Child labor as a barrier to foundational skills: Evidence from Bangladesh and Pakistan

Amita Chudgar1 · Vanika Grover1 · Shota Hatakeyama1 · Aliya Bizhanova1

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Abstract

According to the International Labor Organization, at least 160 million children ages 5 to 17 around the world were involved in some form of child labor at the beginning of 2020, including 79 million children performing hazardous labor. This article uses recent representative data from Bangladesh and Pakistan to investigate the relationship between foundational skills and child labor engagements for 12- to 14-year-old children. It found a consistent negative association between child labor and reading and numeracy foundational skills. In particular, it found that engagement in hazardous child labor had large negative associations with reading and numeracy foundational skills. It also found negative associations between engagement in economic labor and reading foundational skills. Finally, the article found that intense engagement in household labor was also negatively associated with foundational skills. It discusses the implications of these findings which paint a deeply concerning picture of the challenges ahead of the global community to ensure that all children acquire foundational skills (and beyond). It notes that systematic efforts to define, document, and measure child labor will be crucial to better understand the negative implications of child labor for foundational learning and the potential policy solutions to address these impacts.

Keywords

Child labor · Foundational skills · Bangladesh · Pakistan

Amita Chudgar
amitac@msu.edu
Vanika Grover
grover@msu.edu
Shota Hatakeyama
hatakey2@msu.edu
Aliya Bizhanova
bizhanov@msu.edu

1 Department of Education Administration, Michigan State University, Erickson Hall 620 Farm Lane Rm 408, East Lansing 48824, MI, USA
The global community’s attention to foundational skills marks an important departure from the focus on outcomes such as school enrollment, attendance, grade attainment. Sustainable Development Goal (SDG) 4 emphasizes quality education and focuses on the acquisition of foundational skills (United Nations, 2015). This commitment draws attention to the global urgency to achieve foundational learning for all children. As we continue to document and address the challenges of foundational learning, the situation of a large and particularly vulnerable group of children—children engaged in child labor—remains understudied.

According to the International Labor Organization (ILO), at least 160 million children ages 5 to 17 around the world were involved in some form of child labor at the beginning of 2020, including 79 million children who perform hazardous labor. Out of the 160 million children *Engaged* in child labor, 89.3 million were young children aged 5 to 11, 35.6 million were children aged 12 to 14, and 35 million were children aged 15 to 17 (ILO & UNICEF, 2020). The Covid-19 pandemic has further worsened this situation. During previous global crises, it was observed that “a 1 percentage point rise in poverty leads to at least a 0.7 percentage point increase in child labor” (ILO & UNICEF, 2020, p. 8). Due to Covid-19–related job losses and economic hardships, the living standards of many vulnerable families have declined. Temporary school closures during the pandemic have also led to young people dropping out of school. Affected by pandemic-related rising poverty and school closure, nearly 9 million more children are expected to enter child labor by the end of 2022 (ILO & UNICEF, 2021). These young people are amongst the most marginalized members of our global community and it is important to understand their performance on various SDG 4 outcomes.

In this article, we present recent representative data from Bangladesh and Pakistan used to investigate the relationship between foundational learning and child labor. We contribute to the existing literature on the association between child labor and educational outcomes. This literature has yet to explore systematically the relationship between child labor and foundational skills because large-scale data on foundational skills have not been available until recently. We also advance the discourse in this literature by evaluating various definitions and measures of child labor to understand the impact of child labor on learning. Finally, using a definition of foundational skills aligned with SDG 4, our work contributes to the global concerns surrounding factors that inhibit children’s opportunity to acquire foundational skills.

Review of literature

A growing body of work over the past decades has studied the relationship between child labor and education, or more broadly, human capital development. We review some of the key insights from this literature to inform our research approach and situate our paper within the literature. A vast majority of the literature on child labor shows a negative association between child labor and educational outcomes. But this analysis has been to some extent limited by lack of data on outcomes of interest (such as foundational skills) and it is complicated by the challenges of measuring and accounting for child labor in quantitative analyses. We discuss these issues in turn.
Child labor and educational outcomes

We identified several studies published in the last 2 decades that investigated the relationship between child labor and educational outcomes. While our search was not exhaustive, it represented some broad patterns observed in the literature. Most of the literature we identified is focused on Latin America, followed by Sub-Saharan Africa and Asia. The studies from Latin America analyzed data from Argentina, Bolivia, Brazil, Chile, Colombia, the Dominican Republic, Ecuador, Honduras, Mexico, Paraguay, Peru, and Venezuela (e.g., Gunnarsson et al., 2006). We found a few single-country studies from Latin America, including studies from Colombia (Emerson et al., 2014) and Brazil (Guarcello et al., 2005). Most recently, Delprato and Akyeampong (2019) expanded this sample to include Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay, and produced the largest cross-national analysis on the subject from Latin America. In Africa, a recent large, cross-country study by Lee et al. (2021) used data from Benin, Burkina Faso, Burundi, Cameroon, Chad, Congo, Côte d’Ivoire, Niger, Senegal, and Togo. Other single-country studies focused on Tanzania (Akabayashi & Psacharopoulos, 1999), Ghana (Heady, 2003), and Ethiopia (Woldehanna & Gebremedhin, 2017). From Asia, we primarily identified single-country studies, including studies from China (He, 2016), Vietnam (Le & Homel, 2015), and Indonesia (Sim et al., 2017). Finally, the literature also contains studies that looked beyond one continent, including Orazem and Gunnarsson’s study (2004), which included 11 Latin American countries from the Latin-American Laboratory of Quality Education (LLECE), several European countries from Trends in International Mathematics and Science Study (TIMSS), and Thailand, plus data from some villages in India. Guarcello et al. (2005) investigated data from Brazil, Kenya, Lebanon, Sri Lanka, and Turkey. Similarly, Bhalotra and Heady (2003) used data from Pakistan and Ghana, and Rosati and Rossi (2003) used data from Pakistan and Nicaragua. In the literature, we observed that attention to Asian countries was limited, compared with attention to Latin American and Sub-Saharan African countries.

