Balancing Work and Childcare: Evidence from COVID-19 School Closures and Reopenings in Kenya

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Abstract

Childcare responsibilities are an important factor affecting household labor decisions. This paper uses COVID-19 school closure policies in Kenya as an exogenous shock to estimate the impact of changes in childcare needs on adults' labor. Partial school reopenings across grades combined with bi-monthly panel data allow us to compare labor decisions among otherwise similar households in a difference-in-difference design. We compare changes after schools partly reopened in Kenya in October for households with a child in grade 4 or 8—eligible to return to school—against households with a child in an adjacent grade. Having a child in grade 4 or 8 eligible to return increases adults' labor supply for both women and men in the following weeks. Gains are concentrated in household agriculture hours, with marginally significant increases in household enterprise, consistent with labor in these activities being more flexible than for wage employment. We find no effects on wage employment. Increased adult agriculture hours are partly a response to reduced child labor, suggesting that changes in the Kenyan school calendar relative to the agricultural cycle over the next three years may affect labor supply and household agricultural production. The impact of partial reopening on work hours corresponds to one-third of the fall in hours from before the first COVID-19 cases in Kenya to the first few months afterward, indicating that school closures are responsible for a significant share of the reduction in labor supply during the pandemic. More generally, results indicate that policies to increase availability and affordability of childcare options in Kenya could have large and significant impact on labor supply, even in the uncertain context of the global pandemic.

JEL: D04, D13, H12, J13, J22, J43, J46, O17

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1 Introduction

A number of studies have analyzed how the availability and cost of childcare affects adult labor in high-income countries, with a focus on women, but there is little evidence on this question in low- to middle-income countries (LMICs), and particularly in African countries. Such countries differ from more frequently studied high-income countries in many ways. Sub-Saharan African households have more children on average than other regions but also more commonly have additional household adults (UN 2020). Formal day care or early childhood development center availability is increasing, but from a low base and there are concerns around quality and cost (Samman et al. 2016). While the rate of female labor force participation is higher in this region than any other in the world, women's employment is concentrated in informal household agriculture and enterprise, such that Sub-Saharan Africa has the highest gender gap in wage employment of any global region (ILO 2017). It is not clear *a priori* how these differences would affect the relationship between childcare needs and labor participation in these contexts.

An important factor influencing the amount of childcare households need to provide for their children is the availability of low- or no-cost primary school and preschool. In response to the global COVID-19 pandemic, countries around the world implemented school closures in an effort to limit the spread of the virus. These school closures represent a shock to households' childcare burden. Children previously in school require increased care and attention in the home, varying by child age, at times when adult household members might usually be working. Unlike school breaks or vacations, pandemic closures were generally of undetermined duration and were concurrent with restrictions on alternative sources of childcare, limiting parents' ability to cope. Yet the literature on the impacts of pandemic-related school closures also focuses primarily on high-income countries.

This paper leverages COVID-19-related school closure policies in Kenya as exogenous shocks to households' childcare burdens to provide empirical estimates of the impact of childcare responsibilities on adults' labor in an LMIC setting in Africa. Exploiting quasi-random variation in the timing that children enrolled in different grades were eligible to return to school, we find that having a child that had been home due to closures return to school significantly increases labor supply in household agriculture and enterprise for both women and men.[1]

Kenya closed all schools nationwide soon after the first COVID-19 cases in the country in March 2020, and partially reopened schools for specific grades (4, 8 and 12) on 12 October 2020, several months prior to general reopening on 4 January 2021. Although initial school closures were coincident with many other changes that could affect both labor supply an demand, the timing of partial reopening was not associated with other pandemic-related policy changes. Using data from a nationally-representative panel phone survey reaching over 7,000 households, we implement a difference-in-difference identification strategy comparing changes in labor participation after the

1. School closure policies will have many impacts on the students. These could include falling behind academically and reducing long-term earning potential, nutrition and food security challenges for children receiving school lunches, harm to children's psychological well-being, and the possibility of not returning to school when they reopen: teen pregnancy or marriage, entering the labor force, parent inability to pay school fees. Here we focus on the impacts of school closures on household adults.

partial reopening for adults in households with children in grades eligible to return to school against those with children in adjacent grades, and include individual and county-by-month fixed effects to isolate the impact of school closure policy.

Consistent with evidence from other countries, childcare hours in Kenya increase during the pandemic when schools are closed, and return to pre-pandemic levels after schools fully reopen. Women experience a larger increase during school closures than men, though both contribute to household childcare. Very few households report using any formal childcare, even in urban areas and as pandemic restrictions are eased over time. Children are reported to spend their time when out of school almost exclusively at home and almost always in the presence of a parent, including when that parent is working.

After schools partly reopen, adults in households with children in grades 4 or 8 (eligible to return) increase their labor participation relative to households with children in adjacent grades. Impacts are not significantly different between women and men, contrasting with evidence from the United States and other contexts finding that mothers' labor has been more negatively affected by increased childcare burdens during the pandemic than fathers' (e.g., Collins et al. (2021) and Furman, Kearney, and Powell (2021)). Effects are concentrated on the extensive margin: the partial reopening is not associated with a greater likelihood of engaging in work in the last 7 days, with the exception of a marginally significant increase in non-farm enterprise participation. This sector may be more constrained than household agriculture in combining work with childcare, but more flexible than wage work in allowing adults to begin working soon after a change in their childcare burden. On the intensive margin, total work hours in the past 7 days increase by 4.2, with a 31% increase relative to the control mean for household agriculture, and a 38% increase for household non-farm enterprise. We find no impacts on wage employment in the time period we observe after the partial reopening, suggesting it is easier for adults to alter their labor participation in household work sectors than in paid employment.[2] The impact of partial reopening on adult work hours corresponds to one-third of the fall in hours from February 2020, before the first COVID-19 cases in Kenya in March, to May-July, indicating that school closures are responsible for a significant share of the reduction in labor supply during the pandemic.

We present evidence that these results are driven by changes in the household childcare burden and by changes in child agricultural labor. First, there is heterogeneity in how childcare is affected by the partial school reopening, and adults in households with a larger decrease in childcare experience larger increases in work hours. Importantly, the composition of other household children matters: the net change in respondent childcare hours from a child in grade 4 or 8 returning to school is positive rather than negative for households with young children age 0-4. This points to the important role of older siblings in providing childcare in this context, as documented in Jakiela et al. (2020) and others. Households with young children respond to the increased burden by multitasking childcare with other household activities, and this appears to reduce labor productivity,

2. Analysis of longer-term impacts is complicated by the fact that schools fully reopened in January 2021, meaning our comparison group also becomes "treated."

consistent with evidence from Uganda (Delecourt and Fitzpatrick 2019). These results indicate that availability of childcare has important implications for household labor in Kenya.

Second, the partial reopening coincided with the main harvest season in Kenya, and child agricultural labor is common in our sample. Child agriculture hours decrease in households with a child eligible to return to school, and the decrease represents approximately 30% of the increase in adult agriculture hours. Changes in the timing of school breaks relative to the agricultural cycle in Kenya as the school calendar changes over the next several years until terms realign with the pre-pandemic academic calendar may have further impacts on household agricultural production.

In addition to effects of schools reopening on individual labor we also consider short-term effects on household earnings, though our earnings data are limited. We observe decreases in total earnings in the last 14 days for treatment households. This appears to be driven in part by efforts to shift household agriculture and enterprise earnings forward to precede the date schools reopened in order to be able to pay school costs. These costs help explain why not all children returned to school after the partial reopening, and indicate that liquidity constraints may affect households ability to take advantage of potential childcare options.

This paper contributes to a broad literature on the interaction between adults' childcare and labor decisions (e.g., Browning 1992; Connelly 1992; Ribar 1992). Many studies explore the impacts on parents' labor of expanding or subsidizing preschool, other early childhood programs, and daycare that relieve the childcare burden (e.g., Anderson and Levine 1999; Attanasio et al. 2021; Berlinski and Galiani 2007; Berlinski, Galiani, and McEwan 2011; Evans et al. 2017; Fitzpatrick 2010) or of expanding formal schooling or children reaching the age of school enrollment (e.g., Barua 2014; Gelbach 2002; Jaume and Willén 2019). These papers largely focus on childcare for younger children, typically ages 6 and below, and also typically analyze positive childcare shocks—i.e., policies that reduce the childcare burden. This paper considers the impacts of alleviating a large *negative* childcare shock—school closures—through a policy that affects older children (above age 10). Our study is closest to Jaume and Willén (2021) who find that teacher strikes in Argentina—totalling around one week per year on average over a 10 year period—significantly reduce labor participation and earnings, particularly for mothers. The school closures we analyze are much longer in duration (over half a year), which allows us to analyze the impact of the reopening. We demonstrate that the childcare needs of older children and the informal care and labor they provide within the household during school closures can significantly affect both parents' labor decisions.

We add to a small literature on childcare and parents' labor outcomes in Africa and in LMICs more generally. This literature generally suggests childcare plays a role in labor decisions and outcomes—particularly for women—though results are mixed and causal identification is limited. Two studies report on associations between availability and cost of childcare on labor outcomes but do not identify causal impacts of childcare needs (Lokshin, Glinskaya, and Garcia (1999) in Kenya, Quisumbing, Hallman, and Ruel (2007) in urban Ghana and Guatemala). Another two studies report on randomly offered subsidized childcare in urban settings in Africa (Clark et al. (2019) in Nairobi, Bjorvatn et al. (2021) in peri-urban Uganda) with mixed but generally positive results

on mothers' labor and earnings. Only one study reports on impacts of childcare in a rural setting in Africa: Martinez, Naudeau, and Pereira (2012) randomize community preschool provision in Mozambique and find positive impacts of preschool enrollment on labor supply of fathers but not mothers. As with most of the literature, these studies focus on childcare needs of children below school-age. This paper estimates causal impacts of a change in household childcare needs using a natural experiment affecting both rural and urban households, and focusing on school-age children who may both demand and supply childcare in a household.

The paper also contributes to the literature on the labor impacts of pandemics. A growing number of studies analyzes the effect of the COVID-19 pandemic on gender labor gaps and looks at childcare as a factor exacerbating these gaps (e.g., Albanesi and Kim 2021; Alon et al. 2021; Amuedo-Dorantes et al. 2020; Collins et al. 2021; Del Boca et al. 2020; Farré et al. 2020; Furman, Kearney, and Powell 2021; Grantham et al. 2021; Heggeness 2020; Ma, Sun, and Xue 2020; Prados and Zamarro 2021; Zamarro and Prados 2021), almost exclusively reporting on high-income settings. Though descriptive evidence from COVID-19 in India and South Africa and from Ebola in Sierra Leone and Liberia suggests that women increase domestic work and reduce their labor during pandemics more than men (Casale and Posel 2020; Chauhan 2020; Deshpande 2020; Wenham et al. 2020), we are not aware of any study analyzing the causal impact of changes to household childcare needs during a pandemic on parents' labor in a LMIC. We analyze the impacts of changes in school closure policies on adults' labor during the COVID-19 pandemic in an African country, and estimate that school closures account for around one-third of the pandemic reduction in work hours.

These results are highly relevant to policy-makers, as most countries globally enacted school closures in response to the pandemic, some of these closures are still partly in force, and some countries may close schools again in response to new waves of the virus. These policies have significant effects on adults' labor outcomes even in the short term, in addition to any impacts on the children themselves, which must be considered against the benefits of keeping children out of schools during a pandemic. A back-of-the-envelope calculation indicates that school closures decreased work hours across Kenya by 2.4 billion during the period schools were closed. More generally, we demonstrate that reducing the burden of childcare on households can lead to important increases in labor participation, though the costs of accessing sources of childcare may present challenges to many households. Policies to increase availability and affordability of childcare options in Kenya and similar contexts could have large and significant economic impacts, even in the uncertain conditions of a global pandemic.

2 Context and Data

Countries across the world implemented a variety of policies in response to the COVID-19 pandemic. Common policy responses include mask-wearing mandates, restrictions on movement (both across and within countries), curfews, closure of non-essential businesses, and bans or broad restrictions on

large gatherings. In addition, most countries around the world closed schools, suspending in-person classes.

