also study correlations with the household's pre-COVID standard of living using an asset index and with the household's current size and location of residence (urban/rural). See Table A2 in the Appendix for a list of all variables.

First, to capture how the probability and the main correlates of participation in school have changed during the COVID-19 pandemic, we estimate the following regression specification (equation 2):

$$SchoolAtt_{i,t} = \alpha + \beta PostCOVID_t + \gamma X'_{i,t} + \delta(PostCOVID_t \times X'_{i,t}) + \varepsilon_{i,t}$$

where $SchoolAtt_{i,t}$ is equal to 1 for children in school, and 0 for those out of school, $PostCOVID_t$ is an indicator variable, that takes the value 1 for post-COVID rounds with schools fully open (Uganda: partially open), $X'_{i,t}$ is a vector of the correlates of school attendance listed above, and $PostCOVID_t \times X'_{i,t}$ an interaction term of this term with the post-COVID indicator.

The coefficient β is interpreted as the impact of the pandemic on school attendance in the reference group, the vector of coefficients γ captures the pre-COVID correlates of school attendance, while δ captures the changes in these associations during the pandemic. The post-COVID correlation between certain covariate and school attendance is given by the sum of $\gamma + \delta$, we report this sum as the marginal effect of a certain covariate at the end of the regression Tables 2 and A4, with p values referring to the significance of this sum.

Second, in addition to the changes in the correlates of the main predictors of school attendance pre- and post-COVID, we are interested in the difference of these changes by gender, i.e., whether the way the association between our explanatory variables and school attendance changed over time was different for adolescent boys vs. girls. We therefore estimate the following regression (equation 3), which provides some insights into whether the pandemic impacted girls' and boys' school participation differently, and if there were any mitigating factors to this difference.

$$\begin{aligned} SchoolAtt_{i,t} = \alpha + \beta_1 PostCOVID_t + \beta_2 gender_i + \gamma X'_{i,t} + \delta\left(PostCOVID_t \times X'_{i,t}\right) \\ + \epsilon\left(gender_i \times X'_{i,t}\right) + \theta\left(PostCOVID_t \times gender_i \times X'_{i,t}\right) + \varepsilon_{i,t} \end{aligned}$$

All terms are the same as in equation 2, the added terms are $gender_i \times X'_{i,t}$, is the interaction between gender and all other covariates, and $PostCOVID_t \times gender_i \times X'_{i,t}$, is a triple interaction term between post-COVID survey round indicator, gender and other covariates.

The coefficients ϵ indicate the difference in the effect of certain covariates between male and female adolescents pre-COVID, while θ captures if there were any changes in the gender-specific impacts of covariates over time. We also report the marginal effects of every single covariate on girls' school attendance post-COVID in Tables 3 and A5. These marginal effects are hence equal to the sum of $\gamma + \delta + \epsilon + \theta$, and show the impact a covariate X on girls' school attendance in the post-COVID survey round.

4. School attendance of adolescent boys and girls over the course of the pandemic

Table 1 shows for each country-round the share of children aged 10-18 attending school and the status of school closures. The data document that the COVID-19 pandemic caused unprecedented disruptions in school attendance for adolescents in many Sub-Saharan African countries. For example, in Kenya, only 16 percent of children aged 10-17 years attended school between September and November 2020. Similarly, in Uganda, only 32 percent of children aged 10-18 years were reported to attend school between March and April 2021. In both situations, schools were closed due to COVID-19, with some concessions for exam candidates. Pre-COVID-19 household surveys conducted in both countries suggest that prior to the pandemic between 85 and 92 percent of children in these age groups were attending school, indicating a massive disruption in education for millions of adolescent girls and boys.

At the same time, school attendance rates fluctuated significantly over the course of the pandemic, as schools cycled through periods of closures and re-openings. Encouragingly, the data suggest that many children did return to school once they reopened. For example, in Kenya, 99 percent of children aged 10-17 were attending school between January and March 2021, at a time when schools had fully reopened – a significant recovery from 16 percent just four months earlier. Likewise, in Nigeria attendance of children aged 10-18 years increased from 59 percent in October 2020, when schools were partially closed due to COVID-19, to 82 percent in March 2021, when schools had reopened. These are early and preliminary results – but they do give rise to the hope that the COVID-19 crisis did not necessarily lead to the massive dropout rates that were initially feared. However, it will be necessary to closely monitor these trends going forward, as there is a risk that children, who regressed in learning during COVID-19, may struggle with the new curriculum and drop out in the months or years that follow.

These sharp fluctuations also imply that routine data collections are necessary during the pandemic to monitor the situations on the ground. However, even high-frequency phone surveys, which collect household-level information on children's school attendance, only provide a very partial picture as there can be significant intra-household variability. The data used in this paper were pre-selected for the availability of individual-level data on school attendance. In what follows, we turn to gender differences as one important dimension of intra-household variation.

Table 1: School attendance of adolescents before and during the pandemic, by country and survey round

Country	Period (survey)	% of children aged 10-18 attending school*	% of children aged 10-18 attending school in person	School status
Burkina Faso				
	2018-19 (LSMS)	59.9		Pre-COVID
	Dec. 2020 (HFPS R5)	71.6	71.6	Fully open**
Ethiopia				
	2018-9 (LSMS)	72.4		Pre-COVID
	Dec. 2020 (HFPS R8)	77.6	51.8	Partially open
	April-May 2021 (HFPS R11)	78.4	76.7	Fully open
Kenya				
	2015-16 (KIHBS)	91.8		Pre-COVID
	Sep-Nov 2020 (RRPS R3)	16.0		Partially open
	Jan-Mar 2021 (RRPS R4)	99.2		Fully open

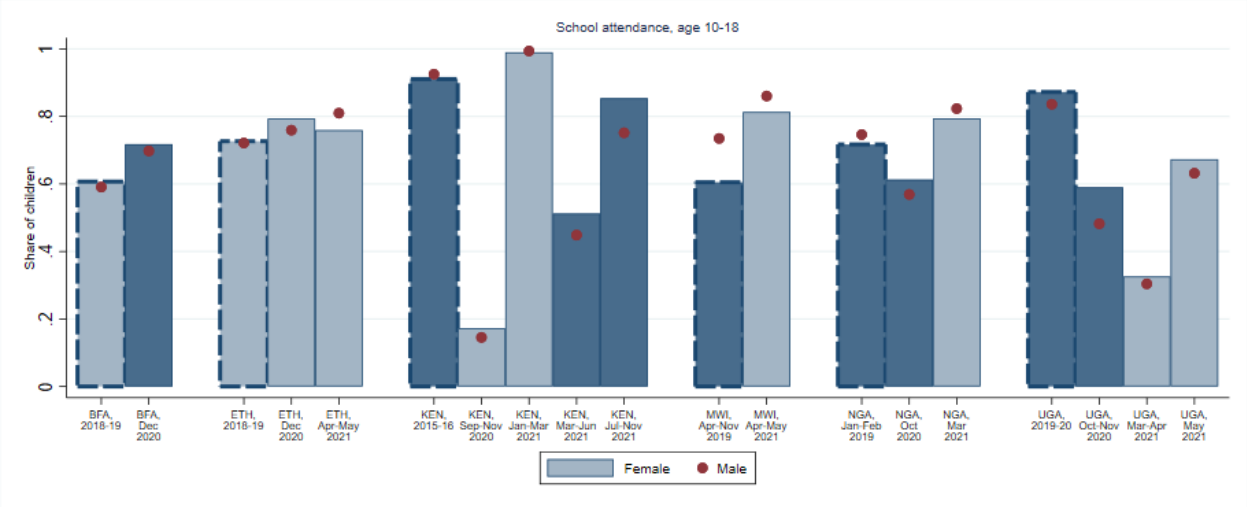
	Mar-Jun 2021 (RRPS R5)	47.9		Fully open**
	Jul-Nov 2021 (RRPS R6)	80.1		Fully open**
Malawi				
	Apr-Nov 2019 (LSMS W5)	66.9		Pre-COVID
	Apr-May 2021 (HFPS R10)	83.7		Fully open**
Nigeria				
	Jan-Feb 2019 (LSMS W4)	73.2		Pre-COVID
	Oct 2020 (HFPS R6)	59.0	54.3	Partially open
	Mar 2021 (HFPS R11)	81.6		Fully open
Uganda				
	Mar 2019-Feb 2020 (LSMS W8)	85.4		Pre-COVID
	Oct-Nov 2020 (HFPS R4)	53.8		Partially open
	Mar-Apr 2021 (HFPS R6)	31.5		Partially open
	Sep-Nov 2021 (HFPS R7)***	65.2		Partially open

Notes: * estimates for Kenya refer to children aged 10-17 years. Estimates for Malawi refer to children aged 15-18. ** with academic break. *** Uganda R7 asked about school attendance in May 2021.