A vast majority of the studies (except two) we reviewed used school-based data, and by extension, school-based samples. Several of these studies (e.g., Delprato & Akyeampong, 2019; Lee et al., 2021; Orazem & Gunnarsson, 2004) also relied on large-scale testing efforts, including LLECE, Programme d’Analyse des Systèmes Educatifs de la CONFEME (PASEC), and TIMSS. While this allowed the authors to study a number of countries together, it also means that such studies focused on a higher-level skill set (typically measuring content knowledge at Grades 4, 6, or 8, depending on the survey) instead of on foundational learning, and thus these studies were unable to capture information on children who are not currently in school.

In addition to test scores, the studies we reviewed focused on a range of outcomes, including school attendance, time spent studying at home, and grade attainment. Most studies showed that child labor was negatively associated with children’s educational outcomes, including their academic achievement. These findings were consistent across multi-country studies (Delprato & Akyeampong, 2019; Lee et al., 2021) and single-country studies, such as Emerson et al. (2014) in Brazil and He (2016) in China. For example, the study of 10 francophone West and Central African countries by Lee et al. (2021) found that child labor (measured as any work outside the household) undermined academic achievement regardless of subject, gender, and age. It lowered reading and mathematics scores for both genders and children under 12 and over 13 years. In a similarly large study of
15 Latin American countries, Delprato and Akyeampong (2019) found that student’s work (measured as work at home and outside home, regardless of payment) was a significant barrier hampering learning in the region, leading to lower math and reading achievement (by around 9 to 13 points) for working students. They found that the group of students most affected were those engaged in paid employment outside the household. In Indonesia, similar research showed that child labor taking place outside family enterprise had more negative effects on student attainment than did work done to help the family business (Sim et al., 2017).

The nuance that those engaged in paid employment outside the household were more affected (Delprato & Akyeampong, 2019) and the distinction between working for a family enterprise versus a non-family enterprise in Indonesia (Sim et al., 2017) led us to another significant observation. We found that studies employed a range of different approaches to operationalize child labor. Some studies identified a child as engaged in child labor if the child reported working outside the home (Emerson et al., 2014; Gunnarsson et al., 2006; Lee et al., 2021). This work could include farm work, petty work, physical labor, or work for a home enterprise (e.g., Heady, 2003) and could include paid or unpaid labor (e.g., Woldehanna & Gebremedhin, 2017). These distinctions may or may not have been coded separately and often simply were captured under the broader umbrella of “child labor”. Other studies paid attention to children’s work in the household as well, and authors distinguished between a child doing housework, doing farm work, and working for wages (e.g., Delprato & Akyeampong, 2019; Guarcello et al., 2005; He, 2016; Le & Homel, 2015; Post, 2011). Some studies simply used a yes/no category of child labor (e.g., Emerson et al., 2014), whereas others used a detailed accounting of hours worked (Le & Homel, 2015). Some attempted to use cut-offs for the number of hours worked ( Guarcello et al., 2005). Scholars tried, where feasible, to distinguish work for pay and work without pay. We discuss these different definitions and their implications in more detail below, as it is salient to unpacking the associations between child labor and educational outcomes.

Challenges of defining child labor

While no common legal definition of child labor exists, it was defined by ILO (1999) as work that is too early for children to perform and that poses a risk to children’s health and safety. What constitutes hazardous child labor is similarly hard to define. In general terms, it refers to work that is dangerous to be performed by children of a particular age that, due to circumstances or its nature, can take long hours, and that is detrimental to children’s development. One definition for hazardous child labor is provided by ILO Convention R190 Worst Forms of Child Labor Recommendation (1999):

Hazardous forms of child labor include (a) work which exposes children to physical, psychological, or sexual abuse; (b) work underground, underwater, at dangerous heights, or in confined spaces; (c) work with dangerous machinery, equipment, and tools, or which involves the handling or transport of heavy loads; (d) work in an unhealthy environment which may, for example, expose children to hazardous substances, agents or processes, or to temperature, noise levels, or vibrations damaging to their health; (e) work under particularly difficult conditions such as work for long hours or during the night or work where the child is unreasonably confined to the premises or the employer. (Section II.3.a–e)
The challenges of definitions notwithstanding, attention to how child labor is operationalized in empirical work is crucial, as it can lead to underreporting or misestimating the time children spend on such activities and can subsequently influence estimates of interests. This challenge has been well documented by scholars (e.g., Basu, 1999; Fors, 2012; Orazem & Gunnarsson, 2004). Basu, for instance, referred to ILO Convention No. 138, which specified 15 as the age below which a person may be considered a child. Another definition considered such a “child” employed or economically active if they worked on a “regular basis” that generated financial reward or market productivity (p. 1085). The proportion of children engaged in child labor in this manner undercounts those engaged in unpaid labor or those engaged in part-time labor. For instance, among all boys globally, 11.2 percent are in child labor compared to 7.8 percent of all girls. In absolute numbers, boys in child labor outnumber girls by 34 million. However, when the definition of child labor expands to include household chores for 21 hours or more each week, the gender gap in prevalence among boys and girls aged 5 to 14 is reduced by almost half (ILO & UNICEF, 2021, p. 9).

To understand the prevalence and implications of child labor, the operationalization of child labor can be made more nuanced in at least two ways: by paying attention to the “type of work” and “intensity of work” (hours worked). Orazem and Gunnarsson (2004) made several related observations and asked if there is a “threshold level of hours of work at which damage begins, or if any child labor causes damage” (p. 21), or similarly questioned if “work in the home is less damaging to school achievement than is market work” (p. 22) and if “the damage differs by the type of work children do, or if it is subject to the hours worked alone” (p. 22). Guarcello et al. (2005) noted that this lack of understanding about “the relative importance of work type and work intensity in influencing learning achievement” contributes to significant knowledge gaps in advancing appropriate policies (p. 258). Similarly, Dammert et al. (2018) remarked that “because of the focus on the broad category of economic activities (or one of its sub-components), we have little evidence on the extent to which the interventions prevent and reduce the worst forms of child labor, including hazardous work” (p. 115).