This section describes school closure policies implemented in Kenya, the data we use to analyze their impacts on labor outcomes, and summarizes information on childcare arrangements in Kenya during the pandemic.

2.1 COVID-19 and School Closure Policies in Kenya

School closure decisions in Kenya were made at the national level affecting all schools in the country. This top-down decision-making was maintained throughout the pandemic. Figure 1 shows a timeline of school closures and reopenings, along with the timing of other key pandemic-related policy changes, overlaid on a graph of weekly confirmed COVID-19 cases in Kenya.[3]

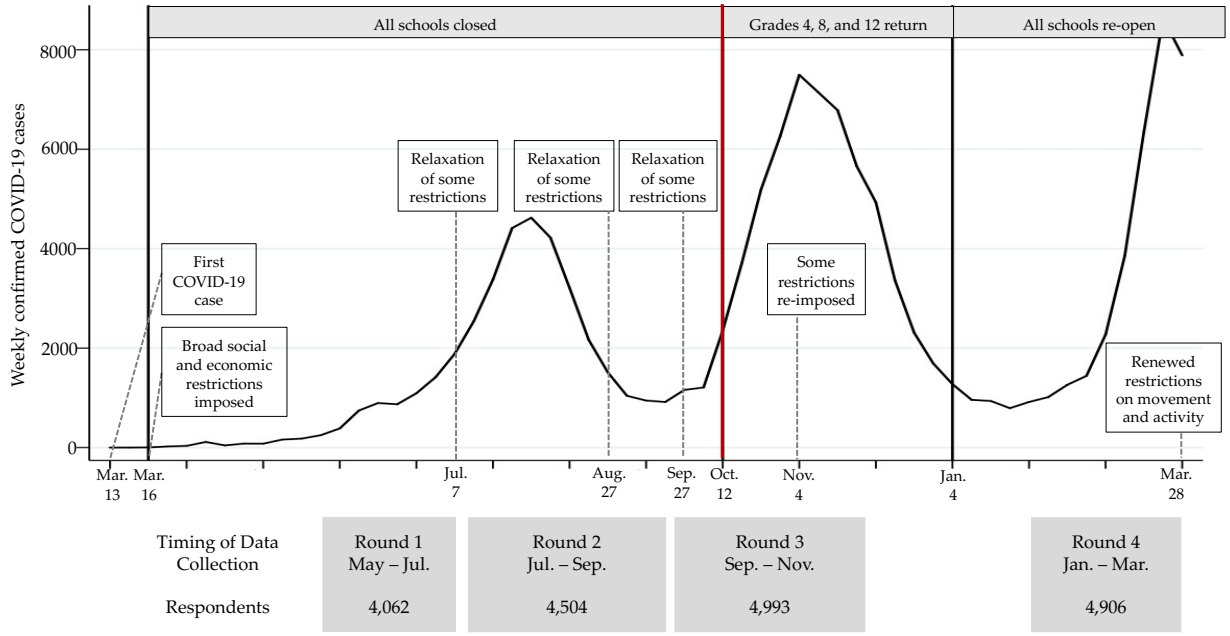
Schools in Kenya initially closed on 16 March 2020, days after the first reported COVID-19 cases in the country.These closures were part of a broad set of national social and economic restrictions imposed to reduce the risk of disease transmission. On 24 June the government proposed that schools might reopen in September, but on 7 July it announced that schools would remain closed until 2021. This decision was partially reversed in mid-September. On 15 September the Ministry of Education released guidelines for safe reopening of schools, and on 21 September they asked all teachers to report back to their schools by 28 September. The timing and nature of reopening remained uncertain, however, until 6 October when the Ministry announced that students in grades 4, 8, and 12—those sitting national exams—should return to school on 12 October. This announcement was presented in the media as "a shocking move that caught parents and candidates off guard" (The Star 2020b). The President then announced on 4 November that schools would reopen fully for all students on 4 January 2021.

Initial school closures in March 2020 were coincident with a variety of other policies. Kenya simultaneously cancelled public events, restricted gatherings to 10 people or less, recommended closing non-essential workplaces, restricted international and domestic travel, and recommended closing or significantly reducing public transport within a week of the school closures. Nationwide nightly curfews were imposed soon after. In contrast, the partial and full reopening of schools were not accompanied directly by other changes in national pandemic-related policies.[4] Reopenings therefore allow for a cleaner identification of the effects of school closure policies than school closures. Further, the reopening of schools is more interesting from a policy perspective as it represents a positive shock (a reduction) to households' childcare burden. For these reasons, our analysis focuses on the impacts of school reopenings rather than the initial closures.

3. An overview of specific pandemic-related policy changes is presented in Appendix C.

4. The partial reopening did follow a relaxation of some restrictions on social activities on September 27, before a second COVID-19 wave led to some restrictions being reimposed on 4 November. The restrictions that were relaxed included the timing of the nightly curfew, operating hours of bars and restaurants, and some limitations on large gatherings.

Figure 1: Kenya COVID-19 cases, pandemic policy, and data collection timeline



The figure shows the evolution of weekly confirmed COVID-19 cases in Kenya over time, along with the timing of key pandemic policy changes. The red bar indicates the partial school reopening on 12 October, the focus of the analysis. The majority of policies were implemented at the national level, with the exception of targeted restrictions on movement in and out of specific counties with higher caseloads. 'Relaxation of some restrictions' indicates that one or more of these constraints were at least partially reduced. Specific policy changes are outlined in Appendix C. Sources: COVID-19 government response timeline for Kenya; Kenya COVID Tracker; Presidency of Kenya; Kenya Ministry of Education Twitter feed; COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University

2.2 Data

Data come from the Kenya COVID-19 Rapid Response Phone Surveys (RRPS), collected by the Kenya National Bureau of Statistics with support from the World Bank.[5] We use data from the first four rounds of the RRPS, covering May 2020-March 2021. Each round lasted approximately 2.5 months and covered a representative cross-section of households each week. In addition, we construct additional measures for February 2020, before the first COVID-19 cases in Kenya, using recall questions from the first time a household was surveyed. Figure 1 shows the timing and number of respondents for each survey round.

The main RRPS sample is drawn from the nationally-representative Kenya Integrated Household Budget Survey (KIHBS) conducted in 2015-2016: 9,009 households that were interviewed and provided a phone number served as the primary sampling frame for the RRPS. All households in the sample were targeted in each round regardless of whether they were reached in a previous round. By the fourth round of the RRPS, 5,499 KIHBS households had been successfully surveyed at least once. The KIHBS sample is supplemented by random digit dialing (RDD). From a sampling frame

5. See Pape et al. 2021 for more detail.

of 5,000 randomly selected numbers, of which 4,075 were active, 1,554 households had completed at least one survey by round four.

The sample is intended to be representative of the population of Kenya using cell phones. In the 2019 Kenya Continuous Household Survey 80% of households nationally report owning a mobile phone, though certain counties—notably in the northeast—have much lower mobile phone penetration. Pape et al. 2021 report that KIHBS households that provided a phone number and those that were successfully surveyed in the RRPS have better socioeconomic conditions—measured by housing materials and asset ownership—than households that did not provide a phone number or that did but were not reached for the RRPS. The RRPS data include household survey weights adjusted based on the weights for the nationally-representative KIHBS to consider different probabilities of selection and to adjust for differential response rates across counties and rural/urban strata. We do not apply these household weights for our individual-level analyses, as we focus on a sub-sample of households with children in grades around those that returned to school during the October partial reopening and surveying was not intended to be representative of such households. Table A2 includes summary statistics for sample households and respondents, the first time they are observed.

The primary outcomes of interest for this paper are measures of individual labor participation collected for all household adults. The extensive margin of labor is measured by work participation in the last 7 days prior to the survey date in three activities: employed/wage labor, household non-farm enterprise, and household agriculture. The intensive margin of labor is captured using hours of work by activity in the last 7 days; an individual not working in a given activity is coded as working 0 hours. The survey also includes data on total child hours spent working in household agriculture.

Respondents report estimates of total household earnings from agricultural activities and from household enterprises as well as profit from household enterprises over the last 14 days. Wage earnings in the last 14 days are reported for individual wage workers. For comparability with the measures of household agriculture and enterprise earnings, we aggregate wage earnings to the household level. Due to variation in timing of earnings across activities, a large share of households report 0 earnings in the last 14 days despite positive hours worked.

We use information on what grades children were enrolled in prior to the initial closures to identify 'treatment' households with children eligible to return to school for the October partial reopening, and 'control' households with children in adjacent grades. No official estimates exist of the share of eligible children that returned nationally, but media coverage suggests many children did not return. The RRPS asks about school attendance for a randomly selected child in survey round 3 over the period of the partial school reopening, and in round 4 after the full reopening it includes a recall question about the date individual children returned to school. Combining these questions we find that only 42% of eligible children in grades 4, 8, and 12 in the sample are reported to have returned to school after the partial reopening in October 2020. This contrasts with 97% of children across all grades that were in school before the pandemic reported to have returned

to school after the full reopening in January 2021. Several news stories from around the partial reopening suggest that schools and parents were unprepared for the sudden reopening, which may have contributed to the low rates of return for the partial reopening compared to the full reopening.

Finally, the data include questions on childcare during the pandemic. For a randomly selected child in each survey round, the RRPS asks which household member has primary responsibility for the child's care, which household member was with the child in the last 15 minutes, and where and in whose company the child stayed during the day when out of school (from a set of general categories).[6] In addition, all survey rounds include the number of hours spent on childcare in the past 7 days by the respondent, and starting in round 4 by each other household adult and by all household children together.[7]

2.3 Childcare During the Pandemic

The government of Kenya provides free primary and secondary education to all children starting at age 6.[8] Pre-primary or nursery school is also broadly available in Kenya for children ages 4 and 5. In our sample 54% of children age 4, 80% of children age 5, and at least 93% of children at each age from 6 to 16 were reported to have been enrolled in school in February 2020 before the first local COVID-19 cases (Figure A1).

School closures represent a large and unexpected shock to household childcare needs, as children are home and require care and supervision during the working day. Unlike school breaks between terms, initial school closures were expected to last at least a few months, much longer than the usual school breaks. Further, the timing and duration of pandemic-related school closures was not known ahead of time, meaning parents were not able to plan ahead to smooth their childcare and labor decisions. A general announcement about schools beginning to reopen was made in mid-September but the specifics of which grades would return and when were not announced until less than 1 week before.

Low use of childcare outside the home in Kenya and potential pandemic restrictions on such services where they were available mean that the only option available to most households was to keep their children at home while schools were closed. Daycares and other early childhood care centers are common in larger cities in Kenya, as are in-home paid care arrangements such as nannies (Clark et al. 2019; Dimova et al. 2015; Garcia, Pence, and Evans 2008), but are rare elsewhere in the country. Disruptions of formal care availability during the pandemic are therefore not likely to affect the large majority of households in Kenya.

For nearly all households in our sample the primary childcare arrangement during the pandemic

6. Respondents are instructed to select all childcare arrangements used. Nevertheless, respondents might omit types of childcare that are used less frequently or that are seen as less socially acceptable (e.g., leaving a child at home by themselves).

7. The survey asks "In the last 7 days, how many hours did you spend doing childcare?" and does not distinguish between time actively spent caring for a child and time spent on other activities while responsible for a child. We topcode reported childcare hours at 140, or 20 hours a day. Over 15% of respondents in our analysis sample indicate spending at least this many hours on childcare.

8. Parents pay fees for school materials, and may also pay to enroll children in private schools.

is for children to stay at home with a parent (Figure A2). Households indicate very few alternative childcare arrangements. Some households report that children spend part of the day at home with another adult (11%) or by themselves (7%), but almost no households report their children spending any time outside the home during the period of school closures. In many households, parents are likely caring for children while working on the household farm or business, but very few households report that this happens at a place of work outside the home (0.3%). Just one household in the sample reports their child spending any time in daycare/other childcare outside the home, and 0.3% report the child staying home with a domestic helper. Reported childcare measures are largely unchanged from May to November 2020, even as COVID-related restrictions in Kenya were largely eased and case numbers fluctuated.

