Master's Thesis of Science in Agriculture

Impact of school closures due to COVID-19 on child labor in agriculture

코로나로 인한 휴교령의 조치가 농업분야
아동노동에 미치는 영향

August 2023

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August 2023

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Abstract

The impact of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) related school closures on child labor in the agriculture sector was analyzed in this study using The United Nations Children's Fund Multiple Indicator Cluster Survey 6 Nigeria 2021. The study confirmed that household poverty was an inducing factor to child labor, based on the Luxury Axiom. School closures were considered as a main variable to examine changes in child labor. To investigate the impact of COVID-19 school closures on child labor in the agricultural sector, this study compared the impact of school closures on agricultural child labor by types of school closure and analyzed the influence of school closures due to COVID-19 on different types of child labor. The analysis showed that COVID-19 school closures had a greater impact on child labor in the agricultural sector, with an 8% increase observed compared to other types of school closures. Moreover, the increase in child labor was higher than other forms of child labor. In a final observation, the analysis of child labor hours demonstrated a 1.4-hour increment per week caused by COVID-19 school closures, highlighting the involuntary nature of child labor escalation on smallholder farms (20 acres or less) during the pandemic. Therefore, this research is significant in affirming that poverty within farming households remains a key driver of child labor, and COVID-19-related school closures have been found to contribute to an increase in child labor in agriculture.

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Chapter 1. Introduction

1.1. Study Background

Child labor is one form of severe violation of child rights. Children forced to work are highly susceptible to physical, emotional, and sexual abuse (ILO, 2017). Additionally, children engaged in child labor experience tend to have less educational opportunities. Child labor hindered educational opportunities which results in a vicious cycle of poverty. (Heady, 2003). Children working in hazardous environments are at a higher risk of experiencing chronic disabilities and severe physical problems (Roggero et al., 2007; Wolff, 2008). Given the circumstances, children's right to education, safety, and survival must be safeguarded to provide children to have chances to have better futures by breaking the poverty cycle from their parent generation.

Despite continuous efforts to reduce child labor, the number of child laborers is showing an increasing trend again after the outbreak of COVID-19(ILO and UNICEF, 2020). The graph in Figure 1 explains the rise in the overall count of child laborers and the number of children involved in hazardous work between 2016 and 2020. The pandemic has disrupted economic, social, and educational systems globally. As a result, factors such as school closures, financial hardships, and deteriorated poverty rates have led to an increase in child labor (Ahad et al., 2020; Sheyoputri et al., 2022; Mohammed., 2023). Especially during school closures, children in rural areas of developing countries are at a higher risk of engaging in risky labor. Due to the ineffective enforcement of child labor laws in rural areas, households that have lost financial sources resort to their children to supplement their income.

Figure 1. Global progress against child labor has stalled since 2016
(Source: ILO and UNCIEF, 2020)
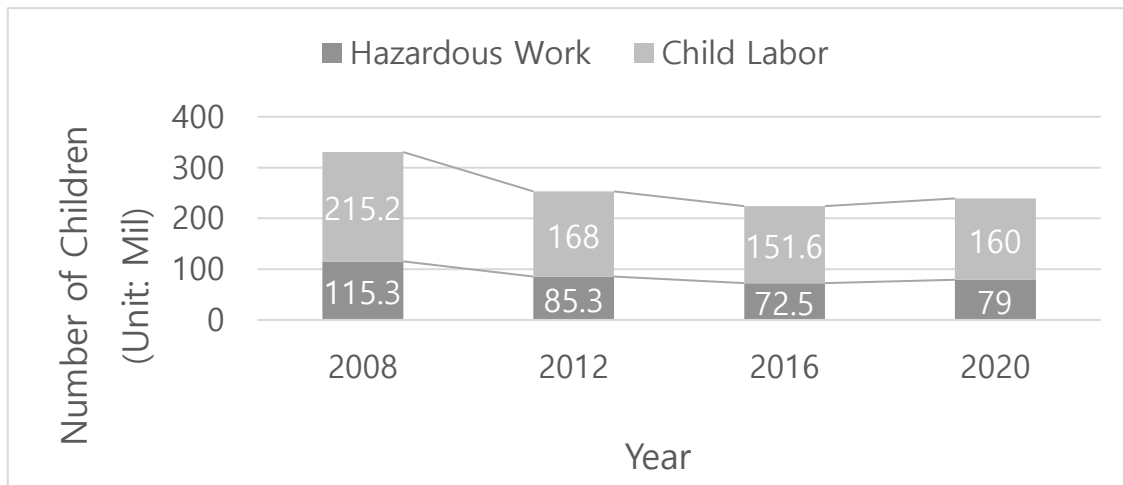
The International Labour Organization (ILO) and United Nations Children's Fund (UNICEF, 2020) have stated that during the four years of the pandemic, the number of children working worldwide has increased by 8.4 million and that COVID-19 has brought about to this issue. This study aims to provide empirical evidence for the hypothesis that COVID-19-related school closures have led to a rise in child labor in the agricultural sector in Nigeria.