The consideration of the type of child labor has implications not just for accounting for the prevalence of child labor but also for understanding its implications. As noted above, for instance, in Indonesia, child labor that took place outside family business had a more negative effect on student attainment than did work done to help the family business (Sim et al., 2017). This may be in part because of the relationship between rurality, farming, and child labor, whereby families with larger landholding or “land-rich” families may also have a greater prevalence of child labor. But their wealth may also allow them to compensate in some other ways for their children’s educational outcomes. Researchers have noted this as the wealth paradox (e.g., in Zimbabwe, as shown by Oryoie et al., 2017; in Ghana and Pakistan, as shown by Bhalotra & Heady, 2003). In contrast with such paid or unpaid work outside the home for a family enterprise, a child engaged in hazardous labor (including paid or unpaid work) could encounter vastly different circumstances. Hazardous child labor is more prevalent among poorer households, in families where a parent may be absent due to death, and/or families where children are living without parents or adult guardians (e.g., Kamei, 2018). Thus, while both groups of children are engaging in child labor and perhaps even paid child labor, accounting for the type of labor may be important to understand the overall association between such labor and the child’s well-being and educational outcomes.

The consideration of the intensity of child labor (hours worked) is similarly salient from the perspective of children’s well-being. Rosati and Rossi (2003) analyzed data from Pakistan and Nicaragua and paid attention not just to the instance of child labor but specifically...
to the hours worked. They proposed a simultaneous conceptual model to estimate the relationship between school attendance decisions and hours worked, as they are likely to be complementary (whereby engagement in one precludes engagement in another). Indeed, they noted that while “school attendance does not rule out child labor, but working hours are assumed to have a negative influence on human capital accumulation. Hours spent at work reduce the time available for study, tire the child, and reduce learning productivity” (p. 284).

In summary, child labor has a negative impact on the lives of tens of millions of children around the world. The concerns about the well-being of these children deserve our utmost attention. While the global education discourse has moved on to the issues of foundational learning, we lack a systematic understanding of the foundational learning outcomes of children engaged in child labor. A large amount of the existing literature uses learning outcomes at more advanced grade levels, due to its reliance on school-based data. Evaluating children engaged in child labor on more advanced learning matrices can mask the true nature of the challenge faced by these children. Such school-based studies are also unable to take into account the conditions of children engaged in labor who may not be in the school system. In this literature, we also noted relatively limited attention to data from Asia, including Southern Asia, a region home to more than 25 million children aged 5 to 17 years engaged in child labor (ILO & UNICEF, 2021). Finally, in our review, we also noted that the literature attended unevenly to the nuances of defining and measuring child labor. These nuances have important policy implications in guiding efforts to limit certain types of child labor.

Our analysis of the relationship between foundational skills and child labor used round 6 of UNICEF Multiple Cluster Indicator Survey (MICS) data from Pakistan and Bangladesh and responded to several of the challenges we identified in the literature. We briefly provide the country context for Bangladesh and Pakistan before discussing the data, methods, and our results.

Country context

The population of Bangladesh is 165 million, and its gross domestic product (GDP) per capita is 1,962 USD (current USD). Gross enrollment rates are 119.6% and 74.4% at the primary and secondary levels, respectively. The gender parity index for each educational level is 1.09 and 1.21 (World Bank, 2021). The enrollment numbers exceed the school-age population, which implies that a significant number of children experience repetition at the primary level. In secondary education, enrollment is much better than in Pakistan (discussed below); however, it is significantly skewed toward girls.

National legislation on child labor in Bangladesh through the Labor Act of 2006 (Bangladesh Employers’ Federation, 2009) prohibits the employment of children below 12 years of age. Moreover, the act prohibits the employment of adolescents in certain hazardous conditions (e.g., cleaning of moving machinery, working with dangerous machines, working underground or underwater, working in any factories or mines). For children above the age of 12, the act highlights certain conditions, or “light work” (Article 44), that do not endanger the child’s health or development and do not interfere with their education (Bureau of International Labor Affairs, 2020a). While children’s employment rate in Bangladesh is lower than Pakistan at 5.0% (boys 5.7%; girls 4.2%), it is still sizable: 48% of children are wage workers, 41% are unpaid family workers, and 11% are self-employed. A majority (58%) do only work, and 42% engage in both work and study. Economically
active children are almost equally distributed across main sectors (39% in agriculture, 27% in manufacturing, and 33% in service; World Bank, 2021).

The population of Pakistan is 221 million, and its GDP per capita is 1,189 USD (current USD). Gross enrollment rates are 95.5% and 44.9% at the primary and secondary levels, respectively. The gender parity index of each educational level is 0.88 and 0.87 (World Bank, 2021). Thus, although Pakistan has almost achieved universal primary education, the gender gap in access to primary education is still large. Furthermore, access to secondary education is a significant challenge.

Like Bangladesh, Pakistan has several laws that contain provisions to prohibit child labor below the age of 14. Children over the age of 14 can work in factories under certain conditions and work hour limits. Moreover, the Employment of Children Act of 1991 specifies what conditions are deemed hazardous for children (e.g., not working in the transport of passengers or goods or mails by railway, cinder picking, working at a catering establishment at a railway station, selling crackers and fireworks). Given decentralized governance structures in the country, separate laws against child labor in Khyber Pakhtunkhwa, Punjab, and Sindh provinces have raised the minimum age for employment in hazard conditions to 18 years (Bureau of International Labor Affairs, 2020b). However, the prevalence of child labor in Pakistan is far greater than in Bangladesh. Children’s employment rate in Pakistan is 13.0% (boys 12.5%; girls 13.5%). Among them, 14% are wage workers, 75% are unpaid family workers, and 10% are self-employed. The majority (87%) do only work, and 13% engage in both work and study. Unlike in Bangladesh, in Pakistan, a majority of economically active children are in the agricultural sector (76% in agriculture, 7% in manufacturing, and 15% in service; World Bank, 2021).