Figure 2, Panel A presents how hours of childcare provided by different sources vary with the number of household children, using data from survey round 4 after schools fully reopened. Previous survey rounds only include data on the respondent's childcare hours. Consistent with low reported use of non-household childcare arrangements, non-household members provide very little childcare—around 2 hours per week on average. 85% of households with children report 0 hours of care from non-household members in the last 7 days.

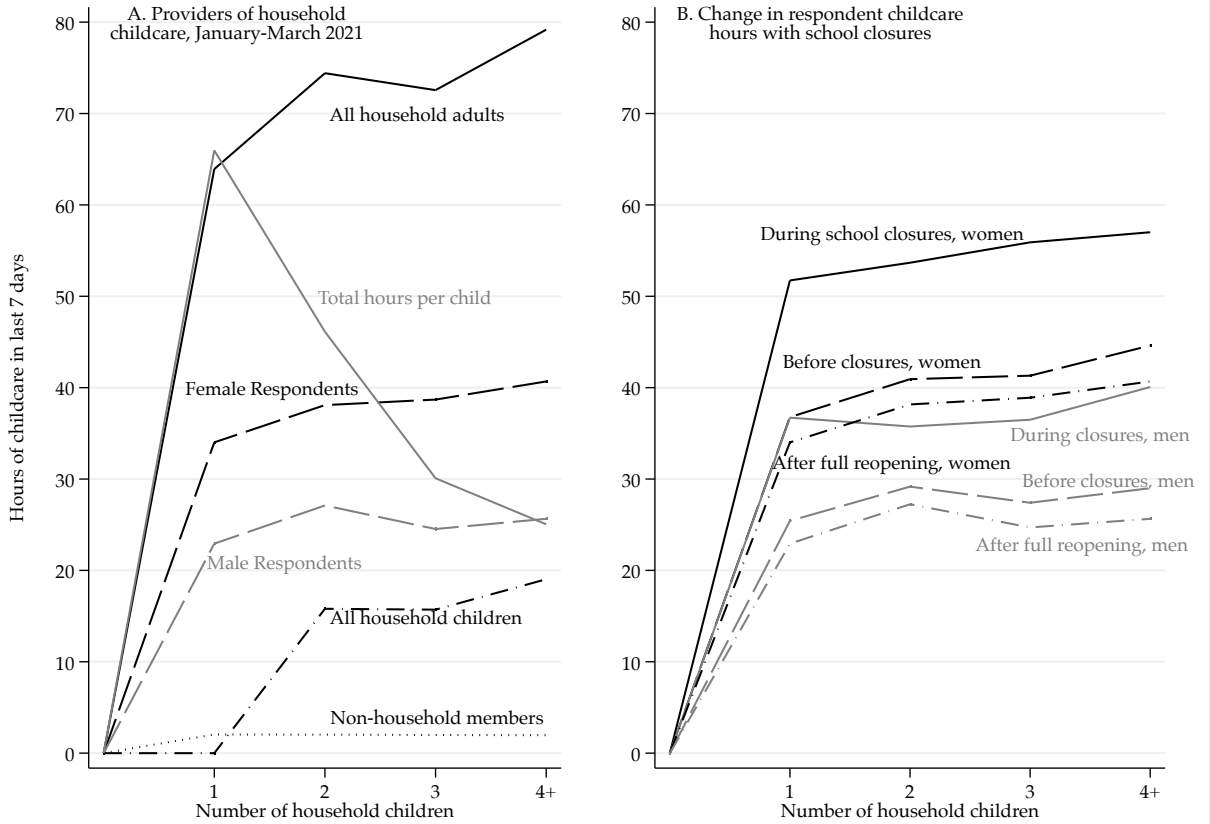
Childcare in Kenya is primarily the responsibility of female parents. For 85% of children in the sample, the primary caregiver for children is a woman, and for 78% it is the mother compared to 10% for the father and for a grandparent. Female respondents spend more hours on childcare each week (between 35-40) than males on average, but men also contribute significant childcare hours (around 25). Respondents provide 46% of total household childcare on average, which aligns with expectations of parents being the primary care providers, with both parents involved.

Many households have other adult members besides the parent who also provide some childcare support, though in our sample the difference in number of adults between households with and without children is not significant. Households with children have 0.5 other adults on average (other adults are present in just under 40% of these households). IThe data suggest that other household adults provide around 10 hours per week of childcare on average.

Siblings (particularly older girls) play an important role in helping with childcare, but often still require some adult oversight (see e.g., Jakiela et al. 2020). In round 4 of the RRPS, 55% of children are reported to have provided childcare to other household children in the last 7 days. In households with at least 2 children such that an older sibling can care for a younger one, children provide 15-20 hours of childcare per week. These data are from after schools fully reopened; one impact of school closures may have been for school-age children to provide more childcare to their younger siblings as they were not in school during the days.

Figure 2 indicates that there are significant economies of scale in childcare hours in Kenya. In households with multiple children, total childcare hours are likely determined by the child that requires the most care, with additional children's needs mostly provided in the time already allocated for the neediest child. Total hours of childcare per child falls rapidly with additional children, and respondent childcare hours barely increase after the first child. This suggests that households are

Figure 2: Childcare hours in the last 7 days by count of children, by provider of care and school closure status



The figures show mean childcare hours in the last 7 days by number of household children (ages 0-17).
Panel A presents data from survey round 4 (January-March 2021) which asked about childcare hours for each household adult, for all children in total, and for all non-household members in total. Previous rounds only ask about childcare hours for the respondent. The hours for 'all household adults' includes the respondent's hours. Total hours per child is the sum of all childcare hours divided by the number of children.
Panel B presents data for female and male *respondent* childcare hours before school closures (dashed lines, recall data from survey round 4 about January-early March 2020), during school closures (solid lines, survey rounds 1-3 covering May-November 2020), and after schools fully reopened (dash-dot lines, survey round 4 covering January-March 2021). Data on childcare hours before and during the school closures period for other care providers are not available.

able to care for multiple children simultaneously during the same hours, with older siblings and other household adults helping to make up for the marginal increase in childcare needs that the parents cannot absorb into their existing childcare hours. This highlights further the role of older children in reducing parents' childcare burden.

Panel B of Figure 2 shows how childcare hours changed as school closure policies changed. We focus on households respondents as we do not have data on childcare hours for other providers before the full school reopening. Before the pandemic and school closures, in households with at least one child, women spent 40.4 hours per week on childcare on average while men spent 27.8 hours per week. This gap increased during the pandemic period when schools were closed: women with children increased their childcare by 14.1 hours per week compared to 9.5 for men. Thus while

women bore slightly more of the pandemic childcare shock from school closures, the burden for men also increased. Average childcare hours fell after schools reopened for both women and men to slightly below the levels before the pandemic.

As with the data in Panel A from after the full school reopening, childcare hours do not increase by much as the number of household children increases during the pandemic school closures period. There also appears to be no difference in how childcare hours increase with additional children by time period. This indicates that pandemic school closures primarily affect the household childcare burden by increasing the base level of care required by the highest-need child, without affecting household economies of scale in childcare. Households that have young children requiring large amounts of care might be less affected by school closures as they could absorb additional childcare needs into their existing childcare time allocation. In fact, adults in these households might see their childcare burden fall as older siblings out of school provide more childcare. Conversely, households with no young children should be more affected by school closures, as parents would need to increase their childcare allocation to meet the increased need of schoolchildren out of school.

3 Empirical Approach

We identify the effect of a shock to the childcare burden from school closures through a difference-in-difference research design comparing outcomes before and after changes in school closure policies between households with and without children affected by the change in policy. In general, we estimate regressions of the form

$$y_{iht} = \alpha + \beta_1 \cdot Post_t \times Treat_h + \beta_2 \cdot Treat_h + \beta_3 \cdot Post_t + \mu_i + County_h \times \tau_t + X_{iht} + \epsilon_{iht} \quad (1)$$

y_{iht} are labor outcomes for individual i in household h at time t. $Post_t$ is a dummy variable taking a value of 1 for time periods t after a school closure policy change, and 0 otherwise. $Treat_h$ indicates whether the household is affected by the change. β_1 is the coefficient of interest, as it represents the differential effect of being in a period after school closure policy changes on households that are affected by the change in policy. We refer to this as the 'treatment'. Individual fixed effects μ_i absorb time invariant characteristics of the individuals and their households which may affect labor outcomes. County-by-month fixed effects account for location effects and allow these to vary during the pandemic period, controlling for common shocks affecting households across locations and over time. Finally, X_{iht} is a vector of possibly time-varying individual- and household-level controls.[9] We cluster standard errors at the household level.

We focus the analysis on 'prime-age' adults aged 25-50 (roughly the 25th and 75th percentiles of adult ages in our sample) for our analyses. These are the individuals most likely to have children and be working.

9. The baseline set of controls includes individual age, sex, and household headship status, the sex and age of the household head, the number of adults, young children (age 0-4), and school-age children (5-17) in the household, an index of household wealth based on asset ownership, and dummies for the household having an electricity connection, being in an urban location, being engaged in agriculture, and being engaged in household enterprise.

The primary labor outcomes we analyze are individual work participation and hours in the last 7 days by activity. In addition, we report effects on household earnings in the last 14 days by activity. Earnings data are limited—for all activities the 75th percentile of household earnings is 0—in part due to a focus on the last 14 days, which does not accommodate seasonality or other variability in earnings. The analysis thus focuses primarily on work participation and hours.

Changes in school closure policies in Kenya are made nationally from the top down and represent exogenous shocks to households that are not related to local economic or health conditions. We focus on the partial reopening of schools on 12 October, and compare data from the period when schools were fully closed to the period after the partial reopening, omitting data from after schools fully reopened. Our primary analysis therefore defines $Post = 1$ for observations on or after 12 October 2020, excluding observations after schools fully reopened in January 2021.

Due to limitations in the data on whether individual children returned to school after the partial reopening, we define $Treat$ as a dummy variable for a household having any child eligible to return to school. We focus on intent to treat impacts, but also present results estimating treatment on the treated impacts using whether a household has any child eligible to return to school after the partial reopening as an instrument for whether the household reports any child having returned to school in that period. Results from this approach are qualitatively similar to the main intent to treat estimates.

We define 'treatment' households as those with children enrolled in grades 4 or 8 (eligible to return to school)[10] while 'control' households have children in grades 3, 5, 7, or 9. Some 'mixed' households include children in both grade groups. As some of their children in the relevant grade range return to school but some do not, we might expect different outcomes for this group and therefore separate them from 'treatment' households in our analyses.

Identification is based on the argument that observed and unobserved factors that could affect outcomes of interest are continuous around the thresholds of children being in different grades of school. Respondent and household characteristics and labor participation are similar for treatment and control households during the full school closures period (Table A1).

Our sample of households with at least 1 child in grades 3, 4, 5, 7, 8, or 9 differs in many ways from the full survey sample of households with any children (Table A2, so estimates of the impacts of a childcare shock on adult labor might not generalize to a childcare shock affecting households with only younger children. The youngest children in the relevant grade range in our sample are 8 years old, and the oldest are 17. We expect these children to require less childcare time than a younger child and to provide more care to any younger siblings. This suggests that our estimated impacts on labor will likely be smaller than the impacts of a younger child returning to school, if a shock to the household childcare burden is the main mechanism.

We test for two mechanisms by which a child in grade 4 or 8 returning to school might affect adult labor. First, we directly test for impacts of the partial school reopening on childcare using

10. Few households report any children in grade 12, so we exclude them from our treatment definition. We expect these children would have likely been net suppliers of childcare rather than requiring additional care during school closures.

Equation 1 with respondent childcare hours in the last 7 as the dependent variable. As schoolchildren may also care for younger siblings, we test for differences in childcare impacts by the presence of other children, and young children aged 0-4 in particular. We do not measure childcare provided by household members other than the respondent in the survey round coincident the partial reopening, so tests of impacts on respondent childcare hours are considered indicative of broader household impacts.

Second, reopening-eligible children are old enough to contribute to household work, particularly on family farms, so school reopenings may also affect adult labor through the loss of child labor. We estimate Equation 1 with total child agricultural labor as the dependent variable, and consider differences in impacts by whether households are engaged in agriculture.