Child labor in Nigeria is a considerable issue. In connection with the country's poverty situation, children are employed in various industries. As a representative of Saharan countries, Nigeria is suitable for verifying the hypothesis, considering the significant prevalence of child labor in the agricultural sector and the impact of school closure. This prompted the commencement of the research. The following provides an explanation of child labor in Nigeria.

Child labor in Nigeria

Figure 2 shows the percentage of children involved in child labor using data from the 2021 Multiple Indicator Cluster Survey 6 (MICS6) survey. In the depicted figure, Nigeria is shown in green color to indicate its geographical location. The survey reported that 31.5% of 61,437 Nigerian children aged 5-17 are engaged in child labor. Nigeria ranks among the top 10 out of 101 countries worldwide.

Figure 2. Percentage of children aged 5-17 years engaged in child labor by country.
(Source: 2021 UNICEF MICS6 survey)
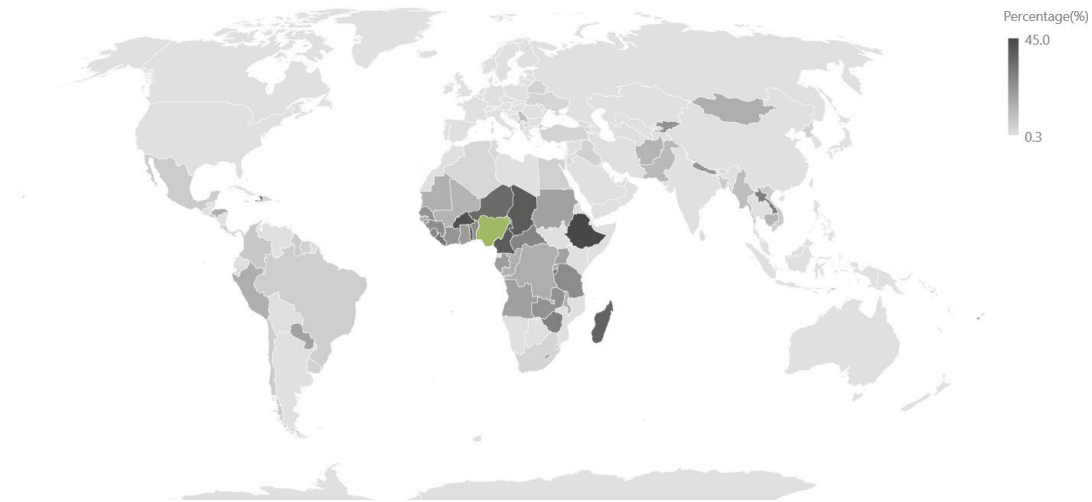
Particularly in the agricultural sector, children participate in land clearance, transplanting seedlings, applying fertilizers, and spraying pesticides. They face problems of physical injuries from sharp tools or dangerous machinery, exposure to harmful chemicals and pesticides, and health deterioration. In most cases, they are labored without pay to support their families. Not all child labor in agriculture is harmful, and some argue that children can learn occupational skills and help with family farming activities. The problem is that many of these children cannot have sufficient education due to child labor and their fundamental rights are not protected.