Before the onset of the pandemic and according to the last pre-COVID 19 multi-topic household survey available to the research team, adolescent girls were less likely to be in school than adolescent boys at the aggregate level, but this masks important disparities across countries. Particularly, adolescent boys were more likely to attend school than adolescent girls in Kenya (92.5 vs. 91.1 percent), Malawi (73.5 percent vs. 60.5 percent) and Nigeria (74.6 vs. 71.7 percent). Only Uganda showed the opposite pattern (83.6 vs. 87.2 percent), while in Burkina Faso and Ethiopia pre-COVID gender gaps were not significant.

During the pandemic, strikingly, all gender gaps favoring boys disappear. In 2020-2021, adolescent girls are nowhere less likely than adolescent boys to attend school. In fact, girls were significantly more likely to attend school than boys in 5 rounds out of the 13 rounds, compared to zero rounds with significant differences favoring boys (Figure 2). When comparing pre- and post-COVID gender gaps directly, Table A3 in the Appendix shows that gender gaps significantly change to become favorable to girls in three survey rounds compared to pre-pandemic gender gaps. In Kenya, two out of 4 post-pandemic rounds of data reveal a significant increase in the attendance of girls compared to boys, leading to a reversal of the gender gap in favor of boys observed pre-pandemic. This trend is also notable in Nigeria in the round of data collected at the start of the pandemic, although the change in the gender gap becomes close to zero and insignificant in the last round of data collection (see Table A3 in Appendix). In Uganda, where the pre-COVID gender gap was already in favor of girls, we see an increase in this gap in favor of girls in the round collected at the start of the pandemic. In the two subsequent rounds, the gender gap becomes insignificant, as in Nigeria. In contrast, in Burkina Faso, while we did not observe a significant gender gap between boys and girls before the pandemic, girls are more likely to attend schools compared to boys post-COVID (Figure 2). Based on these data, none of the countries included in this study saw gender gaps to the disadvantage of girls emerging during the pandemic.

Figure 2: School attendance of adolescent girls and boys before and during the pandemic, by country and survey round

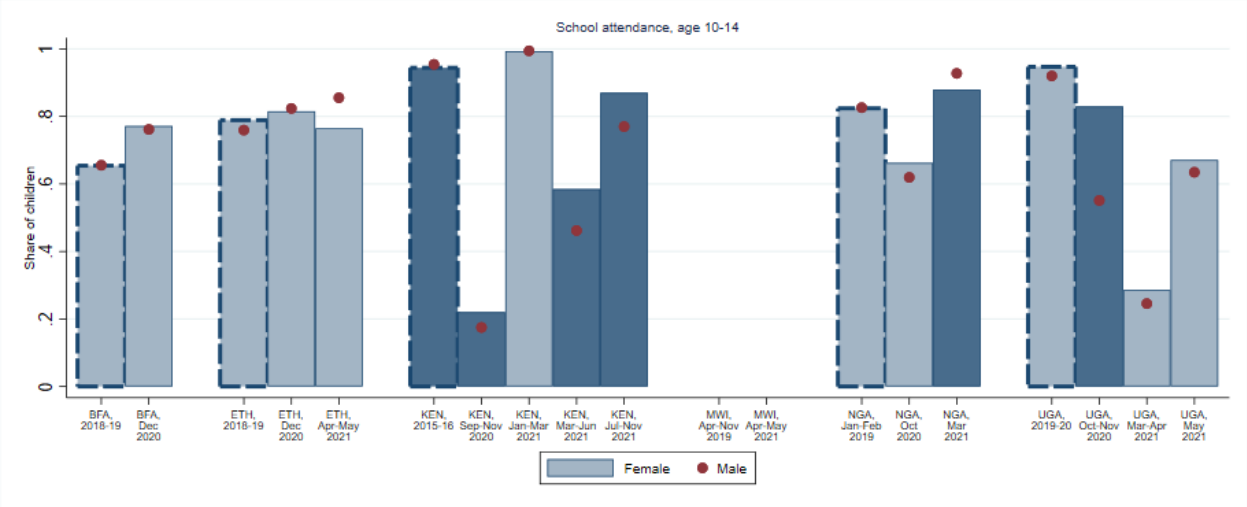


Notes: Estimates for Kenya refer to children aged 10-17 years. Estimates for Malawi refer to children aged 15-18. Bar graphs capture the share of girls in school in the age group, while the red dots show the share of boys in schools in the relevant age group for all country-time observations. Bars marked with a long-dash border refer to rounds before the COVID-19 pandemic (taken as a baseline). The depth of color shows whether the difference between boys' and girls' school attendance is significant, light blue colored bars show no significant difference at the 10 percent level.

To investigate further how the COVID-19 pandemic impacted school attendance, we look separately at the 10-14 age group (Figure 3) and at the 15-18 age group (Figure 4) to capture potential differences in school level (primary/middle school vs high school). In two countries, gender differences are more pronounced pre-pandemic among older adolescents. In Nigeria, while there were no significant gender differences among the 10-14 age group pre-pandemic, boys were more likely to attend school among the 15-18 age group (boys' attendance was 10.5 percentage points higher in Nigeria in this age group). In Burkina Faso, around 65.5 percent of both boys and girls attended school in the 10-14 age group, with no gender difference, but 15-18 girls were significantly more likely to be in school than 15-18 boys. While data is not available for younger adolescent in Malawi, age does not matter for gender gaps in all other countries. There is a significant gender gap favoring both younger and older boys in Kenya and attendance rates are similar for both age groups in Ethiopia and Uganda.

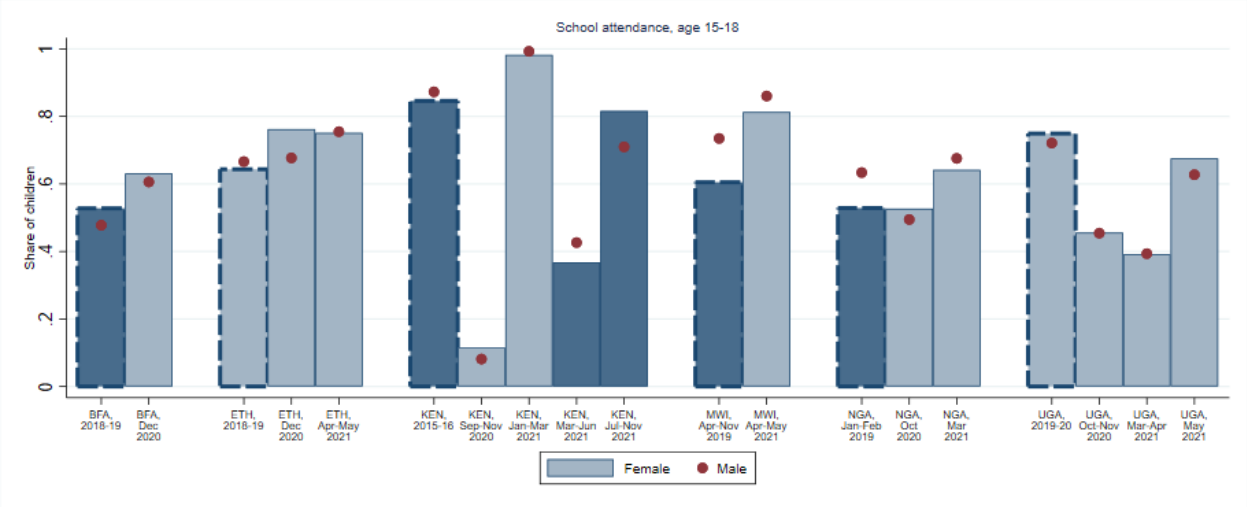
Looking at the evolution of gender gaps in attendance with respect to age during the pandemic, no clear pattern emerges. In one survey round, 10-14 girls are disadvantaged compared to boys (Nigeria), while in another one, 15-18 girls are disadvantaged (Kenya). If anything, 10-14 girls are slightly better off than older adolescents during the pandemic. Younger girls' attendance rates are higher than boys' in four survey rounds (three in Kenya and Uganda), while older girls' attendance rates are only higher in one survey round (Kenya). Taken together, these results suggest that the pandemic did not hurt older girls' school attendance more than it hurt older boys' school attendance. If anything, the pandemic even favored school attendance rates of younger adolescents in some settings.

Figure 3: School attendance of adolescent girls and boys aged 10-14 before and during the pandemic, by country and survey round



Note: Bar graphs capture the share of girls in school in the age group, while the red dots show the share of boys in schools in the relevant age group for all country-time observations. Bars marked with a long-dash border refer to rounds before the COVID-19 pandemic (taken as a baseline). The depth of color shows whether the difference between boys' and girls' school attendance is significant, light blue colored bars show no significant difference at the 10 percent level.