We connect these mechanisms to impacts on adult labor by considering whether differences in impacts on respondent childcare and child agricultural labor in certain sub-groups align with differences in impacts on adult labor. To test for differences across subgroups, we estimate versions of Equation 1 fully interacting $Post$, $Treat$, and a household characteristic Z. In addition to heterogeneity by the presence of other household children, we consider heterogeneity in impacts by household engagement in agriculture and enterprise, rural/urban status, and the number of household adults.

4 Results

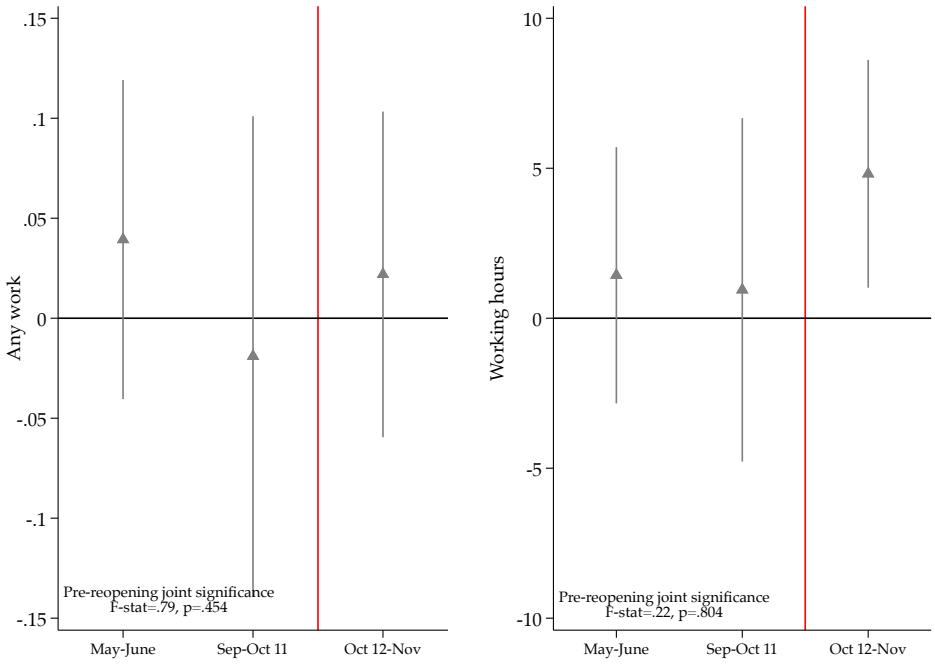
We analyze impacts of partial school reopening in Kenya on 12 October by comparing outcomes for households with children in grades 4 or 8 who could return to school against households with children in grades 3, 5, 7, or 9 who could not.

Figure 3 provides support for parallel trends in labor participation for adults in these two household groups prior to the partial school reopening: having children in grade 4 or 8 does not significantly affect labor outcomes relative to having children in adjacent grades in the periods prior to the partial reopening. We cannot reject that all of the pre-reopening period treatment impacts are 0. The coefficients for the period from September to 11 October are not significant, indicating limited anticipation effects of the partial reopening. This is not surprising, as although there were indications from mid-September that schools could begin reopening in October, the specific timing and the partial nature of reopening was not announced until the week before students were invited to return to school. Households therefore had limited time to alter their activities in anticipation.

Table 1 presents results for the impacts of partial reopening on labor supply[11] by activity at the individual level and on earnings by activity at the household level, pooling data from May to 11 October into one 'pre' period. We pool women and men, as Figure 2 shows that while women do contribute more to childcare than men in our sample, men also contribute a large number of hours on average. When interacting treatment with sex, we find that estimated impacts are not

11. We use the term labor 'supply' here to refer to equilibrium outcomes, acknowledging that individuals may have been willing to supply additional labor but faced limited demand.

Figure 3: Impact of treatment on labor participation in the last 7 days, by time period



The figures show estimated coefficients and 95% confidence intervals for the interaction between treatment and time period from Equation 1, where *Post* is replaced with time period dummies. The reference period is July-August, while schools were closed and before the partial reopening was announced. The red bars indicate the timing of Kenya's partial school reopening. Outcomes are any work participation and total work hours in the 7 days prior to the interview. Treatment households have a child enrolled in grades 4 or 8, and control households have a child enrolled in grades 3, 5, 7, or 9. We do not show differences for households with children in both grade groups. Only adults age 25-50 in these household groups are included.

significantly different for women relative to men. Changes in school closure policies thus appear to affect both parents' labor.

The second column of Panel A shows that just 60% of adults age 25-50 among control households with children in grades 3, 5, 7, or 9 were working during the full school closures period. Mean work hours OF 17.7 in the last 7 days reflect this large share of adults not working. Working adults in the sample are primarily engaged in household agriculture, despite 46% of the sample being classified as 'urban.'

The third column shows that labor supply generally did not change for control households after schools partly re-opened. This suggests that labor conditions were not broadly changing at the same time as school reopened, consistent with Figure 1 showing no major pandemic policy changes at this time. Covid-19 cases did increase in the weeks after the reopening, which may explain the marginally significant fall in enterprise hours worked for control adults in this time period. Fairly stable labor participation among these adults over this period indicates that any impacts on treatment households can be attributed to the partial reopening.

Consistent with Figure 3, Panel A shows limited effects of treatment on the extensive margin of

labor supply. An exception is household enterprise. Adults in treatment households increase their participation relative to adults in control households after schools partly reopen. The magnitude of the effect is large—a 31% increase in the likelihood of participating in enterprise compared to the level among control households when schools were closed. This marginally significant increase contributes to an increase in hours spent working in household enterprise in the last 7 days. This offsets a general decrease in enterprise work after schools reopened.

An increase in enterprise participation suggests that at least some adults not managing their own enterprise while schools were closed were able to do so once one of their children returned to school. Some of these individuals likely restarted enterprises they managed before the pandemic that they had not been able to continue while caring for children out of school. These individuals would face lower startup and business capital costs than individuals not previously engaged in enterprise. The impact of reopening for treatment individuals that were engaged in household enterprise before the pandemic is ten times greater than for treatment individuals that were not, supporting this hypothesis.

In contrast to limited extensive margin impacts, we observe a strongly significant impact of treatment on household agriculture hours. These increase by nearly a third for adults in treatment households relative to adults in control households before schools reopened, and drive a large positive impact on overall work hours. The results provide strong evidence that partial school reopenings did affect parents' labor supply, and particularly in household agriculture and enterprise.

Greater impacts on household agricultural and enterprise hours are not surprising given that we are estimating short-term impacts in the weeks following the partial reopening. Increasing wage hours requires first finding employment, which may take some time. Adults may also be hesitant about certain types of employment in the pandemic context.

'Mixed' households with children eligible to return to school as well as children in adjacent grades experience no labor supply impacts of the partial reopening. This indicates that the composition of household children matters, which is not surprising as households with children still at home requiring care after schools partly reopen do not experience the same childcare shock as households whose children all return to school.

Increases in labor supply among treatment households after the reopening are not matched by increases in household earnings (Table 1 Panel B). Instead, treatment and mixed household earnings fall relative to control households, driven by a large decrease in agricultural earnings.[12] These decreases more than offset the general increase in household earnings during this period, driven by agriculture earnings: October and November are important months for harvesting after the long rains season in most parts of Kenya. Wage and enterprise earnings do not change significantly in the reopening period for control households and are not significantly different for treatment households, though the point estimates for the treatment effect are negative.

One reason agricultural earnings could fall for treatment households is lost agricultural labor as older children return to school. We show in Table 2 that child farm labor falls in treatment

12. Results are qualitatively similar when considering earnings per capita.

Table 1: Impacts of partial school reopening on individual labor supply and household earnings

Panel A: Individual Labor Supply

	N	Control Mean (SD)	Post (SE)	Post x Treat (SE)	Post x Mixed (SE)
Engaged in any work in last 7 days	5057	0.603	0.003	0.013	0.019
		(0.489)	(0.043)	(0.036)	(0.035)
Engaged in wage employment in last 7 days	5057	0.080	0.012	-0.006	-0.017
		(0.272)	(0.024)	(0.018)	(0.016)
Engaged in HH agriculture in last 7 days	5057	0.498	0.017	0.040	0.018
		(0.500)	(0.038)	(0.035)	(0.034)
Engaged in HH non-ag enterprise in last 7 days	5057	0.094	-0.019	0.029*	0.004
		(0.292)	(0.020)	(0.017)	(0.016)
Total work hours, last 7 days	5057	17.681	-1.342	4.164**	-0.886
		(21.069)	(2.256)	(1.627)	(1.689)
Wage hours, last 7 days	5057	2.612	0.947	-0.695	-0.889
		(11.055)	(1.045)	(0.767)	(0.774)
Ag hours, last 7 days	5057	11.675	-0.431	3.683***	0.365
		(15.439)	(1.578)	(1.263)	(1.341)
Enterprise hours, last 7 days	5057	3.458	-1.651*	1.308*	-0.554
		(12.311)	(0.941)	(0.793)	(0.880)

Panel B: Household Earnings (KSH)

	N	Control Mean (SD)	Post (SE)	Post x Treat (SE)	Post x Mixed (SE)
HH total earnings, last 14 days	3091	2238.89	322.60	-1078.15*	-1668.18***
		(5873.17)	(686.69)	(555.97)	(596.37)
HH wage earnings, last 14 days	3091	792.12	267.76	-185.46	-555.31
		(3291.50)	(488.64)	(385.08)	(372.25)
HH agriculture earnings, last 14 days	3091	441.26	554.41*	-679.19**	-811.65***
		(2296.87)	(292.34)	(275.61)	(296.33)
HH enterprise earnings, last 14 days	3091	1005.50	-499.57	-213.50	-301.21
		(3801.25)	(398.05)	(294.06)	(330.26)

This table presents estimates of Equation 1 for individual labor supply (Panel A) and household earnings (Panel B). Individuals not working in a given sector are coded as working 0 hours, and households with no activity in a given sector are coded as earning 0 KSH. Only adults age 25-50 are included in the individual-level regressions.
From left to right, the columns show the number of observations, the control mean prior to the partial reopening, and the impacts of being in the partial reopening period for control households (Post), treatment households (Post x Treat), and mixed households (Post x Mixed). Control households have a child in grades 3, 5, 7, or 9, treatment households have a child in grades 4 or 8, and mixed households have both.
Regressions include fixed effects at the individual level in Panel A and household level in Panel B, county by month fixed effects, and controls for individual and household characteristics. Standard errors are clustered at the household level. Observations include data from May to November 2020.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

households relative to control households after reopening. This decrease is more than offset by the increase in adult agricultural labor we observe in Table 1, however, so the fall in treatment households' farm earnings is unlikely to be explained by a change in farm labor.

Another explanation is that households with children eligible to return sought to shift earnings forward after reopening was announced and before schools reopened in order to pay school costs. The decrease in earnings observed is of a similar magnitude as costs parents might expect to pay for one term of schooling, on average, and we observe similar decreases in both treatment and mixed households, both of which have at least one child eligible to return to school. The government subsidizes much of the cost of public schooling in Kenya, particularly for primary school and day secondary schools. But parents also must pay for meals provided by the school and for materials,

examinations, and other charges. Total public school costs can run to hundreds or thousands of Kenyan shillings per term, with higher costs for private schools and for boarders (Zuilkowski et al. 2018). Final reopening plans were not announced until a week before the date of reopening, leaving parents little time to raise money. News reports following the partial reopening suggest that many schools were short of funding when they reopened while parents struggled to pay for fees and required personal protection equipment for COVID-19 safety (Nation Africa 2020a, 2020b; The Star 2020a).

For school costs to explain the results in Panel B, we should observe an increase in treatment household earnings relative to control households in the period immediately before schools reopened followed by a decrease in the period after. We do in fact observe this pattern for household agriculture earnings. Agricultural earnings are not significantly different between treatment and control households from May through September, but we observe a spike in the difference in earnings between treatment and control households between October 1-11, immediately before schools reopened, followed by a sharp drop as the difference becomes negative (Figure A3). Thus agricultural households appear to sell farm output (stored or from the current harvest) in order to pay school costs when they are due.