Nigeria collaborates with international organizations to eradicate child labor by enacting legislation and other measures. In November 2018, the ILO launched a project called ACCEL AFRICA AT GLANCE to stop child labor in Nigeria's agricultural sector, which was ongoing until 2022. Furthermore, in April 2021, Nigeria approved the National Action Plan for the Elimination of Child Labor (2021-2025) to commemorate the International Year for the Elimination of Child Labor (IYECL). However, more efforts are still needed to eradicate child labor in Nigeria.

Agriculture status in Nigeria

Nigeria has fertile soil, vast areas of cultivated land, and a mild climate, possessing agricultural potential. Nigeria's primary industry is agriculture, with more than 70% of its population involved, contributing to 23.4% of its total GDP (World Bank, 2021). Nigeria's agricultural sector comprises

various fields such as crop production, animal husbandry, and forestry.

The main crops grown in Nigeria include cassava, yam, corn, rice, sorghum, beans, peanuts, and palm. Nigeria's economic potential from cassava is substantial, given that it is the world's top producer. In 2017, 59 million tons of cassava were produced, which accounts for about 20 percents of the world's total production. (IITA, 2023). The production volume is expected to increase further with the improvement of varieties and production technology. Additionally, the government's annual tax revenue is continuously increasing due to the value－added generated by cassava (Ikuemonisan et al., 2020).

However, it should be noted that about 70% of Nigeria's agricultural population consists of small－scale farms of less than two hectares. These farmers produce 99% of Nigeria's crops but remain impoverished. (Anderson, et al., 2017). They primarily engage in subsistence agriculture and rely on family labor due to limited access to high－paying labor and resource constraints. Therefore, the issue of child labor in agriculture may be related to worsen poverty for small－scale farmers.

As a resolution of those problems, the Nigerian government is currently implementing various policies. The Agricultural Transformation Agenda (ATA) was initiated as one of the efforts to eradicate poverty, hunger, and malnutrition and to make Nigeria a net exporter of food. During 2011－2015, it was implemented to increase the production of 5 major crops (rice, cassava, maize, cocoa, and cotton) to reduce food imports.

Following the ATA, the Agricultural Promotion Policy (APP) was implemented from 2016－2020, and aimed to achieve domestic food security, sustainable income generation, and job creation. Through government support, the harvest of major crops such as cassava increased. However, there are evaluations that excessive production has led to a decline in cassava prices due to poor road networks and high transportation costs.

The National Agricultural Technology and Innovation Policy (NATIP) was established as a new policy that extends from the expiration of APP to enhance the integrated approach to agricultural development and the coordination between agricultural research and training institutions. The policy includes provisions for resource support to farmers, agriculture mechanization, rural infrastructure development, and enhancing financial accessibility.

Regional Characteristics in Nigeria

The regional characteristics of Nigeria are as follows. Nigeria is divided into six geopolitical regions: North-Central, Northeast, Northwest, Southeast, Southwest, and South-South.

The northern region is characterized by a higher probability of engaging in agriculture and larger farm sizes. The region with the highest poverty rates is the Northwest, where 45 million people live below the poverty line (NBS, 2023). The influence of Boko Haram, an extremist Islamist group, affects the northeastern region, resulting in significant impacts from the ongoing conflict.

The southern region has a substantial number of people engaged in agriculture, mainly due to the production of crops such as oil palm and cassava in the southeastern region, as well as poultry farming. The wealthiest region is the southwest, generating the highest income. This is attributed to oil and ports in the southern region, along with major industries and cities.

Pandemic Situation in Nigeria

Nigeria has been affected by the pandemic since February 2020, with over 250,000 confirmed cases and 3,000 deaths recorded. (2023, WHO). Nigeria has implemented various measures to curb the spread of COVID-19, such as travel restrictions, regional lockdowns, social distancing, and school closures. Nevertheless, Nigeria's economy has suffered a significant impact.