Figure 4: School attendance of adolescent girls and boys aged 15-18 before and during the pandemic, by country and survey round



Note: Estimates for Kenya refer to children aged 10-17 years. Bar graphs capture the share of girls in school in the age group, while the red dots show the share of boys in schools in the relevant age group for all country-time observations. Bars marked with a long-dash border refer to rounds before the COVID-19 pandemic (taken as a baseline). The depth of color shows whether the difference between boys' and girls' school attendance is significant, light blue colored bars show no significant difference at the 10 percent level.

5. Who returns to school?

This section explores what specific individual and household level characteristics correlate with children's likelihood of attending/returning to school. Unlike in the previous section, the analysis here does not draw on all HFPS rounds fielded since the start of the pandemic but focuses on a comparison of the pre-pandemic data from the LSMS to the latest post-COVID 19 HFPS rounds, which were conducted at a time when schools in most countries had reopened. This approach allows us to abstract from differences in school attendance that are driven by school closures, and to focus on the household and individual factors that explain school attendance of boys and girls in an environment where schools are largely open, both pre- and post-pandemic.[14] As mentioned in section 3, we do not report estimates for Kenya in this section, because we cannot link households and individuals in the Kenya RRPS rounds to a recent pre-pandemic survey. Many of the variables of interest (such as pre-COVID employment, household assets, or parental education) are constructed from the baseline surveys, and linked to during-pandemic outcomes subsequently. As this procedure cannot be implemented in the Kenyan data, we exclude this country to ensure better cross-country comparability of the results in this section.

A descriptive comparison of the pre-pandemic data to the latest post-COVID 19 HFPS rounds for the five countries included in this section shows that school attendance rates post-COVID 19 were generally not

[14] In all countries except Uganda, schools had fully reopened at the time of the last HFPS round; in Uganda they had partially reopened, for exam classes (see Table 1). While we have no information on what would happen if Ugandan schools reopened completely, household decisions about adolescents in exam classes could potentially be indicative of what happens when schools reopen for a broader group of adolescents.

lower than before the pandemic (see Figure 2). In Burkina Faso, Ethiopia, Malawi and Nigeria, attendance rates in the latest post-COVID 19 survey were higher than those in the pre-pandemic LSMS survey. Only in Uganda, where schools had only partially re-opened when the latest HFPS round with an education module was fielded, had school attendance rates not (yet) returned to pre-pandemic levels. These aggregate rates, however, may mask significant heterogeneity in the impacts of COVID-19 on different groups of adolescents, which are the focus of this section.

Similar to the regressions in Appendix Table A3, our dependent variable is an indicator variable of whether a child attends school. In addition to a post-COVID 19 indicator variable, our vector of independent variables includes a host of current individual and household-level characteristics, such as sex, age, household size, whether the child is a descendent of the household head (i.e., a child or grandchild), whether the child is the oldest adolescent in the household, and urban locality, as well as time-invariant parental characteristics (i.e., mother's and father's education).[15] We further include a set of indicator variables that capture the child's pre-COVID employment status and whether the household had above median-assets pre-pandemic. While both children's employment status and family wealth are likely to have changed over the course of the COVID-19 crisis, they provide important baseline information. All explanatory variables are interacted with the post-COVID 19 indicator variable to assess whether there are differences in the associations between these variables and children's school attendance pre- and post-COVID 19. The regressions are run separately for each of the five countries included in this section.

Table 2 summarizes the results, with a focus on whether the coefficient estimate is positive or negative, and its significance level (see Table A4 for the full set of regression results). For each individual and household-level characteristic included in the regressions, we show the sign and significance of the coefficient estimate (indicating the pre-COVID correlation, rows labeled #1), of the interaction with the post-COVID indicator variable (indicating how the correlation changed pre- vs post-COVID, rows labeled #2) and of the combined effect (i.e., the sum of the two, indicating the post-COVID correlation, rows labeled #3).

Overall, the correlates of school attendance pre-COVID 19 are broadly in line with expectations. In general, younger adolescents are more likely to be in school than older adolescents. Being a descendant of the household head is associated with an increased probability of attending school in all countries but Malawi (where this coefficient is positive but not significant), which could mirror that household heads favor their own offspring over other children in the household (i.e., children of other household members). Being employed pre-pandemic strongly decreased a child's likelihood of attending school, and this association holds for children who worked for pay outside the household as well as for children who worked in household enterprises or family farms (except in Ethiopia in the latter case). Children whose parents had at least primary education were much more likely to attend school, compared to children with parents without any education, and this association holds for both mothers' and fathers' education. Except for Ethiopia, children in wealthier households were more likely to attend school than children in household with below-median assets. For some of the other characteristics – e.g., household size, urban-rural locality and whether the child is the oldest child in the household – the results were less conclusive, as the coefficient estimates were either insignificant and/or varied across countries. It is worth noting however,

[15] Information on parental education is not available for Uganda.

that in Burkina and Ethiopia, children living in urban localities were more likely to attend school pre-covid than children living in rural localities.

The coefficient estimates of the female and post-COVID 19 indicator variables are broadly similar to the results from the previous section. Controlling for a host of individual and household level characteristics, girls were less likely than boys to attend school before the pandemic in Malawi and Nigeria. The coefficient estimates of the post-COVID 19 indicator show that boys' post-pandemic attendance rates are higher than pre-pandemic attendance rates in Nigeria, but lower in Uganda, where schools were still partially closed at the time of the last HFPS round. Our estimates show that the reverse was true for girls' attendance rates post-pandemic, which were lower in Nigeria, but higher in Uganda. However, the positive interactions between the female indicator and the post-COVID 19 indicator in Burkina Faso, Malawi, Nigeria, and Uganda suggest that, if anything, girls' school attendance may have improved relative to boy's school attendance post-pandemic in these four countries. However, since the coefficients are not significant, we cannot say so with any degree of certainty. What is clear, however, is that there is no indication that girls school attendance suffered disproportionately during the pandemic.

Interestingly, the pandemic has significantly affected the associations between locality level characteristics and school attendance as well as between several individual level characteristics and school attendance probabilities. Regarding locality level characteristics, we find that children living in urban localities in Burkina and Ethiopia have now the same probability to attend school as children living in rural localities, suggesting that proximity to school in these countries doesn't play any further role in explaining school attendance post-COVID. Regarding the associations between individual characteristics and school attendance, first, the interaction between the post-COVID indicator variable and the variable indicating whether a child is a descendent of the household head is always negative and the association is significant in three countries (Ethiopia, Malawi, and Uganda). As a result, children who were the direct offspring of the household were not more likely than other children to attend school post-COVID, and even significantly less likely in one country (Malawi). Second, the interaction between parental education and the COVID-19 indicator variable is almost always negative though mostly insignificant. This suggests that mothers' education is no longer significantly associated with children's school attendance post-COVID, although fathers' education remains significant in two countries (Burkina Faso and Malawi). Third, the interactions between the post-COVID indicator and the variables indicating pre-COVID employment status are positive and significant, in some cases, especially for work outside of the household. As a result, there is no significant correlation between the pre-COVID employment status and post-COVID school attendance. This could indicate that children who were not working before the pandemic started working during the pandemic, or conversely that children who were working pre-pandemic lost these income-generating activities during COVID, both of which may attenuate the correlation between the pre-COVID employment status and school attendance in the aftermath of the pandemic. Fourth, while children from wealthier households were more likely to attend school pre-COVID in all countries except Ethiopia, there is only one country (Burkina Faso) where the association between pre-COVID wealth remains positive and significant post-pandemic. This could either suggest that the association between wealth and school attendance weakened during the pandemic, or that pre-COVID wealth is a poor proxy for living standards during the pandemic. Altogether, these results suggest that the COVID-19 pandemic eroded the protective

effects of biological kinship to the household head, parental education and potentially wealth on children's school attendance.