Together, these countries—which can boast of near-universal primary enrollment, while at the same time, a sizable population of children is engaged in labor—provide a valuable context to study the association between child labor and foundational or Grade 2–3 level reading and numeracy skills.

Data

We used representative, multi-national data from round 6 of MICS. Administered by UNICEF starting in the mid-1990s, MICS collects internationally comparable education, health, economic, and well-being data across 118 countries. The primary goal of MICS is to monitor progress on national and international goals related to children’s and women’s well-being.

This paper used household survey and child-level data of 10,369, and 9,200 children aged 12 to 14 years from Pakistan (Sindh and Punjab) and Bangladesh, respectively. The data were collected between 2017 and 2021. MICS round 6 includes a new module on children’s learning. The Foundational Learning module captures basic reading and numeracy skills of children aged 7 to 14 to monitor learning and quality of education aligned with SDG 4 (UNICEF, 2021). MICS also includes a series of questions to document the prevalence of child labor. The MICS questionnaire includes such questions as whether a child worked outside the home in the last week and year and how many hours they worked outside the home on a range of different activities. Together, these data, along with several relevant contextual variables, allowed us to examine the associations between different forms of child labor and foundational skills.
The dependent variable, foundational skills

MICS questions measure whether children are achieving minimum foundational skills in reading and numeracy at Grade 2 and 3 levels (UNICEF, 2019). Foundational reading skills measure three components: (a) word recognition (correctly reading 90% of words in a story), (b) literal questions (replying correctly to all three literal questions), and (c) inferential questions (replying correctly to both inferential questions). If a child succeeds in all three tasks, they are considered to have foundational reading skills. For foundational numeracy skills, MICS measures four tasks: (a) number reading, (b) number discrimination, (c) addition, and (d) pattern recognition. Each task is composed of several questions, and the child must correctly answer all questions to complete the task. If the child succeeds in all four tasks, they are considered to have foundational numeracy skills.

Based on these data, we measured foundational reading and numeracy skills in two ways. For the first type, we adopted a binary measure recommended by UNICEF. We followed the calculation process provided by the UNICEF manual for statistical data analysis of MICS data (Mizunoya & Amaro, 2020). We generated measures that indicated if a child had reading skills (yes = 1, no = 0) and if a child had numeracy skills (yes = 1, no = 0). We refer to these variables as Reading-FLS and Numeracy-FLS. For the second type, we generated a continuous measure that reported the number of questions the child had correctly answered for each skill. As described above, reading skills consisted of three components, with six questions, with the variable ranging from 0-6. Each component for numeracy skill consisted of either five or six questions, with a total of 21 questions, and the variable ranged from 0-21. We refer to these variables as Reading-Score and Numeracy-Score.

Independent variable, child labor

The key independent variable of interest is child labor. We categorized child labor into three categories: hazardous labor, economic labor, and household labor.

A child was categorized as working in hazardous labor if the child worked under any of the following hazardous conditions: carrying heavy loads; working with dangerous tools, such as knives and similar or operating heavy machinery; being exposed to dust, fumes, or gas; being exposed to extreme cold, heat, or humidity; being exposed to loud noise or vibration; being required to work at heights; being required to work with chemicals, such as pesticides, glues, or explosives; or being exposed to other things, processes, or conditions bad for health or safety.

Children who worked on the following activities were classified as engaged in economic labor: working or helping their own or the household’s plot, farm, food garden or looking after animals (e.g., growing farm produce; harvesting; or feeding, grazing, or milking animals); helping in a family business or a relative’s business with or without pay; running their own business, producing or selling articles, handicrafts, clothes, food, or agricultural products; or engaging in any other activity in return for income in cash or in-kind. (We attempted to further separate children working on household-oriented economic activity from children engaged in other types of economic work. Significant proportions of children in both countries were engaged in both types of economic labor, so this distinction ultimately did not work meaningfully for our data.)

The final category of child labor included children who were engaged in household labor. If children engaged with any of the following activities, they were categorized into this group: fetching water for household use, collecting firewood for household use,
shopping for the household, cooking, washing dishes or cleaning around the house, washing clothes, caring for children, caring for someone old or sick, or performing other household tasks.

We placed each child in one of these three categories of labor or identified the child as not engaged in any labor. If a child was performing both hazardous and household labor or hazardous labor and economic labor, we put the child in the “hazardous labor” category. If the child performed both economic and household labor, we put the child in the “economic labor” category. Children who only performed household labor were put in the “household labor” category.

To understand not just the type but also the intensity of child labor, we used three measures that looked at the hours children worked each week. We used the category of child labor discussed above, but instead of binary variables about whether a child engaged with child labor or not, we used a continuous measure for how long a child engaged in each category (hazardous, economic, household) of child labor. We used both the hours worked and the hours worked along with its squared term to examine the linear and nonlinear relationship between hours of child labor and children’s foundational skills outcomes. Finally, we created a third measure of child labor that indicated the intensity of child labor by identifying children who worked more than around 2.5 hours per day (more than 10% of the total 168 hours in the week) in any category of work and were thus engaged “intensive” child labor.

Control variables

We used the following variables as controls in our regression model: sex of the child, age of the child, whether a household was headed by parent or grandparent of the child, number of children in the household, whether a household was headed by a male or female, household wealth index, whether the mother had completed secondary education, and (in Bangladesh only) if the household was a religious minority in the country.

Additionally, we included district fixed effects to account for the range of local, contextual, and structural aspects of the economy that may have an impact on both the prevalence of child labor and children’s educational performance (see, for example, Fors, 2012; Guarcello et al., 2005; Orazem & Gunnarsson, 2004 for discussions of local factors impacting child labor). For instance, lack of administrative capacity can both contribute to a lower quality of schooling outcomes and higher child labor in a given district. In such a case, ordinary least squares (OLS) regression without correcting for district fixed effects would yield biased estimates of the associations between child labor and foundational skills. To control for such unobserved district characteristics, we employed the district fixed effects approach.