In March 2020, nationwide school closures were enforced in Nigeria as measures to prevent the spread of the virus. The government mandated the closure of all schools, including elementary, middle, and high schools. The closures affected at least 22.4 million students in public elementary schools, 6.8 million students in public middle schools, and 1.7 million university students. (Ogeny, 2022). As a result of the continued closures, remote learning through radio and television was implemented for relatively rich students. In September 2020, schools were gradually open by following guidelines for preventing additional COVID-19 outbreaks. However, self-imposed school closures occurred sporadically even after the reopen.

The Nigeria team of the Research on Improving System of Education (RISE), aimed at enhancing education systems in developing countries, conducted a survey showing that Nigeria encountered financial difficulties

due to COVID-19 in schools and households. This led to schools having difficulties paying teachers or maintaining employment, and there is a higher chance that students left school to join the workforce. (Ogeny, 2022).

1.2. Purpose of Research

Considering the adverse impact of COVID-19-related school closures on child labor in the agricultural sector, this study conducted empirical research in Nigeria to address the following research questions.

1. Was the closure of schools due to COVID-19 contributing to the increase in child labor in the agricultural sector?
2. If so, is the magnitude of the increase in child labor in the agricultural sector due to COVID-19-related school closures higher than in other sectors?
3. In addition, is the increase in child labor in the agricultural sector due to COVID-19-related school closures greater than in other forms of child labor?
4. To what extent does the labor time of children in farming households with specific characteristics increase during the pandemic, and what attributes drive this increase?

Chapter 2. Literature Review

Studies on child labor have been ongoing debates on whether household income affects child labor. This chapter aims to showcase the discourse on child labor research, starting with the Luxury Axiom, refuted by the Opposite Result, and leading to Labor Market Failure, and to introduce recent trends in child labor research.

Child Labor: Luxury Axiom

Basu and Van (1998) pioneered the development of a theory of child labor. Their research challenges the belief that child labor arises from parental selfishness and introduces the Luxury Axiom, which argues that the decline in non-child labor income drives child labor. The term "Luxury Axiom" was introduced because the author defined a child's leisure time as a luxury good. The Luxury Axiom arises when parents' income is insufficient for leisure time. Another term commonly used to refer to this phenomenon is the income effect. This theory provided a cornerstone for scholars studying child labor and has been applied in empirical research.

Ray (2000) revealed that the Luxury Axiom holds using child labor surveys in Peru and Pakistan, indicating that children below the poverty line are likelier to work. Additionally, he argued that the interaction between adult and child labor markets differs depending on the gender of the child and adult.

Patrick and Tzannatos (2003) utilized household survey data from Brazil to examine the intergenerational persistence of child labor. They hypothesized that parents decide to send their children to work when the child's contribution to current family consumption outweighs the future consumption benefits that the family could enjoy if the child attended school while accepting the validity of the Luxury Axiom. After controlling for various factors such as household, income, and education, they found that children whose parents were child laborers were more likely to become child laborers themselves, even when these factors were controlled for, suggesting that economic need is not the only factor that perpetuates child labor and that other factors may also be at play.

Child Labor: Opposite result

While the Luxury Axiom has provided a useful theoretical framework for understanding child labor, recent research by Bhalotra and Heady (2003) has shown that the accumulation of wealth, specifically land, can lead to child labor, casting doubt on the validity of the Luxury Axiom.

Bhalotra and Heady (2003) contradicted the Luxury Axiom by challenging the notion that child labor arises primarily in poor households due to poverty. Instead, they suggested that children from households with abundant land are more likely to engage in agricultural labor than those with insufficient land.

Moreover, Kruger's (2007) study also revealed that with increasing coffee production, middle-class children are more likely to drop out of school and work, which is a different result than the notion that poverty increases child labor. The likelihood of child labor increased when families owned land or had their own businesses, but high-income children were not affected similarly.

Child labor: Labor Market Failure

The relationship between an increase in wealth, exemplified by land ownership, and the likelihood of child labor has produced contradictory research results, prompting attempts to interpret research findings comprehensively. The current consensus in academia is that the leading cause of child labor is the failure of the rural labor market, incorporating existing theories.