This result highlights how changes in the school calendar may affect household income streams, consistent with Dillon 2020 who finds that a 2010 shift in Malawi's school calendar led households to sell crops early when prices were low, reducing agricultural income. Agricultural earnings over the full period from September-November are KSH 288 lower for treatment households than control households, suggesting shifting earnings forward to pay school fees also resulted in treatment households earning less than they might have otherwise, though part of the decrease may also be due to decreased child farm labor or to decreased agricultural labor productivity (discussed further in section 5). Thus a positive childcare shock may not increase households' short-term income if there are costs associated with accessing the childcare.

Moving forward we concentrate our analysis on short-term labor supply impacts of schools reopening. We conduct a variety of tests for the robustness of the estimated impacts on labor supply (Table A3). Results are largely unchanged when using household rather than individual fixed effects, when including all adults age 18 or older rather than focusing on adults age 25-50, and when defining *Post* based on the announcement in late September that schools would soon partly reopen rather than the date of reopening. Impacts on household enterprise are no longer significant when considering all household adults, but significant impacts on total and household agriculture work hours are strongly robust. These robustness checks provide support for household activities as the primary areas where households can adjust their labor supply in the short term in response to a childcare shock, in contrast to wage work which may take longer to adjust.

Panel D of Table A3 presents treatment on the treated impacts using whether the household has at least one child eligible to return (our main 'treatment' definition) as an instrument for whether the household reports at least one child returning to school.[13] As in Table 1 we observe positive

13. The first stage is significant with a Kleibergen-Paap Wald F statistic of 17.45.

impacts of treatment on adult working hours driven by an increase in agricultural hours, but the magnitudes are much larger than for the reduced form intent to treat impacts of having a child eligible to return to school. Impacts on household enterprise participation and hours are no longer marginally significant, though the magnitude of the point estimates are larger. Larger estimated impacts on agricultural hours in the IV regression are consistent with the shock of partial reopening being larger for households which actually have children return to school than for households whose eligible children remain at home. Our main intent to treat results should therefore be seen as conservative estimates of the labor impacts of actually experiencing a positive childcare shock.

5 Mechanisms and Heterogeneity

Our analysis of mechanisms is based on the observation that having children between grades 3 and 9 in the household around the time schools partly reopened can affect adults' labor through the difference in childcare they require at home compared to in school, but also through their ability to provide informal childcare to younger siblings and through their ability to contribute to household labor.

We first test for direct impacts of the partial school reopening on respondent childcare hours. Childcare hours of other household members are not included in our analysis data but we consider impacts of the reopening on respondent childcare hours as broadly indicative of general household childcare impacts, particularly since male as well as female respondents are engaged in childcare in our sample (Figure 2). Table 2 column (1) shows that respondent childcare hours in the last 7 days increase non-significantly for treatment households after the partial school reopening. One reason this might occur is if another household adult that had been providing childcare returns to work following the partial reopening and the respondent takes on residual childcare hours that adult had provided, such that their personal childcare hours increase even as household hours decrease.

Another likely reason is that in addition to requiring care, children in grades 3 through 9 may also provide care to siblings. We do not measure siblings' provision of childcare in the period around the partial school reopening so cannot test for changes directly. But, informal childcare provided by a child is only relevant in households where there are younger children to care for. We test this mechanism by comparing households with young children aged 0-4 (39.5% of the sample) who would be most likely to receive an older sibling's care to households with no children aged 0-4. Column 2 shows that treatment respondents in households with young children experience a significantly larger increase in childcare hours than those with no young children, who experience a non-significant decrease in childcare hours. Children old enough to be in grades 4 or 8 likely do not require as much care as young children, so it is reasonable that their return to school would not lead to a very large drop in childcare hours. This result is consistent with the hypothesis that older siblings provide informal care to young children, such that their net contribution when home from school might be to reduce the childcare burden on parents rather than increase it.

Along these lines, households with a grade 4 child and no young children experience a large and

Table 2: Impacts of partial school reopening on respondent childcare hours and child agricultural labor

	Respondent Childcare Hours				Child Ag. Hours	
	(1)	(2)	(3)	(4)	(5)	(6)
Post × Treat	4.389	-5.455	-16.002*	12.739	-2.226**	-4.051**
	(5.959)	(7.249)	(8.853)	(10.373)	(1.109)	(1.996)
Post × Treat × Any kids age 0-4		19.787*	25.502**	8.585		
		(11.945)	(12.796)	(14.006)		
Observations	2364	2364	1444	1161	1462	686
Mean, pre-reopen control	54.421	54.421	53.560	53.747	3.938	4.654
Treated Grades	Both grades	Both grades	Grade 4	Grade 8	Both grades	Grade 8

This table presents estimates of Equation 1 for respondent childcare hours (columns 1-4) and total household child agriculture hours (columns 5-6). Dependent variables are defined over the last 7 days. Childcare hours are not measured for other household adults in these survey rounds. Households not engaged in agriculture are coded as having 0 child hours. Columns 1-4 include data from May to November 2020, but we restrict the sample for columns 5-6 to observations from July-November to capture the main long rains growing season in Kenya.
Treated households have a child in grades 4 or 8 and control households have a child in grades 3, 5, 7, or 9. We do not show impacts for mixed households with children in both grade groups. 'Post' is a dummy for being observed on or after October 12. All regressions include household and county by month fixed effects, and additional household and individual controls. SEs clustered at household level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

significant reduction in childcare hours, while those that have young children significantly increase their childcare hours, and this difference is significant (column 3). For households with a grade 8 child, however, we observe a non-significant increase in childcare hours regardless of whether there are young children age 0-4 in the household (column 4). This may be because the younger children in these households for whom the older sibling provides cares are above age 4, as might be expected in a household where at least one child is around age 14. In general, these results highlight the role of older siblings in providing informal childcare and the importance of household composition in determining the impact of a childcare shock. This motivates an exploration of heterogeneity in impacts by household characteristics

Figure 4 presents estimates of treatment impacts ($Post \times Treat$) from Equation 1 for different sub-samples. We focus on impacts on labor hours as this captures both intensive and extensive margin labor supply responses. We test for the significance of differences across groups estimating Equation 1 but fully interacting $Post$, $Treat$, and a group characteristic Z.[14]

We first consider differences by whether households have more than one child (87% of households in the sample) and whether they have young children age 0-4 (41%). Patterns of results differ by work activity. Total work hours go up by significantly more when a child returns to school and no other children remain at home compared to some other children remaining at home, driven by large differences in wage hours and agriculture hours. This is consistent with the childcare burden being unequivocally reduced when your only child returns to school, while effects when other children are present may depend on whether the child returning to school was providing childcare for them.

As Table 2 indicates the childcare burden increases in treatment households with young children (aged 0-4) as the older child caregiver returns to school, we might expect smaller increases in work

14. Results available upon request.

hours in these households, but the overall impact of treatment on work participation and hours is not smaller in households with young children. We do observe negative point estimates for impacts on wage and household enterprise hours in household with young children compared to positive estimates in households with none. The differences are not statistically significant, but align with the intuition that it is difficult to combine childcare with work in these activities.

On the other hand, the impact of reopening on participation and hours in household agriculture is significantly larger in treatment households with young children than without, despite the increased childcare burden for the former. There is no differential impact of having young children in treatment households (relative to the impact of being a treatment household with no young children) in time periods before the partial reopening, and the differences disappear after schools fully reopen in January 2020 (Figure A4).

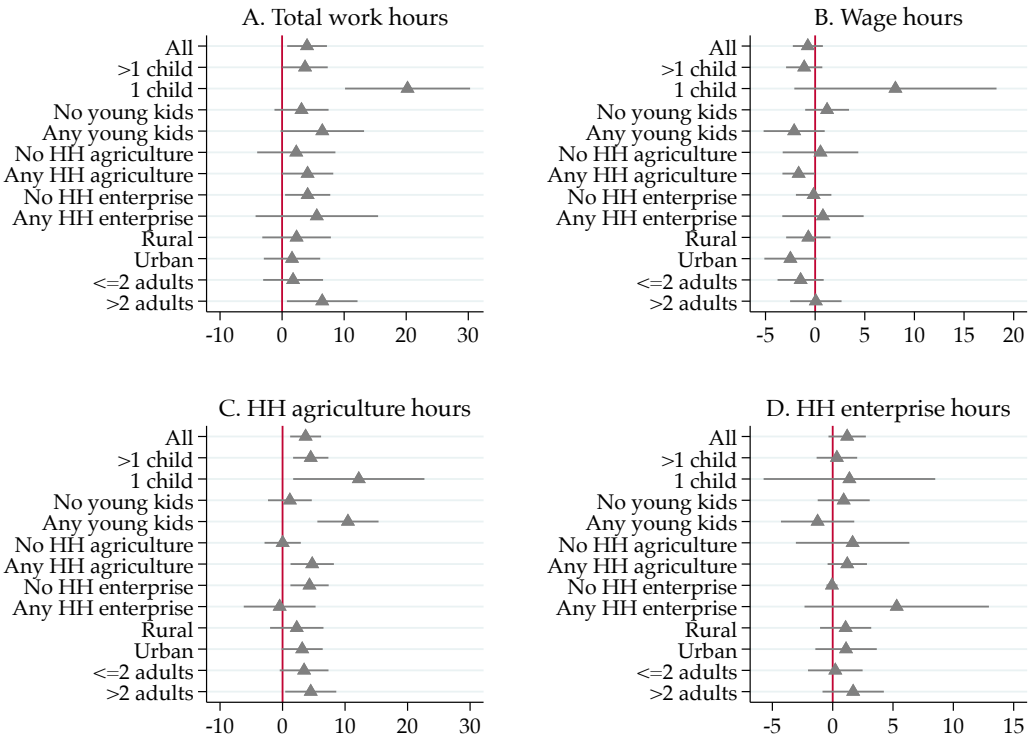
This result indicates that it is easier to combine household farm work with childcare, potentially because this works takes place in an area managed by the household rather than in an external location. We do not observe whether childcare hours are combined with other tasks, but the vast majority of respondents indicate that the child stays with them while at home (Figure A2), indicating they would also bring the child with them to the family farm.

The increase in agricultural labor controlling for the scale of agricultural production suggests an attempt to make up for a decrease in labor productivity in these households. If treatment households with young children care for them while working on the household farm, they may be less focused on the work (with one eye on the children) and may need to stop working more frequently. Consequently, we could be observing that treatment households with young children increase their engagement and hours in agriculture relative to control households with young children (with an older child still at home to help care for them) and to treatment households with no young children (who can be more productive by not multitasking work with childcare) because it takes them more weeks and more hours per week to complete their harvest. Reduced agricultural labor productivity for these households might also explain part of the decrease in household agriculture earnings we observe.

The patterns in increases in household agricultural hours suggest that they are not solely a response to a change in the household childcare burden. Children in grades 3 through 9 are likely old enough to contribute labor to household agriculture—André, Delesalle, and Dumas (2021) find that children aged 10-15 years old (around the age of children in grades 3-9) in neighboring Tanzania increase agricultural production value by USD 0.89 per day of agricultural labor. Part of treatment adults' increase in agriculture hours after partial reopening may therefore be driven by the need to make up for reduced child labor on the farm. This is particularly relevant given that partial school reopening in October coincides with the main harvest season for most households in Kenya.

Larger impacts on agriculture hours in households with only one child than in households with many shown in Figure 4 support this hypothesis. Households whose only child returns to school do not have other children still out of school that continue to contribute agricultural labor. Along these lines, greater increases in agricultural hours in households with young children age 0-4 may

Figure 4: Heterogeneity in impacts on work hours



The figure summarizes the point estimates and 95% confidence intervals for the effect of $Post * Treat$ from Equation 1 estimated for sub-samples with specified characteristics. Household characteristics are from the first time they are observed. 'Young kids' indicates the presence of any children aged 0-4. All regressions include only adults age 25-50 in households with children in grade 4/8 or 3/5/7/9. All outcome variables are over the 7 days prior to the interview; individuals that did not work in this period are coded as having worked 0 hours. All regressions include household and county by month fixed effects and individual and household controls. SEs clustered at household level.

be due to children remaining home in those households not being able to contribute as much labor as children remaining home in households without young children age 0-4 (where children would mechanically be older).