Table 2: Summary of the correlates of individual- and household characteristics with school attendance pre- and post-COVID for adolescent girls and boys, by country

	(1)	(2)	(3)	(4)	(5)
	Burkina Faso	Ethiopia	Malawi	Nigeria	Uganda
Post-COVID	+	+	+	+***	-***
Individual characteristics					
(A1) Female	-	+	-***	-***	+
(A2) Female x Post-COVID	+	-	+	+	+
(A3) = (A1) + (A2)	+	-	-	-**	+**
(B1) Age	-***	-***	-***	-***	-***
(B2) Post-COVID x Age	-	+	+	-	+**
(B3) = (B1) + (B2)	-***	-	-***	-***	-
(C1) Descendent of the hh head	+***	+***	+	+**	+***
(C2) Post-COVID x Descendent of the hh head	-	-**	-*	-	-**
(C3) = (C1) + (C2)	+	+	-*	+	-
(D1) Oldest adolescent in the hh	-***	+	+	-	-**
(D2) Post-COVID x Oldest adolescent in the hh	+*	+	-**	+	-
(D3) = (D1) + (D2)	+	+	-**	-	-
(E1) Work for pay outside hh (pre-COVID)	-***	-***	-*	-***	-***
(E2) Post-COVID x Work for pay outside hh (pre-COVID)	+***	+	-	+***	+***
(E3) = (E1) + (E2)	+	-	-	+	-
(F1) Pre-COVID: Work in hh enterprise (pre-COVID)	-***	-	-***	-***	-***
(F2) Post-COVID x Work in hh enterprise (pre-COVID)	+	+	+	+***	+
(F3) = (F1) + (F2)	-*	-	-	-	-*
(G1) Mother's education: Primary or higher	+***	+**	+***	+***	
(G2) Post-COVID x Mother's education: Primary or higher	-	+	-	-**	
(G3) = (G1) + (G2)	+	+	-	+	
(H1) Father's education: Primary or higher	+***	+***	+***	+**	
(H2) Post-COVID x Father's education: Primary or higher	-	-	-	-	
(H3) = (H1) + (H2)	+***	+	+**	+	
Household characteristics:					
(I1) Hh size	-***	-	+	-	-
(I2) Post-COVID x Hh size	+	+	-	-	+
(I3) = (I1) + (I2)	-	-	-	-	-
(J1) Urban	+***	+**	-	+	-
(J2) Post-COVID x Urban	-*	-	+	-	+
(J3) = (J1) + (J2)	+	+	+	+	+
(K1) Above-median assets (pre-COVID)	+***	-*	+**	+***	+***
(K2) Post-COVID x Above-median assets (pre-COVID)	-	+**	-	-***	-
(K3) = (K1) + (K2)	+**	+	-	-*	+
Observations	12,027	7,686	1,633	6,409	6,255
R-squared	0.162	0.075	0.221	0.185	0.157

Notes: Summary of results from regressions estimating the probability of attending school as a function of individual- and household-level characteristics, and their interactions with a post-COVID indicator. Positive signs (+) indicate an increase, negative signs (-) a decrease in school attendance probabilities. Statistical significance: ***

p<0.01, ** p<0.05, * p<0.1. Pre-COVID data from LSMS, post-COVID data from HFPS. Estimates for Malawi refer to children aged 16-18; estimates for all other countries refer to children aged 10-18.

We further explore whether the pre- and post-COVID associations between the individual and household-level characteristics and children's school attendance discussed in the previous paragraph are heterogenous by gender. To this end, we include triple interaction terms in the regressions, such that we interact all explanatory variables with both a post-COVID indicator and a female indicator variable. The summary of the results are shown in Table 3, and include for each explanatory variable the pre-COVID association for boys (rows labeled #1), the gender difference in the pre-COVID association (rows labeled #2), the pre-COVID associations for girls (rows labeled #3), the pre- vs post-COVID difference in the associations for boys (rows labeled #4), the pre- vs post-COVID difference in the gendered association (rows labeled #5), the pre- vs post-COVID difference in the associations for girls (rows labeled #6), the post-COVID association for boys (rows labeled #7), and the post-COVID association for girls (rows labeled #8). In the interest of parsimony, we only comment on those associations where our results indicate significant gender differences, either pre- or post-COVID, and where we see a somewhat consistent pattern across countries (see Appendix Table A5 for the full set of regression results).

Before the pandemic, being a descendent of the household head (e.g., a child or grandchild) was associated with a higher likelihood of school attendance for boys in Ethiopia and Uganda (row B1) and for girls in all countries except Malawi (row B3). Post-COVID, the association for boys is only significant in Malawi, but negative (B7), and is no longer significant for girls (B8).

Employment significantly decreased adolescents' school participation in almost all countries before the onset of the pandemic, especially if this employment was work for pay outside the household (D1 and D3), but less so for girls working in the household business or on the household farm in Nigeria or Uganda (E2). However, after the pandemic, pre-COVID employment for pay outside the household was no longer associated with a significantly lower school attendance for boys in all countries but Malawi (D7). For girls, however, the negative association with work for pay outside of the household remains significant in three countries: Ethiopia, Malawi and Uganda (D8), with a significant triple interaction (D5). The latter indicate that differences in the relationship between employment and school attendance between boys and girls appeared during the pandemic. This could suggest that post-covid, in some countries, boys have switched to different types of jobs or sectors, likely to be more compatible with going to schools, or that the additional income acquired before the pandemic by the boys allowed to compensate for the negative income effects of the pandemic for the household, leading to less dropouts. Conversely, these results provide suggestive evidence that during the pandemic, adolescent girls started to engage in paid jobs that are competing with schooling requirements post-COVID. In case of work in the household business or farm, the negative correlation with boys' school attendance remains negative post-COVID in Ethiopia and Malawi for boys (E7), while it's never significantly negative for girls. Noteworthy, the marginal correlation between girls' school attendance and household employment post-COVID is significantly positive in Ethiopia and Malawi (E5).

Pre-COVID, mother's education is positively associated with school attendance for both boys and girls in Burkina Faso and Nigeria, but only for girls in Ethiopia and Malawi (F3). Post-COVID both boys (F7) and girls (F8) school attendance are no longer correlated with mother's education. Regarding the association with father's education, interestingly, pre-COVID school attendance was positively correlated with father's education in four countries (Burkina Faso, Ethiopia, Malawi and Nigeria) for boys (G1), compared to three countries (Burkina Faso, Ethiopia and Malawi) for girls (G3), with no difference in the magnitude of the correlation, however. Post-COVID, a positive correlation with father's education only remains in one country (Burkina Faso) for boys (G7), but in two countries (Burkina Faso and Malawi) for girls (G8). In

Malawi, the gender difference in the association between father's education and school attendance widen during the pandemic at the advantage of girls (G5). These results indicate that although the protective effect of fathers' education has eroded during the pandemic for both girls and boys, its positive effect on girls' school attendance compared to boys' school attendance post-pandemic was larger both in magnitude and in terms of the number of countries where this positive correlation remained.

Pre-COVID, living in an urban area was associated with a significant advantage for girls in Burkina Faso, Ethiopia and Nigeria (row I3); while for boys this association was only significant in Burkina Faso. Post-COVID, living in an urban area no longer confers an advantage to boys (I7), but still confers one to girls in Burkina Faso (I8). The marginal correlation for girls post-COVID is significant.

Table 3: Summary of the correlates of individual- and household indicators with school attendance before and during the pandemic, with gender interaction, by country

	(1)	(2)	(3)	(4)	(5)
	Burkina Faso	Ethiopia	Malawi	Nigeria	Uganda
Post-COVID	-	+	+**	+	-
Female	-***	-	+	+	+
Female x Post-COVID	+	-	-	-	-
Individual characteristics					
(A1) Age	-***	-***	-***	-***	-***
(A2) Female x Age	+*	-	-	-***	-
(A3) = (A1) + (A2)	-***	-***	-***	-***	-***
(A4) Post-COVID x Age	-	-	-	-**	+
(A5) Female x Post-COVID x Age	+	+	+	+*	+
(A6) = (A4) + (A5)	-	+	+	+	+***
(A7) = (A1) + (A4)	-***	-***	-***	-***	-
(A8) = (A1) + (A2) + (A4) + (A5)	-**	-	-**	-***	+
(B1) Descendent of the hh head	+	+***	+	+	+**
(B2) Female x Descendent of the hh head	+***	+	-	+*	-
(B3) = (B1) + (B2)	+***	+***	-	+***	+***
(B4) Post-COVID x Descendent of the hh head	+	-	-**	+	-**
(B5) Female x Post-COVID x Direct descendent of the household head	-*	-	+	-	+
(B6) = (B4) + (B5)	-	-***	-	-	-
(B7) = (B1) + (B4)	+	+	-**	+	-
(B8) = (B1) + (B2) + (B4) + (B5)	+	+	-	+	+
(C1) Oldest adolescent in the hh	-***	+	-	+	-
(C2) Female x Oldest adolescent in the hh	+	-	+	-	-
(C3) = (C1) + (C2)	-*	-	+	-	-**
(C4) Post-COVID x Oldest adolescent in the hh	+**	+	-	+	-
(C5) Female x Post-COVID x Oldest adolescent in the hh	-	-	-	+	+
(C6) = (C4) + (C5)	-	+	-**	+	+
(C7) = (C1) + (C4)	+	+	-	+	-
(C8) = (C1) + (C2) + (C4) + (C5)	-	+	-**	-	-
(D1) Work for pay outside hh (pre-COVID)	-***	-**	-	-***	-***
(D2) Female x Work for pay outside hh (pre-COVID)	+	-	-	+	-
(D3) = (D1) + (D2)	-***	-***	-*	-***	-***
(D4) Post-COVID x Work for pay outside hh (pre-COVID)	+***	+*	-	+***	+***
(D5) Female x Post-COVID x Work for pay outside hh (pre-COVID)	-*	-***			-*
(D6) = (D4) + (D5)	+	-***	-	+***	+***