Methods

We first examined characteristics of children by their child labor status using descriptive statistics. Next, we employed the following district fixed effects approach.

\[
Y_{id} = \beta_0 + \beta_1 \text{Household Labor}_{id} + \beta_2 \text{Economic Labor}_{id} + \beta_3 \text{Hazardous Labor}_{id} + \text{Other controls}_{id} \beta_4 + \text{District}_d + \epsilon_{id}
\]  

(1)
\( Y_i \) in equation 1 represents the four outcomes (Reading-FLS, Numeracy-FLS, Reading-Score, Numeracy-Score) for child \( i \) in district \( d \). The coefficients \( \beta_1-\beta_3 \) capture the relationship between engaging in the specific type of child labor and child outcomes, compared with children who did not engage in child labor. We estimated three additional equations where we replaced the binary categories of types of child labor with hours worked in a specific type of child labor, hours worked in a specific type of child labor, along with a squared term to account for nonlinear relationships, and finally a set of indicators for if the child was engaged in a given type of labor for more than about 2.5 hours each day (intensive labor). In total for each country, with four outcomes and four key sets of independent variables, we estimate 16 equations.

Results

In this section we present our findings, starting with the descriptive results.

Descriptive results

Tables 1 and 2 compare children who did and did not engage in child labor in Bangladesh and Pakistan, respectively. The first column describes children who were not engaged in labor, the second column provides descriptive statistics on children engaged in any form of child labor. The final three columns then further separate those children engaged in labor by the type of labor they engaged in.

In Bangladesh, female children and older children were more likely to engage in any form of child labor, compared with male children and younger children. They worked, on average, nearly 8 hours a week and tended to come from rural families with less-educated mothers and lower levels of wealth. In Bangladesh, 45% of children who did not engage in child labor had foundational numeracy skills and, on average, got 19 out of 21 questions correct. However, 42% of children who engaged in child labor had foundational numeracy skills but, on average, they too got 19 out of 21 questions correct. On the reading side, 75% of children who did not engage in child labor had foundational reading skills and, on average, got 5 out of 6 questions correct, whereas 71% of children who engaged in child labor had foundational reading skills but, on average, got 5 out of 6 questions correct.

Some of these observations become more nuanced when we look separately at children performing different types of labor. Children performing hazardous labor and economic labor tended to disproportionately be male; female children were overrepresented in household labor. Children performing hazardous work came from particularly challenging home circumstances with lower levels of wealth and less-educated mothers. They also tended to be disproportionately likely to belong to a language minority group and reside in a rural area. Not surprisingly, the foundational skills performance of children working in hazardous conditions was worst among all children, followed by those working in economic labor, especially in terms of their reading skills. Finally, despite various laws in place to protect the 12- to 14-year-old children in our sample, children working in hazardous labor worked 18 hours a week, and those in economic labor worked 11 hours a week, on average.

In Pakistan, the data reveal some patterns similar to those in Bangladesh. Girls and older children were more likely to be engaged in some form of labor, and once again, children engaged in any form of labor, on average, came from slightly larger families with lower wealth and less-educated mothers. They also tended to be slightly more likely to
### Table 1: Characteristics of children engaged in child labor by type of labor, Bangladesh

| Variable                                      | No child labor | Child labor | Child labor type | Household chore | Economic activity | Hazardous labor |
|-----------------------------------------------|----------------|-------------|------------------|-----------------|------------------|-----------------|
|                                               | Mean           | Mean        | Mean             | Mean            | Mean             | Mean            |
| **Child characteristics**                     |                |             |                  |                 |                  |                 |
| Female                                        | 0.289          | 0.598       | 0.699            | 0.331           | 0.275            |                 |
| Age                                           | 12.876         | 13.036      | 13.014           | 13.059          | 13.144           |                 |
| Child or grandchild                           | 0.967          | 0.963       | 0.963            | 0.964           | 0.964            |                 |
| **Family characteristics**                    |                |             |                  |                 |                  |                 |
| Number of children in the household          | 2.427          | 2.462       | 2.466            | 2.439           | 2.466            |                 |
| Male headed household                        | 0.876          | 0.877       | 0.861            | 0.933           | 0.917            |                 |
| Mother’s education below secondary            | 0.538          | 0.626       | 0.598            | 0.670           | 0.744            |                 |
| Average household wealth index               | 3.292          | 2.804       | 2.928            | 2.566           | 2.312            |                 |
| Language minority                            | 0.010          | 0.008       | 0.007            | 0.007           | 0.015            |                 |
| Religious minority                           | 0.086          | 0.085       | 0.083            | 0.099           | 0.085            |                 |
| Urban                                         | 0.264          | 0.185       | 0.200            | 0.158           | 0.123            |                 |
| **Learning**                                 |                |             |                  |                 |                  |                 |
| FLS numeracy                                  | 0.447          | 0.418       | 0.429            | 0.450           | 0.324            |                 |
| FLS reading                                   | 0.745          | 0.713       | 0.745            | 0.687           | 0.542            |                 |
| Numeracy score (0-21)                         | 18.753         | 18.607      | 18.808           | 18.452          | 17.578           |                 |
| Reading score (0-6)                           | 5.103          | 5.018       | 5.197            | 4.796           | 4.145            |                 |
| Hours of child labor per week                 | 0.000          | 7.749       | 5.438            | 11.123          | 18.005           |                 |
| Observations                                  | 2010           | 6200        | 4580             | 829             | 791              |                 |