We test this hypothesis by estimating Equation 1 with total child labor on the household farm as the dependent variable. Estimated impacts of schools reopening on child agricultural labor are negative and significant for treatment households (Table 2 Column 5) and are also of the same order of magnitude as impacts on adult agriculture hours, consistent with adults substituting their labor for lost child labor. For a two-parent household, the reduction in child labor represented around 30% of the increase in adult labor on the household farm. Point estimates are larger when the treatment is due to a child in grade 8 returning to school compared to a child in grade 4 (Column 6), aligning with older children being more able to contribute to household labor.

We next consider heterogeneity in impacts by other characteristics which may shed light on impact mechanisms. Impacts on household agriculture hours are driven by effects in households engaged in agriculture in February 2020, before the pandemic (60% of the sample). The difference

in the impact of treatment on agriculture hours by baseline agriculture engagement is statistically significant. Similarly, increases in household enterprise hours are driven by households engaged in enterprise in February 2020 (18%), but the difference between these groups is not significant.

These patterns support the hypothesis that adults are constrained away from their optimal labor allocations while children are home from school, and that partial reopening relieves those constraints allowing a shift from childcare hours to labor hours. The results are also consistent with adults increasing hours in household work to make up for reduced child labor after children return to school. Similarly, impacts of reopening on both women and men also suggest that a childcare shock may not be the only mechanism explaining our results. If we assume that men are less responsive to childcare shocks then women, then part of the impact of reopening for men may reflect the household making up for lost child labor.

We observe no differences in impacts between urban (46% of the sample) and rural households. This may be due to the relative broad definition of 'urban' in our sample (over 35% of household classified as urban are engaged in agriculture). We also observe low take-up of childcare services in our sample, which would have been a key reason to expect heterogeneity in impacts by urban status.

Households with more than two adults (34% of our sample) may be better able to absorb childcare shocks, particularly if the third adult is a grandparent or another non-working adult. Parents in these households may therefore experience less of an impact of a positive childcare shock. Impacts are not significantly different by the number of household adults, though point estimates for differential impacts on work hours in households with 3 or more adults are positive.

6 Discussion

Using repeated cross sections from the 2019 Kenya Continuous Household Survey and 2020 RRPS, Pape et al. (2021) estimate that labor force participation among Kenyans age 18-64 fall from 75% in the last quarter of 2019 to 61% in May-July 2020. We observe a smaller decline in our sample of households with children in grades 4 or 8 or adjacent grades, using recall data on respondents' labor in February 2020[15]: labor participation for respondents age 18-64 falls from 76% in February 2020 to 68% in May-July.[16] Working hours also fall for respondents in our sample households, from 29.7 hours in the last 7 days in February to 18.9 hours in May-July. Work hours fall in both agricultural and non-agricultural households, suggesting it is not due solely to seasonality of labor. Even among those working in each period, hours fall from 38.1 to 28.1, indicating that the pandemic affected labor on both the extensive and intensive margins. Considering the full set of households in the RRPS data, adult work hours fall from 24.1 hours in the last 7 days in February on average to 16.6 in May-July.

15. We have limited data on pre-pandemic labor participation for adults other than the respondent.

16. The smaller drop may be due to differences in types of work that parents and non-parents engage in, to parents' greater need to continue working in order to feed their families, or to respondents being more likely to continue working during the pandemic than other household adults.

It is challenging to estimate the share of this reduction in labor hours that can be ascribed to the school closures that followed the onset of the pandemic in March 2020. Those closures coincided with a large number of other policies affecting labor supply and demand. Households with and without schoolchildren also differ in many respects, further complicating identification.

To the extent that the effects of a child being home from school after it closes and of that child returning to school after it reopens are symmetric, however, our estimates of the impacts of the partial school reopening help us to understand the contribution of school closures to pandemic labor participation decreases in Kenya. While we do not find a significant effect on labor participation on the extensive margin, Figure A5 illustrates how raw mean labor hours fall generally in our sample relative to the pre-pandemic period then increase after the partial school reopening for households with children eligible to return. The partial reopening increases total work hours in the last 7 days by 3.7 hours for adults age 18 and over (Table A3), and by 4.2 hours among our primary analysis sample of adults age 24-50 (Table 1). Focusing on the broader sample of adults, this represents a 22.2% increase relative to the period when schools were fully closed, and corresponds to 34.2% of the reduction in labor hours relative to the period before the pandemic.

Based on this, we estimate the reduction in labor hours during the pandemic if schools had remained open. The labor shock of a single child in grade 4 or 8 returning to school is likely smaller than that of all school-age children being home when schools close. Further, our IV estimates using eligibility to return to school to instrument for actually having a child return to school are much larger in magnitude than our main intent to treat estimates of the impact of partial reopening, as not all eligible children returned to school. Initial school closures, meanwhile, affected all enrolled children. For both reasons, the intent to treat impact of the partial school reopening on adult labor hours can be considered as a conservative estimate of the magnitude of the impact of the initial school closures in Kenya on adults in households with school-age children (66.4% of households). Increasing labor hours for these adults during the school closure period by the amount we observe it increase due to the partial reopening reduces the drop in average work hours from February to May-July among all adults nationally from 7.4 hours to 4.9 hours, a 33% decrease.

Across Kenya's labor force of 23.7 million (ILO 2021), 2.5 hours of additional labor per week over the period of the school closures from 16 March 2020 to 4 January 2021 adds up to over 2.4 billion hours. This is a simplified back-of-the-envelope calculation making many assumptions and focusing just on labor supply, but provides a rough estimate of the magnitude of the labor impact of school closures. The economic impact might be even greater if households with schoolchildren coped with closures by multitasking childcare with household agriculture or enterprise work. This coping mechanism avoids a greater reduction in work hours but, as indicated in the impacts of the partial reopening on agricultural households with young children, may reduce work productivity such that output falls by more than the amount suggested by the fall in labor inputs.

7 Conclusion

We present findings on how a childcare shock affects adults' labor in a lower middle-income African country, with some of the first results for the impacts of childcare on labor in a rural African setting. The results shed light on how both urban and rural households in Kenya have been affected by the shock of pandemic-related school closures. Having a child in grade 4 or 8 return to school after the partial reopening increases adults' labor supply in the following weeks. Increases are concentrated in household agriculture hours, with marginally significant increases in household enterprise as well, consistent with labor in these activities being more flexible than for wage employment. The increase in labor hours corresponds to one-third of the decrease observed during the first few months after the first COVID-19 cases in Kenya, relative to the period before, indicating that school closures are responsible for a large share of the fall in labor supply during the pandemic.

Unlike results from school closures in the United States and other high-income countries, impacts of the childcare shock are not concentrated primarily among women, as men in our sample also contribute a large amount of time to childcare. Better data on how the childcare burden is allocated within the household would help to shed light on the intrahousehold distributional impacts of childcare shocks.

The generalizability of our results may be limited as the shock we analyze takes place in the context of a global pandemic. The pandemic is unfortunately unlikely to be completely overcome in many African countries in the immediate future, however, suggesting the results will continue to have relevance. For example, after fully reopening schools in January 2021, Kenya closed them again in late March after a spike in COVID-19 cases before reopening again in mid-May. Households may face additional closures if COVID-19 cases rise in the future. Further, although some pandemic-related restrictions were still in effect at the time schools partly reopened in Kenya in October 2020, many had been relaxed, so our results may generalize to similar settings with some ongoing COVID-19 caseloads and basic government policies around public health and safety—likely to be the new normal moving forward.

Our study generates three main policy-relevant takeaways. First, the availability of informal household childcare—in this case from an older sibling—affects adult labor supply and productivity. The childcare burden for adults increases when older children return to school if there are young children in the home, consistent with the important role of older siblings in providing childcare in this context, as documented in Jakiela et al. 2020 and others. At the extreme, we observe that some adults may *decrease* their labor supply, particularly in wage and enterprise work, in response to a child returning to school when they have young children to care for. Responding to an increase in the childcare burden by combining childcare with other activities, notably household agriculture, appears to reduce labor productivity, consistent with evidence from Delecourt and Fitzpatrick (2019) in Uganda for household enterprise.

More generally, these results indicate that either households lack childcare options for when available informal care from household members falls or that the cost of available options is more than adults could earn by working instead of caring for children themselves. A better understanding

of the availability and affordability of childcare options in different parts of Kenya—and particularly in rural areas—would be useful to determine what policies could best address household childcare needs.

Second, school closures and changes in the Kenyan academic calendar may affect agricultural production. Older children contribute significantly to household agriculture when not in school. Increases in treatment adults' household agriculture hours after the partial school reopening are due in part to a substitution of adult hours for lost child labor hours, at a cost of their leisure time or engagement in other income-generating activities. In times of peak agricultural labor, such as the main harvests in October and November for much of the country, households might therefore benefit in the short-term from children being out of school (though the children likely do not).

This may have important implications in Kenya as the school calendar changes, with the timing of school terms and breaks shifting each year until schools return to the pre-pandemic academic calendar in 2023. In 2021 a one week holiday between terms falls in October, the beginning of the main harvest season for much of Kenya, but children will otherwise be in school throughout the harvest period. In 2022 that holiday comes two weeks sooner, potentially too soon for the harvest for most households, and children are again in school throughout the main harvest. In 2023 schools gets closer to the pre-pandemic academic calendar, with a holiday in August and the last term ending in early November such that all children except those taking national exams are released to potentially contribute on the household farm. Changes in the availability of child labor may affect demand for hired labor and other household production decisions.

Third, households may not benefit from opportunities to reduce their childcare burden if there are large upfront costs. Though treatment households may benefit from decreased childcare needs with their child in school, in the short term impacts on income are negative. Decreases in earnings for treatment households appear consistent with these households shifting the timing of earnings from household activities—agriculture in particular—to be able to pay school costs before schools reopen. Further, a large share of children eligible to return after the partial reopening do not do so, and media reports suggest school costs were a factor for many households Any policy to make childcare more available to households should therefore consider how best to structure the timing and payment of parent fees to encourage take-up.

We do not make any conclusion about the net benefits of school closures in Kenya. This paper considers just one aspect of the costs of this policy: its impact on labor for adults in households with schoolchildren. We do not estimate costs on the affected children themselves through reduced lifetime earning potential, among other effects. We also do not assess the benefits of the school closures in terms of protecting children and households from infection with COVID-19—the motivation for closing schools—or possible benefits to households of having older children contributing more to household agriculture. But a better understanding of the labor impacts of school closures may inform policy-making if the COVID-19 pandemic worsens or a future pandemic leads to renewed discussion of school closures as a policy response.

The results have relevance to other policies affecting household childcare burdens, beyond school

closures. The literature primarily focuses on the labor impacts of childcare for children below school-age, whereas the shock we analyze affects the burden of childcare from older children. If we expect that childcare needs are decreasing in child age, we would expect the impacts we observe to be lower bounds on the impact of a policy that gives households access to full-day childcare for young children during the working week (as schools implicitly provide). Given the increase in childcare hours we observe in households with children age 0-4 when an older child returns to school, policies increasing access to childcare for young children could have large positive impacts on adult labor supply and productivity.