Dumas (2007) contested the idea that child labor is entirely driven by poverty and instead proposed that the imperfections of the labor market play a vital role. He hypothesized that an increase in family-owned land would increase the relative wage of child labor due to labor market imperfections, resulting in increased participation in the child labor market.

Basu et al. (2010) proposed that the more land a household owns, the more child labor increases initially but decreases after a certain point by using the survey of India. This study offers a comprehensive perspective, reconciling the Luxury Axiom and contradictory research findings and shedding light on the nuanced relationship between landownership and child labor.

Fan (2011) explains the states influenced by wealth through the Luxury Axiom and those influenced by relative labor productivity through the Substitution Axiom. The study found that when households face subsistence

consumption constraints, an increase in parental income leads to decreased child labor hours. However, when adult wages are high and subsistence constraints do not apply, the substitutability between child labor and adult labor has a more substantial influence on child labor than parental income.

Bharadwaj (2015) argues that due to the inefficiencies of labor markets in rural areas, there is a preference for family labor, including child labor. The need for supervision in tasks such as weeding and fertilizer application makes family labor more desirable, and using family labor reduces the amount of time needed for supervision.

Child Labor: Recent studies

Recent research on child labor and COVID-19 has been conducted using qualitative research methods, potentially due to the difficulty in collecting local data during the pandemic.

According to Ahad et al. (2020), the pandemic-related school closures have increased child labor, especially in rural areas where families tend to involve their children in work, particularly in agriculture. They noted that this is because of the poor implementation of lockdown policies and limited access to online education in rural areas. It is anticipated that the exploitation of child labor due to school closures will be particularly severe in Africa and Asia, where most child laborers work in agriculture.

Sheyoputri et al. (2022) conducted focused group discussions with Indonesian students. According to the survey, 63% of students started working in agriculture during the pandemic, while 37% were already engaged in agriculture before the pandemic. Students started to work in agriculture mainly due to the limitations of online devices and poor internet connectivity, making online learning very difficult.

Mohammed (2023) conducted semi-structured interviews and found that child labor rates increased in Ghana during the pandemic school closures, and poverty was identified as a major cause of child labor. The likelihood of children engaging in hazardous forms of child labor was higher for those who experienced economic difficulties during the pandemic.

Chapter 3. Theoretical Background

Child labor

UNICEF defines *child labor* as "children who are engaged in work that is unsuitable for their capacities as children or are in work that may jeopardize their health, education, or moral development." This definition is based on ILO Convention No. 138 on the Minimum Age for Admission to Employment (1973) and ILO Convention No. 182 on the Worst Forms of Child Labour (1999).

To monitor the welfare of children and their families more closely, UNICEF's international survey program MICS (Multiple Indicator Cluster Surveys) defines *child labor* as children aged 5-11 who engage in economic activities for at least one hour per week, children aged 12-14 who engage in economic activities for at least 14 hours per week, and those who perform unpaid domestic work for at least 28 hours per week. Information on workers aged 15-17 is not gathered in the MICS survey on child labor as it does not conform to international standards for measuring child labor.

However, no universal and operational definition of child labor applies to all countries since national laws and conventions may have varying provisions. The Government of Nigeria has defined child labor as follows, as stated in No. 23 of Part IV of The Federal Republic of Nigeria Official Gazette No. 3 volume 102(Trafficking in Person (Prohibition) Enforcement and Administration Act 2015), adopted on March 26, 2015.

(1) Any person who:

(a) employs, requires, recruits, transports, harbors, or hires out a child under 12 years as a domestic worker, commits an offense and is liable on conviction to imprisonment for a minimum term of 6 months and not exceeding 7 years.

(b) employs, requires, recruits, transport, harbors, receives, or hires out a child to do any work that is exploitable, injurious, or hazardous to the physical, social, and psychological development of the child, commits an offence and is liable on conviction to imprisonment for a minimum term of 2 years but not exceeding 7 years without an option of fine.