Descriptive statistics based on numeracy sample. Due to the presence of children who took reading but not numeracy and numeracy but not reading, the sample size is slightly different. The sample size based on reading is 7948.
Table 2  Characteristics of children engaged in child labor by type of labor, Pakistan

| Variable                        | No child labor | Child labor | Child labor type |
|---------------------------------|----------------|-------------|------------------|
|                                 | Mean           | Mean        | Mean             | Mean           | Mean           |
|                                 |                |             | Household chore  | Economic activity | Hazardous labor |
| Child characteristics           |                |             |                  |                |                |
| Female                          | 0.385          | 0.529       | 0.593            | 0.419          | 0.340          |
| Age                             | 12.832         | 13.000      | 12.988           | 12.948         | 13.073         |
| Child or grandchild             | 0.944          | 0.936       | 0.942            | 0.907          | 0.932          |
| Family characteristics          |                |             |                  |                |                |
| Number of children in the household | 4.210         | 4.473       | 4.302            | 5.034          | 4.851          |
| Male headed household           | 0.903          | 0.907       | 0.900            | 0.932          | 0.922          |
| Mother’s education below secondary | 0.754         | 0.846       | 0.804            | 0.927          | 0.970          |
| Average household wealth index  | 3.305          | 2.814       | 3.139            | 2.301          | 1.816          |
| Language minority               | 0.358          | 0.392       | 0.373            | 0.411          | 0.455          |
| Religious minority              |                |             |                  |                |                |
| Urban                           | 0.476          | 0.381       | 0.458            | 0.258          | 0.148          |
| Learning                        |                |             |                  |                |                |
| FLS numeracy                    | 0.177          | 0.147       | 0.157            | 0.141          | 0.109          |
| FLS reading                     | 0.588          | 0.454       | 0.534            | 0.331          | 0.240          |
| Numeracy score (0-21)           | 13.960         | 13.270      | 14.016           | 11.662         | 11.198         |
| Reading score (0-6)             | 4.258          | 3.422       | 3.994            | 2.667          | 1.843          |
| Hours of child labor per week   | 0.000          | 10.825      | 6.874            | 15.171         | 23.861         |
| Observations                    | 1773           | 6207        | 4499             | 546            | 1162           |

Descriptive statistics based on numeracy sample. Due to the presence of children who took reading but not numeracy and numeracy but not reading, the sample size is slightly different. The sample size based on reading is 7992.
belong to rural and language-minority households. Children engaged in child labor worked nearly 11 hours, on average, per week. Their foundational skills performance in both reading and numeracy were also lower, compared with that of children not engaged in any form of labor. Overall, on all counts, foundational skills levels in Pakistan were lower than those we found in Bangladesh.

Once again, looking at children engaged in different types of labor reveals additional nuances. We found an overrepresentation of female children in household labor and an overrepresentation of male children in hazardous labor. Children engaged in hazardous labor came from households where a majority of their mothers had less than a secondary level of education and from families with very low levels of wealth. Like in Bangladesh, they were more likely to belong to a language minority group and reside in a rural area. And once again, despite various laws to protect these children, children were engaged in hazardous labor, on average, for 24 hours per week, followed by 15 hours per week for those engaged in economic labor. The foundational skills performance of the children who worked was alarmingly low as well. The children working in hazardous labor were at an extreme disadvantage in terms of their foundational skills.

These descriptive data from Bangladesh and Pakistan reveal the importance of considering different types of childhood work or labor separately. They reveal in particular the extremely precarious situation of children engaged in hazardous labor. A proportionally smaller group, these children appear to be living in exceedingly challenging circumstances. Their home background and their lower education performance reveal the structural traps these children find themselves in. Less-educated parents, greater poverty, rurality, and their status as (language) minorities were all associated with these children engaging in the worst form of labor. These children themselves performed poorly on foundational reading and numeracy skills (measured at Grade 2 and 3 level), even at a relatively advanced age of 12 to 14 years.

Regression results

Tables 3 and 4 display regression results that analyze the relationships between different measures of child labor and foundational skills (Reading-FLS, Numeracy-FLS, Reading-Score, Numeracy-Score). Each table is divided into four horizontal panels to present results from a different set of child labor measures. The analysis presented here controlled for several covariates (e.g., family wealth, family size, maternal education, child age) that are important in explaining variations in foundational skills. We also accounted for the unique contextual attributes of each child and family by using district fixed effects.

Focusing on Table 3, panel 1, for Bangladesh, when we used a simple binary variable that indicates engagement in one of the three types of child labor, we saw a consistent and negative relationship between hazardous child labor and all of the foundational skills outcomes. For instance, the foundational numeracy and reading score of a child engaging in hazardous labor was lower by 0.17 and 0.32 units, respectively, at the 0.1% level of significance. Their foundational numeracy and reading skills were also 9.6% and 16.5% lower, respectively, at the 0.1% level of significance. We do not observe any negative association between engagement in household labor (yes/no) and foundational skills. Those engaged in economic activities did receive significantly lower reading scores compared with scores of children not working.

A nearly identical pattern is evident when we look at results in Table 3, panel 2, for “hours worked” under each category instead of a simple yes/no response. We found that every incremental hour of hazardous labor was associated with lower numeracy and
reading scores and lower numeracy and reading foundational skills. Paying attention to hours worked, in Table 3, panel 2, we found a more consistent negative impact of economic labor in particular on reading scores and reading foundational skills. This is aligned with the observations (e.g., Dumas, 2012 from Senegal) that children with some work experience may acquire numeracy skills as a part of their trade or service work.

Panels 3 and 4 in Table 3 provide several additional nuances to these observations. In panel 3, we looked at the impact of engaging in child labor for children who were working, on average, around 2.5 hours or more per day, per week, in the respective category of child labor. These children engaged in intensive child labor did suffer large and significant negative consequences of engaging in hazardous activities and in economic activity for such sustained periods, as seen in panel 3. The foundational numeracy and reading scores of a child engaging in intensive hazardous labor were 0.27 and 0.84 units lower, respectively, at the 0.1% level of significance, and a significant proportion of them were unlikely to attain foundational numeracy and reading skills. Yet even for this level of intensive engagement, we did not note any negative association of engaging in household labor in Bangladesh.

In panel 4 of Table 3, we observe the impact of hours worked along with a squared term for hours worked and can begin to see potential patterns associated with extensive
household work. We note that, for household chores, the coefficient associated with hours worked was positive, implying that a small level of engagement in household chores may not be counterproductive for foundational skills. However, once we take into account the second-order impact or the relationship between hours worked-squared and foundational skills, the potential benefit of household work increases at a decreasing rate and may eventually plateau for numeracy score, numeracy skills, and reading scores. The general impact of economic labor and hazardous labor remains negative. In terms of numeracy score, engagement in both these activities also led to a decline in scores at an increasing rate, implying that greater engagement in economic or hazardous labor will lead to a faster/more rapid decline in numeracy scores.