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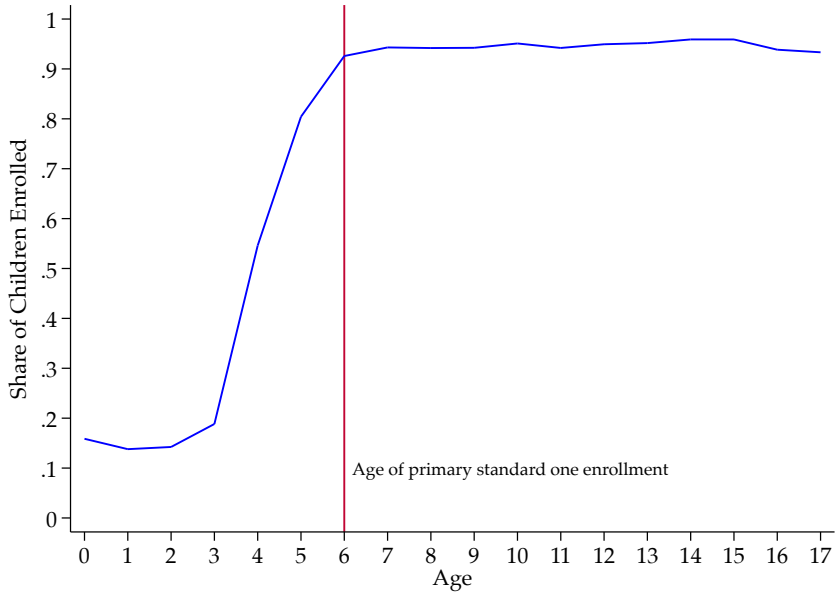
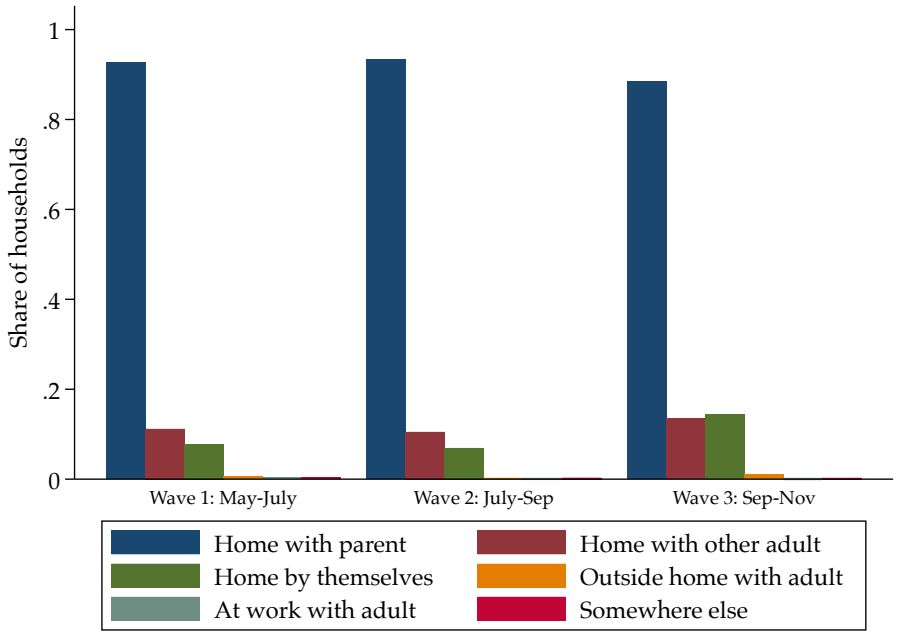
Appendix A: Additional Figures

Figure A1: School enrollment rates before school closures by child age



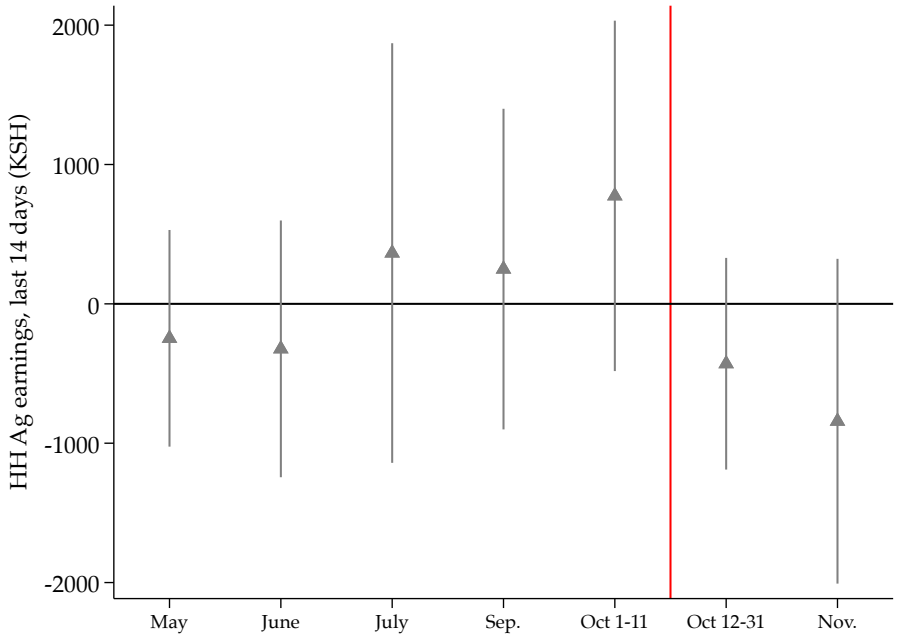
For each child, the respondent is asked whether they were enrolled in school in February 2020. 'School enrollment' for very young children may reflect enrollment in daycare or nursery, and may also reflect measurement error in child ages.

Figure A2: Childcare arrangements when out of school



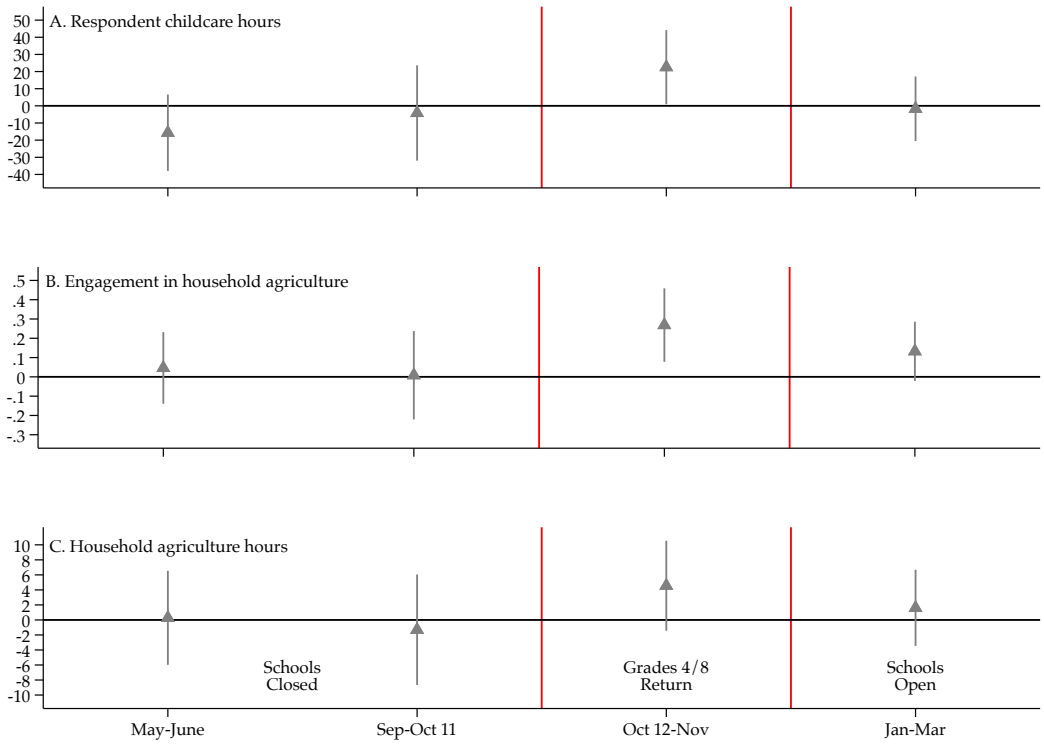
Respondents are asked to specify all of the situations where a randomly selected child spent at least some time when out of school in the past week. The respondent answers naturally and then all relevant responses are checked by the surveyor. 'Somewhere else' includes any other locations/situations not included in the other categories.

Figure A3: Impact of treatment on household agricultural earnings in the last 14 days, by time period



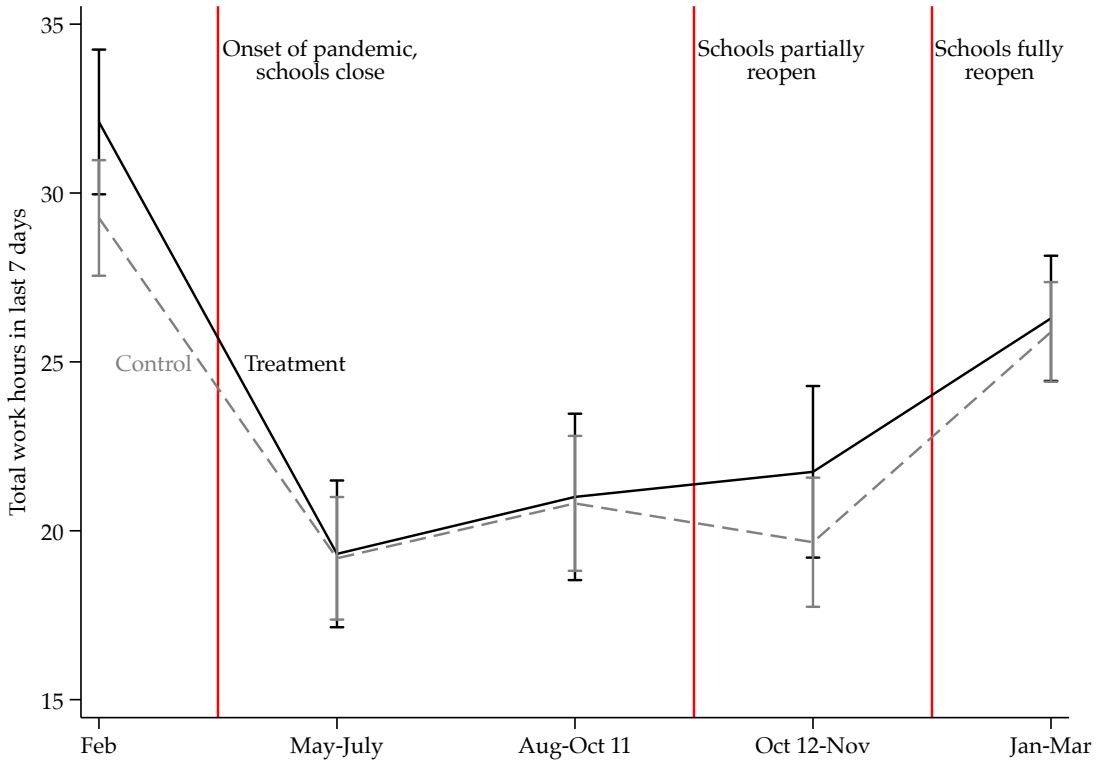
The figure shows estimated coefficients and 95% confidence intervals for the interaction between treatment and time period from Equation 1, where *Post* is replaced with time period dummies. The reference period is August, while schools were closed and before the partial reopening was announced. The red bar indicates the timing of Kenya's partial school reopening. Outcomes are total household agriculture earnings in the 14 days prior to the interview, with non-farm households recorded as having 0 earnings. Treatment households have a child enrolled in grades 4 or 8, and control households have a child enrolled in grades 3, 5, 7, or 9. We do not show differences for households with children in both grade groups.

Figure A4: Differential impact of treatment in households with children aged 0-4, by time period



The figures show estimated coefficients and 95% confidence intervals for the effect of being both a treatment households (having a child in grade 4 or 8 as opposed to 3, 5, 7, or 9) and having any children age 0-4 in the household, by time period. We fully interact a treatment dummy, time period dummies, and a dummy for having any children age 0-4, and include individual and county fixed effects as well as a vector of individual and household controls. Standard errors are clustered at the household level. The reference period is July-August, while schools were closed and before the partial reopening was announced. The red bars indicate changes in school closure policies: the partial reopening on 12 October 2020 and the full reopening in January 2021. Outcomes are measured over the 7 days prior to the interview. For childcare hours we only have data for the respondent, but for HH agriculture engagement and hours we include all adults age 25-50. In all three regressions, we cannot reject that the differential impact of treatment in households with children aged 0-4 over the periods when schools are closed is 0 (p=0.495, p=0.914, and p=0.943, respectively).

Figure A5: Respondent work hours over time, by household treatment status



The figure shows raw means and 95% confidence intervals for household respondents' total work hours in the last 7 days by treatment status in each time period. Outcomes are measured for the respondent only due to missing data on pre-pandemic working hours for other household adults. Treatment is defined as having a child in grade 4 or 8 while control is defined as having a child in grade 3, 5, 7, or 9). The red bars indicate changes in school closure policies: the initial pandemic onset and school closures in March 2020, the partial reopening on 12 October 2020, and the full reopening in January 2021.