(D7) = (D1) + (D4)	+	-	-**	+	+
(D8) = (D1) + (D2) + (D4) + (D5)	-	-***	-**	+	-**
(E1) Work in hh enterprise	-***	-	-*	-***	-***
(E2) Female x Work in hh enterprise	-	+	-	+**	+***
(E3) = (E1) + (E2)	-***	-	-***	-***	-**
(E4) Post-COVID x Work in hh enterprise (pre-COVID)	+	-	-	+***	+
(E5) Female x Post-COVID x Work in hh enterprise	+	+**	+*	-**	-
(E6) = (E4) + (E5)	+	+**	+	+	-
(E7) = (E1) + (E4)	-	-**	-**	+	-
(E8) = (E1) + (E2) + (E4) + (E5)	-	+*	+	-	-
(F1) Mother's education: Primary or higher	+**	+	+	+***	
(F2) Female x Mother's education: Primary or higher	+	+	+	+	
(F3) = (F1) + (F2)	+***	+**	+***	+***	
(F4) Post-COVID x Mother's education: Primary or higher	+	+	-	-	
(F5) Female x Post-COVID x Mother's education: Primary or higher	-*	-	-	-	
(F6) = (F4) + (F5)	-**	-	-	-**	
(F7) = (F1) + (F4)	+	+	-	+	
(F8) = (F1) + (F2) + (F4) + (F5)	-	+	+	+	
(G1) Father's education: Primary or higher	+***	+***	+***	+**	
(G2) Female x Father's education: Primary or higher	+	-	-	-	
(G3) = (G1) + (G2)	+***	+***	+***	+	
(G4) Post-COVID x Father's education: Primary or higher	-	-**	-**	-	
(G5) Female x Post-COVID x Father's education: Primary or higher	+	+	+**	+	
(G6) = (G4) + (G5)	+	-	+	+	
(G7) = (G1) + (G4)	+**	-	-	+	
(G8) = (G1) + (G2) + (G4) + (G5)	+***	+	+***	+	
Household characteristics:					
(H1) Hh size	-***	-	-	-	-
(H2) Female x Hh size	+***	-	+***	+	-
(H3) = (H1) + (H2)	-	-	+***	+	-
(H4) Post-COVID x Hh size	+*	+	-*	+	+
(H5) Female x Post-COVID x Hh size	-**	-	+	-	-
(H6) = (H5) + (H4)	-	-	-	-	+
(H7) = (H1) + (H4)	+	+	-**	+	+
(H8) = (H1) + (H2) + (H4) + (H5)	-	-	-	-	-
(I1) Urban	+***	+	+	+	+

(I2) Female x Urban	-	+*	-	+	-
(I3) = (I1) + (I2)	+***	+***	-	+*	-
(I4) Post-COVID x Urban	-***	-	-	-	+
(I5) Female x Post-COVID x Urban	+***	-	+	+	-
(I6) = (I4) + (I5)	+	-	+	+	-
(I7) = (I1) + (I4)	-	-	-	+	+
(I8) = (I1) + (I2) + (I4) + (I5)	+***	+	+	+	-
(J1) Above-median assets	+***	-**	+	+**	+***
(J2) Female x Above-median assets	-	+	+	+	+
(J3) = (J1) + (J2)	+***	-	+	+***	+***
(J4) Post-COVID x Above-median assets	+	+**	+	-**	-
(J5) Female x Post-COVID x Above-median assets	-	-	-	-	+
(J6) = (J4) + (J5)	-	+	-	-***	-
(J7) = (J1) + (J4)	+***	+	+	-	-
(J8) = (J1) + (J2) + (J4) + (J5)	+	+	-	-	+
Observations	12,027	7,686	1,633	6,409	6,255
R-squared	0.171	0.093	0.245	0.195	0.163

Notes: Summary of regression results from regressions estimating the probability of attending school as a function of individual and household determinants, and their interactions with a post-COVID round indicator and a female indicator. Positive signs (+) indicate an associated increase, negative signs (-) a decrease in school attendance probabilities. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. Pre-COVID round from LSMS, post-COVID data from HFPS respectively for all countries. The sample consists of 16-18 years old adolescents for Malawi, and 10-18 years old adolescents for all other countries.

6. Conclusion

The COVID-19 pandemic has been an unprecedented global shock that has highlighted the vulnerability of systems and people to interconnected shocks and raised important questions about countries' readiness to face future pandemics. In this paper, we investigate how the pandemic has affected the school attendance of adolescent girls and boys in Sub-Saharan Africa. Our aim is to deepen the understanding of the impact of global shocks and draw lessons that can inform efforts to prevent or mitigate the negative effects of future pandemics.

Our study provides important insights into the gendered impacts of the COVID-19 pandemic on adolescents' school attendance in Sub-Saharan Africa. While we did not find evidence of increased education gender gaps during the pandemic, the erosion of traditionally protective factors, such as descent from household head, parental education, and household wealth, is concerning. For instance, being a descendant of the household head, which was previously correlated with a higher probability of school attendance among adolescents, lost its predictive power after the pandemic, indicating that family support for education may have weakened. Some adolescents may have had to forgo school attendance due to competing demands on household resources, such as providing additional caregiving support, or engaging in income-generating activities.

Moreover, our findings suggest that the pandemic has had far-reaching consequences for education in Sub-Saharan Africa. The fact that household wealth was no longer a significant predictor of school attendance in some countries post-pandemic suggests that the economic impact of the pandemic may have led to increased economic vulnerability among households, especially those previously categorized as above-median household wealth. This may have made it challenging for such households to provide the necessary resources to support their children's education.

The erosion of these protective factors, combined with the finding that the pandemic has affected the associations between locality level characteristics and school attendance, highlights the need for concerted efforts to mitigate the impact of pandemics and similar global shocks on education, particularly for the most vulnerable adolescents. These efforts may include providing economic support to households to help them meet the additional costs associated with education, promoting digital learning platforms to facilitate remote learning, and ensuring that adolescent girls and boys have access to quality education regardless of their gender or socioeconomic status. By learning from the lessons of the effects of this pandemic on education, we can better prepare and respond to future global shocks and ensure equitable access to education for all.

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Appendix

Table A1: Characteristics of the data used in this paper

A. Pre-COVID 19 comparison surveys

Country	Survey	Sample size (hhs)
Burkina Faso	Enquête Harmonisée sur le Conditions de Vie des Ménages (EHCVM) 2018/19	7,010
Ethiopia	Ethiopia Socioeconomic Survey (ESS) 2018/19	6,770
Kenya	Kenya Integrated Household Budget Survey (KIHBS) 2015/16	23,880
Malawi	Integrated Household Panel Survey (IHPS) 2019	11,428
Nigeria	General Household Survey, Panel (GHSP) 2018/19	4,976
Uganda	Uganda National Panel Survey (UNPS) 2018/19	3,078

B. HFPS and RRPS data

Country	Rounds used	Sampling approach	Sample size (hhs)	HFPS and RRPS education questions
Burkina Faso	Dec 2020 (R5)	Previous survey (EHCVM 2018/19)	1,944	Is [child] currently attending school for the 2020/2021 school year (in person or remotely)? Did [child] take on-site (in-person) classes during the 2020/21 school year?
Ethiopia	Dec 2020 (R8)	Previous survey (ESS 2018/19)	2,222	Has [child] registered for the 2021 school year? Has [child] attended school in the past 4 weeks?
	Apr-May 2021 (R11)		1,982	
Kenya	Sep-Nov 2020 (R3)	Previous survey (KIHBS 2015/16) and random digit dialling	4,979	Is [child] planning to attend school once they reopen or is [child] already attending school now?
	Jan-Mar 2021 (R4)		4,892	Is [child] planning to attend school once they reopen or is [child] already attending school now?
	Mar-Jun 2021 (R5)		5,854	Is [child] currently enrolled in school or planning to enrol once schools reopen?
	Jul-Nov 2021 (R6)		5,765	Is [child] currently enrolled in school or planning to enrol once schools reopen?
Malawi	Apr-May 2021 (R10)	Previous survey (IHPS 2019)	919	Are you currently attending school (the 2020-21 year)?
Nigeria	Oct 2020 (R6)	Previous survey (GHSP 2018)	1,762	Is [child] currently attending school either in-person or remotely? Has [child] been attending classes on-site since schools reopened after the closure due to the coronvirus crisis?
	Mar 2021 (R11)		1,680	Is [child] currently attending school either in-person or remotely?
Uganda	Oct-Nov 2020 (R4)	Previous survey (UNPS 2018/19)	2,136	Is [child] currently going to school?
	Mar-Apr 2021 (R6)		2,100	Is [child] currently going to school?
	Sep-Nov 2021 (R7), asking about May 2021		1,950	Was [child] attending school before schools were closed due to the second lockdown due to coronavirus in June 2021?