The four panels in Table 4 display similar results for Pakistan. In Pakistan, while we once again observed a consistent negative association between participation in child labor and foundational skills, we also noted some interesting differences from Bangladesh. Panel 1 shows that any involvement in economic or hazardous labor was associated negatively with almost all four of the outcomes: reading foundational skills, reading score, numeracy score, and also numeracy foundational skills (for hazardous labor). The foundational numeracy score of children engaging in economic activities for instance was lower by 0.15

| Table 4 | Regression of child labor on foundational numeracy and reading skills, Pakistan |
|---------|--------------------------------------------------------------------------------|
|         | Numeracy FLS | Num-Scr | Reading FLS | Read-Scr |
| **Panel 1: Child labor** | | | | |
| Household chores | −0.015 | 0.037 | −0.023 | −0.008 |
| Economic activities | −0.013 | −0.146** | −0.134*** | −0.278*** |
| Hazardous labor | −0.045** | −0.193*** | −0.181*** | −0.446*** |
| **Panel 2: Child labor time per week** | | | | |
| Household chores | −0.001*** | −0.006*** | −0.004*** | −0.010*** |
| Economic activities | −0.000 | −0.003 | −0.006*** | −0.017*** |
| Hazardous labor | −0.001 | −0.008*** | −0.007*** | −0.020*** |
| **Panel 3: Intensive child labor** | | | | |
| Household chores | −0.032* | −0.131** | −0.129*** | −0.357*** |
| Economic activities | 0.007 | −0.021 | −0.178** | −0.524*** |
| Hazardous labor | −0.022 | −0.289*** | −0.266*** | −0.746*** |
| **Panel 4: Child labor time per week with squared term** | | | | |
| Household chores | −0.001 | −0.003 | −0.006*** | −0.017*** |
| Household chores ^2 | −0.000 | −0.000 | 0.000*** | 0.000*** |
| Economic activities | 0.005 | −0.011 | −0.008* | −0.019** |
| Economic activities^2 | −0.000* | 0.000 | 0.000 | 0.000 |
| Hazardous labor | −0.001 | −0.019*** | −0.011*** | −0.030*** |
| Hazardous labor ^2 | 0.000 | 0.000** | 0.000** | 0.000*** |
| Observations | 7980 | 7980 | 7992 | 7992 |

Regression in each panel controls the following variables: Sex of the child, age of the child, whether the household head is either a parent or grandparent of the child, number of children in the same household, whether household head is male, mother’s educational background is less than secondary completion, wealth index of the household, language minority, religious minority, household location is urban, district of the household.

*Significance at 5% level, **Significance at 1% level, ***Significance at 0.1% level
units, and the child’s foundational reading score was lower by 0.28 units. The coefficients for children engaged in hazardous labor were larger, implying a worse association between hazardous labor and foundational skills. Once again, we found no association between engagement in household chores (yes/no) and foundational skills.

In panel 2, once we account for hours worked (rather than a yes/no measure of child labor engagement), we notice changing patterns. We now note that incremental involvement in all three forms of labor was associated with declining reading scores and reading foundational skills. For the numeracy score and numeracy skills, the results were uneven in terms of significance but tended in the same (negative) direction. Paying closer attention to children engaged in intensive labor, as we did in panel 3, is again worthwhile, as we found that these children who engaged in intensive labor (nearly 2.5 hours per day/week) were especially likely to underperform their non-working counterparts. Children who worked intensively in household labor also did not escape these negative relationships. Interestingly, only children who worked in economic labor seemed to be somewhat immune to the negative association between intensive child labor and their numeracy foundational skills and numeracy scores.

Panel 4, Table 4, once again shows that in Pakistan, we found much more consistent associations between child labor and reading foundational skills and reading scores. For each type of child labor engagement (at home, economic, and hazardous), the association between child labor and reading outcomes was negative and the association decreased at an increasing rate. We noted a similar negative association between hazardous labor and numeracy scores.

Conclusion

Child labor, especially hazardous child labor and intensive child labor (where the child is engaged in labor for several hours each week) is a highly problematic phenomenon because of the implications it has for a child’s well-being. Children who engage in such labor represent the most marginalized members of our global community, not just because of the work they perform but also because of the challenging circumstances that lead them into such labor in the first place. These circumstances include poverty, lack of opportunities for parents and guardians to find adequate means to support their families. Edmonds and Theocharides (2021) noted at least two pathways through which child labor also impedes the very economic growth needed to break free from this cycle. Child labor impedes child development (including education, as we show in this paper), which has long-term consequences for the productive capacities of future generations. Child labor, where available, also drives down the wages of the unskilled jobs children tend to engage in. This may reduce investment in high-skilled, high-growth opportunities within the community or region. The presence and prevalence of child labor is thus not an isolated problem but rather marks patterns of structural inequities and lack of opportunities and resources that both cause child labor and are perpetuated by child labor.

In this study using a descriptive approach, we focused on understanding the relationship between engagement in child labor and reading and numeracy foundational skills, as defined by and aligned with the SDG 4 goal. In doing so, our study marks a departure from existing literature on the relationship between child labor and educational outcomes. This literature was not able until recently to attend to foundational skills as an outcome, due to the lack of available data. Prior studies on the relationship between child labor and educational performance tended to rely on larger cross-national data, that were primarily school
based and tested children’s academic skills at Grades 4, 6, and 8. While such outcomes are interesting, they also measure a skill set that may already be too advanced for some children, especially children engaged in labor. Such a measure may therefore lump a large proportion of children performing child labor into a low-performing category because of lack of nuance. Also, such school-based data and measures would entirely overlook children out-of-school. Our use of recent (2017–2021) foundational skills data from Bangladesh and Pakistan addressed these concerns. We measured the performance of 12- to 14-year-old children on Grade 2 and 3 skills (skills they may have acquired by age 7 or 8). Because these foundational skills were measured as a part of a household survey it also ensured that children out-of-school were included in the analysis. Guided by the literature, we also paid attention to different ways of measuring and defining child labor. Even with this relatively lower performance bar, our findings were sobering.