Appendix B: Additional Tables

Table A1: Baseline balance: Households with a child in grade 3, 4, 5, 7, 8, or 9

	Grade 3/5/7/9		Grade 4/8			
	Child Mean	N	Child Mean	N	Difference	p-value
Respondent characteristics						
Age	40.12	934	41.36	327	-1.24	0.108
Female	0.58	934	0.57	327	0.01	0.669
Completed primary school	0.88	934	0.86	327	0.02	0.477
Completed secondary school	0.48	934	0.49	327	-0.01	0.739
Completed school beyond secondary	0.15	934	0.17	327	-0.02	0.415
Married	0.75	927	0.73	323	0.02	0.461
Is the household head	0.64	934	0.64	327	-0.00	0.950
Household characteristics						
Female household head	0.29	934	0.30	327	-0.01	0.746
Age of household head	44.49	934	46.11	327	-1.62	0.036
Count adults	2.54	934	2.61	327	-0.07	0.352
More than 2 household adults	0.40	934	0.40	327	-0.00	0.937
Only 1 household child	0.15	934	0.17	327	-0.02	0.442
Any young (0-4) children	0.42	934	0.37	327	0.05	0.098
Count young (0-4) children	0.56	934	0.48	327	0.08	0.101
Count school (5-17) children	2.47	934	2.31	327	0.15	0.059
Count adolescent (10-17) children	1.57	934	1.50	327	0.07	0.187
Household wealth index	-0.06	934	0.03	327	-0.09	0.137
Connected to electricity grid	0.45	934	0.51	327	-0.05	0.095
Urban household, dashboard definition	0.46	934	0.47	327	-0.01	0.647
Household engaged in agriculture	0.64	934	0.63	327	0.01	0.771
Household engaged in enterprise	0.15	934	0.19	327	-0.04	0.118
Respondent labor participation						
Engaged in any work in last 7 days	0.70	934	0.71	327	-0.01	0.670
Engaged in wage employment in last 7 days	0.10	934	0.13	327	-0.03	0.204
Engaged in HH agriculture in last 7 days	0.57	934	0.54	327	0.03	0.374
Engaged in HH non-ag enterprise in last 7 days	0.09	934	0.13	327	-0.03	0.119
Engaged in any work in February 2020	0.76	934	0.75	327	0.00	0.866

Data are from the first time a given household is observed in the RRPS data. Individual-level data are for the survey respondent. 'Mixed' households with a child in both grade groups are omitted. The joint F-stat is 0.98, with p-value 0.489.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Baseline balance: Households with children in sample vs. not

	Out of Sample		In Sample			
	Mean	N	Mean	N	Difference	p-value
Respondent characteristics						
Age	37.78	3197	40.61	1623	-2.84	<0.001
Female	0.54	3198	0.58	1623	-0.03	0.021
Completed primary school	0.90	3198	0.87	1623	0.03	0.001
Completed secondary school	0.55	3198	0.47	1623	0.09	<0.001
Completed school beyond secondary	0.22	3198	0.15	1623	0.07	<0.001
Married	0.71	3176	0.76	1610	-0.05	<0.001
Is the household head	0.67	3198	0.64	1623	0.03	0.019
Household characteristics						
Female household head	0.30	3198	0.29	1623	0.02	0.178
Age of household head	42.53	3198	45.00	1623	-2.46	<0.001
Count adults	2.60	3198	2.60	1623	-0.01	0.854
More than 2 household adults	0.39	3198	0.42	1623	-0.03	0.037
Only 1 household child	0.31	3198	0.13	1623	0.18	<0.001
Any young (0-4) children	0.53	3198	0.41	1623	0.11	<0.001
Count young (0-4) children	0.72	3198	0.56	1623	0.17	<0.001
Count school (5-17) children	1.82	3198	2.62	1623	-0.80	<0.001
Count adolescent (10-17) children	0.61	2598	1.80	1623	-1.19	<0.001
Household wealth index	0.06	3198	-0.06	1623	0.12	<0.001
Connected to electricity grid	0.52	3198	0.45	1623	0.06	<0.001
Urban household, dashboard definition	0.54	3198	0.46	1623	0.08	<0.001
Household engaged in agriculture	0.53	3198	0.64	1623	-0.11	<0.001
Household engaged in enterprise	0.16	3198	0.16	1623	-0.01	0.571
Respondent labor participation						
Engaged in any work in last 7 days	0.62	3198	0.70	1623	-0.08	<0.001
Engaged in wage employment in last 7 days	0.13	3198	0.10	1623	0.03	0.006
Engaged in HH agriculture in last 7 days	0.46	3198	0.57	1623	-0.11	<0.001
Engaged in HH non-ag enterprise in last 7 days	0.10	3198	0.10	1623	-0.00	0.707
Engaged in any work in February 2020	0.73	3198	0.76	1623	-0.03	0.032

Only households with any children are included. Data are from the first time a given household is observed in the RRPS data. Individual-level data are for the survey respondent. The joint F-stat is 58.15, with p-value < 0.001

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Robustness of results

Panel A: Household fixed effects

	(1) Any work	(2) Wage work	(3) HH ag.	(4) HH ent.	(5) Total hrs	(6) Wage hrs	(7) HH ag hrs	(8) HH ent hrs
Post × Treat	0.019	-0.008	0.043	0.030*	3.806**	-0.875	3.459***	1.387*
	(0.036)	(0.019)	(0.035)	(0.018)	(1.652)	(0.791)	(1.250)	(0.798)
Observations	4214	4214	4214	4214	4214	4214	4214	4214
Mean, pre-reopen control	0.602	0.082	0.500	0.084	17.682	2.804	11.845	3.167

Panel B: All adults (age >=18)

	(1) Any work	(2) Wage work	(3) HH ag.	(4) HH ent.	(5) Total hrs	(6) Wage hrs	(7) HH ag hrs	(8) HH ent hrs
Post × Treat	0.068*	0.008	0.059	0.011	3.702**	-0.211	3.353***	0.610
	(0.035)	(0.012)	(0.037)	(0.016)	(1.500)	(0.566)	(1.233)	(0.631)
Observations	6636	6636	6636	6636	6636	6636	6636	6636
Mean, pre-reopen control	0.593	0.064	0.517	0.066	16.737	2.246	12.224	2.368

Panel C: Post defined by timing of reopening announcement, 27 Sept 2020

	(1) Any work	(2) Wage work	(3) HH ag.	(4) HH ent.	(5) Total hrs	(6) Wage hrs	(7) HH ag hrs	(8) HH ent hrs
Post × Treat	0.009	-0.006	0.029	0.030*	3.357**	-0.563	2.530**	1.526**
	(0.033)	(0.017)	(0.031)	(0.016)	(1.496)	(0.708)	(1.099)	(0.758)
Observations	4214	4214	4214	4214	4214	4214	4214	4214
Mean, pre-reopen control	0.611	0.081	0.510	0.085	17.743	2.690	12.093	3.115

Panel D: Eligibility as instrument for all children being back in school

	(1) Any work	(2) Wage work	(3) HH ag.	(4) HH ent.	(5) Total hrs	(6) Wage hrs	(7) HH ag hrs	(8) HH ent hrs
Post × Treat	0.072	-0.021	0.176	0.103	13.214**	-2.753	12.615***	4.197
	(0.137)	(0.072)	(0.133)	(0.071)	(6.419)	(3.070)	(4.852)	(3.104)
Observations	4204	4204	4204	4204	4204	4204	4204	4204
Mean, pre-reopen control	0.602	0.082	0.499	0.085	17.705	2.795	11.864	3.181

This table presents estimates of variations of Equation 1. Panel A replaces individual with household fixed effects. Panel B relaxes the focus on only adults age 25-50 to include all adults age 18 or older. Panel C defines *Post* not by the date schools reopened on 12 October 2020 but by the timing it was announced, 27 September. Panel D instruments for whether all household children returned to school using whether the household had at least 1 child eligible to return, based on their enrolled grade. The p-value for the Kleibergen-Paap underidentification test LM statistic is < 0.001, and the Kleibergen-Paap weak identification test Wald F statistic is 17.45.
Observations include data from May to November 2020, and include treatment households with children in grades 4 or 8 and control households with children in an adjacent grade, but for simplicity exclude 'mixed' households with both. Dependent variables are defined over the last 7 days, and take a value of 0 for individuals not working in a particular activity. All regressions include household and county by month fixed effects, and additional household and individual controls. SEs clustered at household level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix C: Major Pandemic Policy Changes in Kenya

The following list summarizes when major nation-wide pandemic-related policies were implemented and relaxed over the course of 2020 after the first COVID-19 case in Kenya on March 13.

The dates for the announcements of new restrictive policies are in *italics* and the dates when policies were relaxed or ended are in **bold**. We also include announcements related to school closures, even though policies did not necessarily change with these announcements. Most policies were extended multiple times after first being imposed; we do not list the dates of policy extensions, except for school closures.

- *March 13-20*
  - Suspend all public gatherings, meetings, games, events
  - Ban on gatherings of more than 10 people
  - All schools closed
  - Recommend working from home where possible
  - Ban on foreigner entry; quarantine requirements for entry of nationals and visa holders
  - Public transport asked to reduce to 60% of capacity
- *March 24-27*
  - Ban on national and international flights
  - Closure of bars and restaurants for in-person service
  - Direct cash payments implemented for vulnerable citizens
  - Stay at home requirements imposed, except for 'essential' trips
  - Curfew imposed from 1700 to 0500 hours
  - Public transit closed between 'infected' and 'not infected' areas
- April 26: School closures extended to June 4
- **April 27**: Partial reopening of restaurants for take-out service
- June 6: School closures extended until further guidance from the Ministry of Health
- **June 7**: Nightly curfew revised to between 2100 and 0400 hours
- June 24: Announcement that school might reopen on September 1
- **July 7**
  - Phased reopening of religious gatherings
  - Up to 100 people permitted to attend weddings and funerals
  - Local air travel within Kenya to resume July 15
  - International air travel to resume August 1
- July 7: Announcement that schools will remain closed until January 2021, final exams are cancelled, and students would repeat the year; colleges and universities following strict guidelines might reopen in September
- ***July 27***
  - Restaurants reopened, must close by 1900 hours
  - Ban on sale of alcoholic drinks and beverages in eateries and restaurants
- **August 27**
  - Restaurants may remain open until 2000 hours
  - Ban on sale of secondhand clothing lifted
  - Licensed hotels may sell alcohol
- September 15: Ministry of Education releases guidelines for safe reopening of schools

- September 21: Ministry of Education calls all teachers to report back to schools by September 28
- **September 27**
  - Nightly curfew revised to between 2300 and 0400 hours
  - Bars may reopen; restaurants and eateries may sell alcohol; bars, restaurants, and eateries may remain open until 2200 hours
  - Religious gatherings may open for up to 1/3 of capacity
  - Up to 200 people may attend funerals and weddings
- October 6: Ministry of Education announces that students in examination grades (4, 8, and 12) shall return to classes on October 12
- **October 12**: Students in examination grades (4, 8, and 12) to return to classes
- *November 4*
  - Requests for government work to be done remotely when possible
  - Political gatherings suspended
  - Nightly curfew revised to between 2200 and 0400 hours
  - Bars, restaurants, and eateries must close by 2100 hours
- November 4: Announcement that schools to fully reopen in January 2021
- **January 4**: Schools fully reopen

Other policies were implemented that specifically affected certain parts of the country. For example, on April 6 the government instituted a 21 day movement ban/lockdown for Nairobi, Kilifi, Kwale, and Mombasa, and Mandera was added soon after. This lockdown was extended multiple times. These were the only counties affected. The lockdowns for Kilifi and Kwale ended on June 7 and those for Nairobi, Mombasa, and Mandera ended on July 8.

Sources: COVID-19 government response timeline for Kenya; Kenya COVID Tracker; Presidency of Kenya; Kenya Ministry of Education Twitter feed