Table A2: Variable definitions

Variable	Description	Time-varying or time-invariant	Source
Female	Gender of the adolescent Male (0), Female (1)	Time-invariant	Corresponding round in baseline and HFPS
Post-COVID	Time dimension Baseline round (0), Post-COVID round (1)	Time-varying	Corresponding round in baseline and HFPS
Age	Age of the adolescent Continuous	Time-varying	Corresponding round in baseline and HFPS
Descendent of household head	Relationship of the adolescent to the household head No (0), Yes (1)	Time-invariant (usually)	Corresponding round in baseline and HFPS
Oldest adolescent in the household	Adolescent is the oldest person between 10-18 years of age in the household No (0), Yes (1)	Time-invariant (usually)	Corresponding round in baseline and HFPS
Work for pay outside the household	Pre-COVID employment status: Adolescent was working for pay outside the household pre-COVID No (0), Yes (1)	Time-invariant	Baseline survey rounds
Work in household farm, enterprise or other	Pre-COVID employment status: Adolescent was working in the household farm, enterprise or other No (0), Yes (1)	Time-invariant	Baseline survey rounds
Mother's education	Mother's highest education attained Less than primary (0), Primary or higher (1)	Time-invariant	Baseline survey rounds
Father's education	Father's highest education attained Less than primary (0), Primary or higher (1)	Time-invariant	Baseline survey rounds
Household size	Number of people in the adolescent's household Continuous	Time-varying	Corresponding round in baseline and HFPS
Urban	Household's location of residence Rural (0), Urban (1)	Time-invariant	Corresponding round in baseline and HFPS
Above-median assets	Household's wealth position according to asset index (construction following DHS methodology) Below-median households (0), Above-median households (1)	Time-invariant	Baseline survey rounds

Table A3: Gender gap estimations in school attendance of adolescent girls and boys before and during the pandemic, by country

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Burkina Faso	Ethiopia	Kenya	Malawi	Nigeria	Uganda
Female	0.016	0.005	-0.014**	-0.130***	-0.029*	0.036**
	(0.014)	(0.018)	(0.007)	(0.028)	(0.015)	(0.016)
HFPS round 3			-0.780***			
			(0.010)			
Female x round 3			0.042***			
			(0.014)			
HFPS round 4			0.069***			-0.354***
			(0.007)			(0.039)
Female x round 4			0.011			0.071
			(0.010)			(0.054)
HFPS round 5	0.107***		-0.477***			
	(0.038)		(0.008)			
Female x round 5	0.004		0.078***			
	(0.036)		(0.011)			
HFPS round 6			-0.174***		-0.177***	-0.532***
			(0.008)		(0.032)	(0.021)
Female x round 6			0.117***		0.073**	-0.014
			(0.011)		(0.033)	(0.030)
HFPS round 7						-0.204***
						(0.022)
Female x round 7						0.005
						(0.030)
HFPS round 8		0.038				
		(0.029)				
Female x round 8		0.029				
		(0.034)				
HFPS round 10				0.125***		
				(0.034)		
Female x round 10				0.083		
				(0.058)		
HFPS round 11		0.089***			0.077***	
		(0.029)			(0.024)	
Female x round 11		-0.056			0.000	
		(0.045)			(0.026)	
Constant	0.591***	0.721***	0.925***	0.735***	0.746***	0.836***
	(0.016)	(0.017)	(0.005)	(0.019)	(0.016)	(0.012)
Observations	12,462	9,940	32,543	1,906	11,179	11,038
R-squared	0.013	0.006	0.377	0.047	0.042	0.189
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1						

Note: OLS regression estimates with gender indicator, round fixed effects and gender-round interaction effects. Estimates for Kenya refer to children aged 10-17 years. Estimates for Malawi refer to children aged 15-18.

Table A4: Regression results: individual- and household-level correlates of school attendance for adolescent girls and boys before and during the pandemic, by country

	(1)	(2)	(3)	(4)	(5)
	Burkina Faso	Ethiopia	Malawi	Nigeria	Uganda
Post-COVID	0.102	0.066	0.288	0.312***	-0.423***
	(0.154)	(0.175)	(0.450)	(0.114)	(0.153)
Individual characteristics					
(A1) Female	-0.000	0.006	-0.120***	-0.065***	0.012
	(0.014)	(0.018)	(0.027)	(0.016)	(0.015)
(A2) Female x Post-COVID	0.028	-0.007	0.033	0.008	0.047
	(0.040)	(0.040)	(0.065)	(0.033)	(0.033)
(A3) = (A1) + (A2)	0.028	-0.001	-0.087	-0.057**	0.060**
	(0.038)	(0.039)	(0.061)	(0.027)	(0.030)
(B1) Age	-0.026***	-0.021***	-0.098***	-0.038***	-0.026***
	(0.003)	(0.005)	(0.013)	(0.004)	(0.004)
(B2) Post-COVID x Age	-0.005	0.007	0.017	-0.003	0.024**
	(0.008)	(0.011)	(0.026)	(0.007)	(0.010)
(B3) = (B1) + (B2)	-0.031***	-0.014	-0.081***	-0.041***	-0.003
	(0.008)	(0.011)	(0.023)	(0.006)	(0.009)
(C1) Descendent of the hh head	0.095***	0.197***	0.035	0.104**	0.113***
	(0.019)	(0.040)	(0.038)	(0.040)	(0.027)
(C2) Post-COVID x Descendent of the hh head	-0.006	-0.149**	-0.157*	-0.069	-0.152**
	(0.067)	(0.074)	(0.084)	(0.084)	(0.069)
(C3) = (C1) + (C2)	0.090	0.048	-0.123*	0.035	-0.038
	(0.064)	(0.076)	(0.074)	(0.068)	(0.065)
(D1) Oldest adolescent in the hh	-0.043***	0.007	0.025	-0.015	-0.039**
	(0.012)	(0.021)	(0.037)	(0.017)	(0.017)
(D2) Post-COVID x Oldest adolescent in the hh	0.065*	0.020	-0.216**	0.003	-0.011
	(0.039)	(0.059)	(0.086)	(0.040)	(0.044)
(D3) = (D1) + (D2)	0.023	0.028	-0.191**	-0.012	-0.050
	(0.038)	(0.054)	(0.075)	(0.036)	(0.042)
(E1) Work for pay outside hh (pre-COVID)	-0.421***	-0.374***	-0.257*	-0.645***	-0.667***
	(0.048)	(0.099)	(0.137)	(0.075)	(0.044)
(E2) Post-COVID x Work for pay outside hh (pre-COVID)	0.444***	0.140	-0.172	0.822***	0.542***
	(0.143)	(0.188)	(0.326)	(0.134)	(0.105)
(E3) = (E1) + (E2)	0.024	-0.234	-0.428	0.177	-0.125
	(0.131)	(0.178)	(0.374)	(0.170)	(0.101)
(F1) Pre-COVID: Work in hh enterprise (pre-COVID)	-0.159***	-0.019	-0.089***	-0.221***	-0.090***
	(0.033)	(0.024)	(0.028)	(0.031)	(0.020)