Our results showed several noteworthy patterns. At the outset, despite laws against child labor in both countries, we found a non-trivial number of children engaged in child labor, including economic and hazardous child labor. The children engaged in hazardous labor came from some of the most vulnerable circumstances. We also found that hazardous child labor was unequivocally negatively associated with foundational reading and numeracy skills, even for children ages 12 to 14 years old. Greater exposure to hazardous labor as well as intense exposure to hazardous labor were associated with negative outcomes, and as some of the analyses showed, the negative association between hazardous labor and foundational skills may have decreased foundational skills at an increasing rate (i.e., the decline in foundational skills became more rapid with every additional hour of hazardous labor). It is also noteworthy that the coefficients associated with hazardous labor were consistently larger than the coefficients associated with other types of child labor, regardless of their significance levels, implying that hazardous labor may have a particularly large negative impact on foundational skills. We also found a generally consistent and negative relationship between engaging in economic labor and foundational skills in both countries. We found that greater engagement with economic labor or more intense engagement with such labor was associated with declining foundational skills and scores.

One interesting distinction from hazardous labor is the relationship between economic labor and numeracy performance. In the Pakistan data, and to some extent the Bangladesh data, the association between economic labor and numeracy scores and skills was not consistently significantly negative. This may be due to potential market-based transactions and interactions some of these children had to conduct, which might have led them to use simple numerical skills with some regularity in the work they do. To be clear, these economic activities did not improve their numeracy performance in either country.

Finally, engagement in household labor may have the least negative association with these skills. This would not be surprising, as the category of household labor incorporates a broad range of tasks, many of which may be regularly incorporated in a child’s life (e.g., looking after a younger sibling or doing dishes) and may not become disruptive to their learning immediately. However, we found a negative association in Pakistan between intense household labor and foundational skills, and in Bangladesh, we found that the potential positive association between household labor and foundational skills may eventually plateau. This leads to a final significant observation based on our study: the importance of carefully accounting for and measuring child labor. This is an observation other scholars have made before us; we add some further observations to this discourse.

We found in our analysis that carefully defining the type of child labor engagement is indeed crucial to understanding the potential impact of children’s engagement in labor. Children engaged in hazardous labor may get classified as engaged in economic labor or as
working with or without pay outside the home. However, as we see this category of children, their work must be recognized and recorded separately. Attention to these distinctions has implications both for data collection efforts and for eventual policy discussions, which may want to focus more urgently on specific forms of child labor. We also found that the intensity of child labor engagement is important to document. Depending on the dependent variable and the context, a mere engagement, or an hourly increment in child labor, may be associated negatively with foundational skills. We also found it valuable to separately identify children who engage in such work intensively each week (we used roughly 2.5 hours a day, or 10% of total hours a week, as our measure of intensive engagement). The approach to use not just the number of hours worked but also a squared term for hours worked also proved to be fruitful in revealing nuances of how increased exposure to child labor may prove detrimental. This approach, for instance, contrasts with UNICEF’s (2020) classification of child labor, whereby a 12- to 14-year-old would be classified as engaged in economic labor if they worked 14 or more hours each week, and in household work if they worked 28 or more hours per week. Using such a definition of child labor may have led us to underestimate or ignore the potential damages of even relatively lower levels of child labor engagement.

Our findings taken together paint a deeply concerning picture of the challenges ahead of the global community to ensure that all children acquire foundational skills (and beyond). A significant number of children who engage in child labor are deprived of this outcome. The Covid-19 pandemic has worsened this plight and pushed many more children into labor and limited their formal opportunities to learn. Systematic efforts to define, document, and measure child labor will also be crucial to better understand the negative implications of child labor and the potential policy solutions to address these impacts.

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Amita Chudgar is a professor of education policy at Michigan State University, USA. Her work examines the influence of home, school, and community contexts on educational access and achievement of children in resource-constrained environments. Through the analysis of diverse, large-scale, national, regional,
and cross-national datasets, she studies the role of policy-relevant variables in ensuring equal educational opportunities for disadvantaged children and youth. Her recent research has engaged with issues of teacher labor markets in developing countries, proliferation of private schools in low-income settings and educational experiences of marginalized youth. Amita’s work appears in various leading education journals and co-authored book projects.

Vanika Grover is interested in issues of education, development, and policy across low- and middle-income countries. Vanika graduated from the Education Policy PhD program at Michigan State University in 2022. Her dissertation research focused on parental involvement in early childhood care and education across Ghana, The Gambia, Zimbabwe, and India. She has prior work experience in policy research and impact evaluations with international organizations like UNICEF Innocenti and Oxford Policy Management spanning topics of education, health, and child protection. Vanika also holds a Master’s degree in Development Economics from the University of Sussex, UK and a Bachelor’s (Honors) in Economics from Lady Shri Ram College, University of Delhi, India.

Shota Hatakeyama is interested in international research to inform effective, efficient, and equitable education policy. Shota graduated from the Education Policy PhD program at Michigan State University in 2022. His dissertation focused on children with disabilities and their schooling and learning in Bangladesh, Pakistan, and Ghana. Prior to his doctoral study, he worked on statistical and planning capacity building of education ministries and policy and institutional assessment on gender at the World Bank HQ, UNICEF Zimbabwe, UNICEF HQ, and UNICEF Malawi offices. He holds a Master’s degree in Economics from Kobe University, Japan, and a Bachelor’s in Education from the University of Tokyo, Japan.

Aliya Bizhanova is a 3rd year doctoral student in education policy at MSU. Her research interests are international and comparative education policies, teacher labor markets, school culture, and immigrant education. Prior to joining MSU Aliya worked at the World Bank country office in Kazakhstan and the OECD for institutions and analytical assistance projects focused on K-12 education reforms, skills development, and youth issues. She holds a master’s degree in education policy from Vanderbilt University, USA, and a higher education diploma from Samara State University, Russia.