(F2) Post-COVID x Work in hh enterprise (pre-COVID)	0.045	0.011	0.025	0.193***	0.032
	(0.072)	(0.043)	(0.056)	(0.047)	(0.038)
(F3) = (F1) + (F2)	-0.114*	-0.008	-0.065	-0.028	-0.058*
	(0.064)	(0.041)	(0.053)	(0.036)	(0.034)
(G1) Mother's education: Primary or higher	0.070***	0.053**	0.098***	0.117***	
	(0.019)	(0.025)	(0.034)	(0.026)	
(G2) Post-COVID x Mother's education: Primary or higher	-0.060	0.003	-0.108	-0.103**	
	(0.047)	(0.049)	(0.069)	(0.050)	
(G3) = (G1) + (G2)	0.010	0.056	-0.010	0.014	
	(0.042)	(0.040)	(0.066)	(0.040)	
(H1) Father's education: Primary or higher	0.164***	0.114***	0.184***	0.068**	
	(0.019)	(0.022)	(0.038)	(0.032)	
(H2) Post-COVID x Father's education: Primary or higher	-0.011	-0.072	-0.043	-0.035	
	(0.038)	(0.051)	(0.072)	(0.051)	
(H3) = (H1) + (H2)	0.152***	0.041	0.141**	0.033	
	(0.035)	(0.046)	(0.066)	(0.034)	
Household characteristics:					
(I1) Hh size	-0.005***	-0.004	0.010	-0.001	-0.005
	(0.002)	(0.006)	(0.007)	(0.003)	(0.004)
(I2) Post-COVID x Hh size	0.003	0.004	-0.019	-0.001	0.004
	(0.006)	(0.011)	(0.016)	(0.005)	(0.008)
(I3) = (I1) + (I2)	-0.002	-0.000	-0.009	-0.001	-0.001
	(0.005)	(0.010)	(0.016)	(0.004)	(0.007)
(J1) Urban	0.143***	0.057**	-0.002	0.039	-0.013
	(0.021)	(0.027)	(0.043)	(0.027)	(0.017)
(J2) Post-COVID x Urban	-0.079*	-0.048	0.016	-0.000	0.024
	(0.046)	(0.064)	(0.072)	(0.048)	(0.053)
(J3) = (J1) + (J2)	0.063	0.009	0.014	0.039	0.011
	(0.042)	(0.065)	(0.064)	(0.037)	(0.051)
(K1) Above-median assets (pre-COVID)	0.126***	-0.049*	0.074**	0.105***	0.096***
	(0.021)	(0.028)	(0.036)	(0.028)	(0.019)
(K2) Post-COVID x Above-median assets (pre-COVID)	-0.001	0.122**	-0.094	-0.181***	-0.062
	(0.058)	(0.055)	(0.071)	(0.052)	(0.047)
(K3) = (K1) + (K2)	0.126**	0.073	-0.021	-0.076*	0.034
	(0.054)	(0.053)	(0.068)	(0.041)	(0.043)
Constant	0.842***	0.830***	2.091***	1.083***	1.179***
	(0.051)	(0.080)	(0.221)	(0.090)	(0.059)
Observations	12,027	7,686	1,633	6,409	6,255

R-squared	0.162	0.075	0.221	0.185	0.157

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Regression results estimating the probability of attending school as a function of individual and household determinants, and their interactions with a post-COVID round indicator. Marginal effects of all control variables reported with p-values. Pre-COVID round from LSMS, post-COVID data from HFPS respectively for all countries. The sample consists of 16-18 years old adolescents for Malawi, and 10-18 years old adolescents for all other countries.

Table A5: Regression results: individual- and household determinants of school attendance for adolescent girls and boys before and during the pandemic, by country

	(1)	(2)	(3)	(4)	(5)
	Burkina Faso	Ethiopia	Malawi	Nigeria	Uganda
Post-COVID	-0.141	0.139	1.321**	0.304	-0.232
	(0.220)	(0.222)	(0.532)	(0.188)	(0.211)
Female	-0.313***	-0.014	0.276	0.054	0.080
	(0.072)	(0.128)	(0.384)	(0.134)	(0.110)
Female x Post-COVID	0.438	-0.117	-1.379	-0.065	-0.353
	(0.289)	(0.319)	(0.843)	(0.287)	(0.275)
Individual characteristics					
(A1) Age	-0.029***	-0.020***	-0.078***	-0.026***	-0.024***
	(0.004)	(0.005)	(0.016)	(0.005)	(0.005)
(A2) Female x Age	0.009*	-0.003	-0.035	-0.023***	-0.005
	(0.005)	(0.007)	(0.023)	(0.007)	(0.007)
(A3) = (A1) + (A2)	-0.020***	-0.023***	-0.114***	-0.049***	-0.029***
	(0.004)	(0.006)	(0.019)	(0.006)	(0.004)
(A4) Post-COVID x Age	-0.008	-0.009	-0.032	-0.019**	0.014
	(0.011)	(0.012)	(0.029)	(0.009)	(0.013)
(A5) Female x Post-COVID x Age	0.005	0.025	0.064	0.030*	0.023
	(0.016)	(0.017)	(0.048)	(0.016)	(0.017)
(A6) = (A4) + (A5)	-0.004	0.017	0.032	0.011	0.036***
	(0.012)	(0.013)	(0.039)	(0.012)	(0.013)
(A7) = (A1) + (A4)	-0.038***	-0.028***	-0.111***	-0.045***	-0.011
	(0.011)	(0.011)	(0.028)	(0.008)	(0.012)
(A8) = (A1) + (A2) + (A4) + (A5)	-0.024**	-0.006	-0.082**	-0.038***	0.007
	(0.012)	(0.012)	(0.033)	(0.011)	(0.012)
(B1) Descendent of the hh head	0.004	0.171***	0.050	0.000	0.116**
	(0.025)	(0.062)	(0.054)	(0.053)	(0.051)
(B2) Female x Descendent of the hh head	0.159***	0.040	-0.053	0.142*	-0.013
	(0.031)	(0.068)	(0.078)	(0.075)	(0.059)
(B3) = (B1) + (B2)	0.163***	0.212***	-0.003	0.143***	0.103***
	(0.024)	(0.045)	(0.056)	(0.051)	(0.031)

(B4) Post-COVID x Descendent of the hh head	0.171	-0.028	-0.214**	0.096	-0.230**
	(0.128)	(0.144)	(0.090)	(0.129)	(0.102)
(B5) Female x Post-COVID x Direct descendent of the household head	-0.251*	-0.173	0.126	-0.238	0.141
	(0.143)	(0.163)	(0.168)	(0.187)	(0.127)
(B6) = (B4) + (B5)	-0.080	-0.201***	-0.088	-0.142	-0.089
	(0.077)	(0.073)	(0.133)	(0.120)	(0.085)
(B7) = (B1) + (B4)	0.174	0.143	-0.164**	0.096	-0.115
	(0.125)	(0.146)	(0.077)	(0.122)	(0.093)
(B8) = (B1) + (B2) + (B4) + (B5)	0.083	0.011	-0.091	0.001	0.014
	(0.073)	(0.063)	(0.109)	(0.089)	(0.077)
(C1) Oldest adolescent in the hh	-0.054***	0.025	-0.002	0.006	-0.023
	(0.017)	(0.027)	(0.044)	(0.022)	(0.024)
(C2) Female x Oldest adolescent in the hh	0.020	-0.035	0.049	-0.045	-0.032
	(0.027)	(0.037)	(0.069)	(0.032)	(0.035)
(C3) = (C1) + (C2)	-0.033*	-0.010	0.047	-0.040	-0.055**
	(0.020)	(0.028)	(0.054)	(0.024)	(0.024)
(C4) Post-COVID x Oldest adolescent in the hh	0.126**	0.061	-0.047	0.001	-0.028
	(0.057)	(0.065)	(0.102)	(0.049)	(0.057)
(C5) Female x Post-COVID x Oldest adolescent in the hh	-0.136	-0.036	-0.328	0.004	0.034
	(0.096)	(0.090)	(0.206)	(0.074)	(0.079)
(C6) = (C4) + (C5)	-0.010	0.024	-0.375**	0.005	0.006
	(0.065)	(0.070)	(0.164)	(0.062)	(0.060)
(C7) = (C1) + (C4)	0.072	0.086	-0.048	0.007	-0.051
	(0.055)	(0.057)	(0.089)	(0.041)	(0.054)
(C8) = (C1) + (C2) + (C4) + (C5)	-0.043	0.015	-0.327**	-0.035	-0.049
	(0.062)	(0.062)	(0.156)	(0.059)	(0.056)
(D1) Work for pay outside hh (pre-COVID)	-0.462***	-0.357**	-0.240	-0.683***	-0.663***
	(0.057)	(0.149)	(0.228)	(0.123)	(0.061)
(D2) Female x Work for pay outside hh (pre-COVID)	0.124	-0.060	-0.056	0.043	-0.036
	(0.099)	(0.165)	(0.293)	(0.129)	(0.069)
(D3) = (D1) + (D2)	-0.339***	-0.418***	-0.296*	-0.640***	-0.700***
	(0.080)	(0.084)	(0.173)	(0.046)	(0.038)
(D4) Post-COVID x Work for pay outside hh (pre-COVID)	0.587***	0.291*	-0.395	0.869***	0.678***
	(0.149)	(0.153)	(0.270)	(0.135)	(0.129)
(D5) Female x Post-COVID x Work for pay outside hh (pre-COVID)	-0.462*	-0.640***			-0.274*
	(0.242)	(0.176)			(0.163)
(D6) = (D4) + (D5)	0.125	-0.349***	-0.395	0.869***	0.404***

	(0.189)	(0.102)	(0.270)	(0.135)	(0.129)
(D7) = (D1) + (D4)	0.125	-0.066	-0.635**	0.186	0.014
	(0.133)	(0.109)	(0.316)	(0.175)	(0.124)
(D8) = (D1) + (D2) + (D4) + (D5)	-0.213	-0.767***	-0.691**	0.228	-0.295**
	(0.188)	(0.066)	(0.324)	(0.144)	(0.129)
(E1) Work in hh enterprise	-0.152***	-0.029	-0.070*	-0.276***	-0.133***
	(0.043)	(0.029)	(0.038)	(0.038)	(0.028)
(E2) Female x Work in hh enterprise	-0.013	0.012	-0.040	0.116**	0.088***
	(0.049)	(0.034)	(0.054)	(0.046)	(0.034)
(E3) = (E1) + (E2)	-0.164***	-0.017	-0.110***	-0.160***	-0.045**
	(0.039)	(0.030)	(0.039)	(0.037)	(0.022)
(E4) Post-COVID x Work in hh enterprise (pre-COVID)	0.046	-0.079	-0.082	0.298***	0.090
	(0.088)	(0.059)	(0.071)	(0.063)	(0.055)
(E5) Female x Post-COVID x Work in hh enterprise	0.003	0.193**	0.200*	-0.244**	-0.113
	(0.122)	(0.077)	(0.116)	(0.095)	(0.071)
(E6) = (E4) + (E5)	0.049	0.114**	0.117	0.054	-0.023
	(0.103)	(0.056)	(0.091)	(0.073)	(0.049)
(E7) = (E1) + (E4)	-0.106	-0.107**	-0.153**	0.021	-0.043
	(0.076)	(0.054)	(0.059)	(0.043)	(0.047)
(E8) = (E1) + (E2) + (E4) + (E5)	-0.115	0.097*	0.007	-0.106	-0.068
	(0.094)	(0.054)	(0.082)	(0.068)	(0.046)
(F1) Mother's education: Primary or higher	0.062**	0.033	0.081	0.098***	
	(0.025)	(0.031)	(0.050)	(0.028)	
(F2) Female x Mother's education: Primary or higher	0.015	0.037	0.043	0.042	
	(0.029)	(0.039)	(0.067)	(0.045)	
(F3) = (F1) + (F2)	0.077***	0.070**	0.124***	0.140***	
	(0.023)	(0.031)	(0.044)	(0.038)	
(F4) Post-COVID x Mother's education: Primary or higher	0.019	0.042	-0.086	-0.083	
	(0.061)	(0.063)	(0.094)	(0.059)	
(F5) Female x Post-COVID x Mother's education: Primary or higher	-0.163*	-0.060	-0.029	-0.041	
	(0.083)	(0.088)	(0.119)	(0.079)	
(F6) = (F4) + (F5)	-0.144**	-0.018	-0.114	-0.124**	
	(0.060)	(0.072)	(0.079)	(0.063)	
(F7) = (F1) + (F4)	0.081	0.076	-0.004	0.015	
	(0.053)	(0.051)	(0.082)	(0.049)	
(F8) = (F1) + (F2) + (F4) + (F5)	-0.067	0.052	0.009	0.016	
	(0.057)	(0.062)	(0.072)	(0.052)	
(G1) Father's education: Primary or higher	0.156***	0.135***	0.191***	0.082**	

	(0.023)	(0.026)	(0.047)	(0.033)	
(G2) Female x Father's education: Primary or higher	0.010	-0.041	-0.015	-0.040	
	(0.026)	(0.039)	(0.052)	(0.043)	
(G3) = (G1) + (G2)	0.166***	0.094***	0.176***	0.042	
	(0.023)	(0.033)	(0.043)	(0.043)	
(G4) Post-COVID x Father's education: Primary or higher	-0.056	-0.136**	-0.214**	-0.058	
	(0.052)	(0.053)	(0.084)	(0.056)	
(G5) Female x Post-COVID x Father's education: Primary or higher	0.089	0.097	0.323**	0.067	
	(0.064)	(0.092)	(0.139)	(0.086)	
(G6) = (G4) + (G5)	0.033	-0.039	0.109	0.009	
	(0.045)	(0.080)	(0.106)	(0.075)	
(G7) = (G1) + (G4)	0.100**	-0.001	-0.023	0.024	
	-0.047	(0.048)	(0.077)	(0.041)	
(G8) = (G1) + (G2) + (G4) + (G5)	0.199***	0.055	0.285***	0.051	
	(0.041)	(0.072)	(0.098)	(0.054)	
Household characteristics:					
(H1) Hh size	-0.009***	-0.004	-0.004	-0.002	-0.005
	(0.002)	(0.007)	(0.007)	(0.004)	(0.005)
(H2) Female x Hh size	0.006***	-0.001	0.028***	0.003	-0.001
	(0.002)	(0.009)	(0.009)	(0.004)	(0.006)
(H3) = (H1) + (H2)	-0.002	-0.004	0.024***	0.000	-0.006
	(0.002)	(0.008)	(0.009)	(0.003)	(0.004)
(H4) Post-COVID x Hh size	0.012*	0.012	-0.038*	0.003	0.007
	(0.007)	(0.015)	(0.020)	(0.007)	(0.010)
(H5) Female x Post-COVID x Hh size	-0.017**	-0.016	0.012	-0.006	-0.006
	(0.009)	(0.019)	(0.031)	(0.009)	(0.012)
(H6) = (H5) + (H4)	-0.005	-0.004	-0.026	-0.004	0.001
	(0.007)	(0.014)	(0.023)	(0.006)	(0.010)
(H7) = (H1) + (H4)	0.003	0.008	-0.043**	0.001	0.002
	(0.007)	(0.014)	(0.017)	(0.005)	(0.008)
(H8) = (H1) + (H2) + (H4) + (H5)	-0.008	-0.008	-0.002	-0.003	-0.005
	(0.007)	(0.012)	(0.021)	(0.006)	(0.009)
(I1) Urban	0.157***	0.005	0.025	0.017	0.001
	(0.026)	(0.039)	(0.046)	(0.031)	(0.025)
(I2) Female x Urban	-0.018	0.101*	-0.050	0.040	-0.024
	(0.031)	(0.053)	(0.065)	(0.040)	(0.033)
(I3) = (I1) + (I2)	0.139***	0.106***	-0.025	0.057*	-0.023
	(0.026)	(0.038)	(0.061)	(0.034)	(0.022)
(I4) Post-COVID x Urban	-0.184***	-0.017	-0.072	-0.010	0.052
	(0.056)	(0.076)	(0.076)	(0.053)	(0.070)
(I5) Female x Post-COVID x Urban	0.207***	-0.094	0.177	0.029	-0.060
	(0.075)	(0.115)	(0.149)	(0.083)	(0.075)

(I6) = (I4) + (I5)	0.023	-0.111	0.104	0.019	-0.009
	(0.062)	(0.090)	(0.121)	(0.071)	(0.060)
(I7) = (I1) + (I4)	-0.027	-0.012	-0.047	0.007	0.052
	-0.050	(0.074)	(0.062)	(0.046)	(0.069)
(I8) = (I1) + (I2) + (I4) + (I5)	0.162***	-0.005	0.080	0.076	-0.032
	(0.056)	(0.090)	(0.102)	(0.055)	(0.055)
(J1) Above-median assets	0.141***	-0.073**	0.043	0.077**	0.090***
	(0.026)	(0.036)	(0.042)	(0.034)	(0.029)
(J2) Female x Above-median assets	-0.035	0.049	0.047	0.052	0.009
	(0.031)	(0.050)	(0.066)	(0.043)	(0.033)
(J3) = (J1) + (J2)	0.107***	-0.024	0.090	0.129***	0.099***
	(0.025)	(0.040)	(0.054)	(0.033)	(0.020)
(J4) Post-COVID x Above-median assets	0.065	0.157**	0.009	-0.148**	-0.092
	(0.079)	(0.072)	(0.090)	(0.057)	(0.063)
(J5) Female x Post-COVID x Above-median assets	-0.129	-0.078	-0.133	-0.063	0.066
	(0.098)	(0.120)	(0.159)	(0.084)	(0.073)
(J6) = (J4) + (J5)	-0.064	0.079	-0.125	-0.212***	-0.026
	(0.073)	(0.092)	(0.112)	(0.072)	(0.055)
(J7) = (J1) + (J4)	0.206***	0.084	0.052	-0.072	-0.001
	(0.075)	(0.068)	(0.082)	(0.046)	(0.060)
(J8) = (J1) + (J2) + (J4) + (J5)	0.043	0.055	-0.035	-0.083	0.073
	(0.068)	(0.088)	(0.107)	(0.062)	(0.073)
Constant	1.000***	0.845***	1.876***	1.066***	1.152***
	(0.057)	(0.100)	(0.255)	(0.108)	(0.093)
Observations	12,027	7,686	1,633	6,409	6,255
R-squared	0.171	0.093	0.245	0.195	0.163

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Regression results estimating the probability of attending school as a function of individual and household determinants, and their interactions with a post-COVID round indicator and a female indicator. Marginal effects of all control variables reported with p-values. Pre-COVID round from LSMS, post-COVID data from HFPS respectively for all countries. The sample consists of 16-18 years old adolescents for Malawi, and 10-18 years old adolescents for all other countries.