(2) Notwithstanding the punishment prescribed in subsection (1) of this section, a convicted person under this section shall, in addition to the prescribed punishment, be liable to:

(a) A term of not more than 2 years imprisonment where a child is

denied payment or reasonable compensation for services rendered; or

(b) A term of not more than 3 years where the child is defiled or inflicted with bodily harm.

In order to establish a more stringent definition of child labor, a thorough examination of the literature was conducted in this study. Scholars have employed varying definitions of child labor, as indicated in Table 1.

In terms of setting the dependent variable, it was divided into two categories: whether child work and hours of child labor. The reason for choosing the binary variable is that many respondents tend to report that they do not engage in child labor. Thus, numerous observations are censored at zero, requiring using the Tobit model to adjust and obtain accurate observations if the dependent variable is set as the child labor hours.

When inquiring about child labor, the time frame of observation varied from the past day, past week, to past year, but in most cases, the question focused on whether the child worked during the previous week. Regarding the child's age, in most cases, the child was defined as being under 18 years old. However, when reporting child labor, the most common practice was to adopt the definition set by the ILO, which considers children under 15 years old, and depending on the survey characteristics, the minimum age ranged from 5 to 10 years old.

Moreover, in the investigation to determine whether working on the household farm is defined as child labor, it was found that in most cases, if the child works on the family farm, it is classified as child labor. This classification reflects the prevailing situation in developing countries, where it is common for children to engage in unpaid work on family farms, leading to potential impediments to their overall development. In contrast, scholars had differing opinions regarding household labor. Household chores were often excluded from the classification of child labor. Even the ILO defines household labor as working 21 hours or more per week for children aged 5−14. This standard is stricter than the economic labor standard of 14 hours for the same age group.

Following the result, this study aims to analyze the involvement of children aged 7−14 in economic activities. The definition of child labor includes work carried out by children on household farms, excluding household chores. Furthermore, this study also included child labor hours as a dependent variable to gain a more specific understanding of the impact of influencing factors on child labor.

Table 1. Child labor definitions or literature by authors

Author (Year)	Dependent Variable	Time	Econometric Methodology	Child age	Source of definition	Country	Household chores	Working on family farm
Ray (2000)	Hours of Child labor	Previous Week	Heckman Selection model	5－14	ILO	Pakistan, Peru	△	O
Patrick (2003)	1 if the child is working, 0 otherwise	Previous Week	Probit model	10－14	－	Vietnam	X	X
Bhalotra and Heady (2003)	Hours of Child labor	Previous Week	Tobit model	7－14	ILO	Pakistan, Ghana	X	O
Bhalotra (2007)	Hours of Child labor	Previous Week	Tobit model	10－14	Author	Pakistan	X	O
Kruger (2007)	1 if the child is working, 0 otherwise	Previous Week	Probit model	10－14	ILO	Brazil	△	O
Dunmas (2007)	1 if the child has leisure time, 0 otherwise	Previous Year	MLE	6－10	Author	Burkina Paso	△	O
Basu, et al. (2010)	Hours of Child labor	Previous day	OLS	6－14	Author	India	O	O
Dunmas (2013)	Hours of Child labor	Previous Year	Tobit Model	6－13	ILO	Madagascar	X	O
Boutin. (2014)	1 if the child is working, 0 otherwise	Previous Week	Probit model	7－14	Author	Malawi	O	O
Dunmas (2020)	Hours of Child labor	Previous Week	Tobit Model	5－14	ILO	Tanzania	O	O

Note:　O signifies the inclusion of the content in the definition, △ indicates the absence of an explanation regarding the content, and X denotes the exclusion of the content from the definition.

Building upon the Luxury Axiom and Substitution Axiom, this study introduces the assumption that the scale of land, influenced by labor market failure in rural areas, has impacted child labor. A detailed explanation of this assumption is provided in the following section.

Basu et al. (2010) proposed an inverted U-shaped relationship between land and child labor. They posited that households with insufficient wealth witness an initial rise in child labor as land size increases. However, once a specific threshold is reached, they opt for hiring external labor instead, leading to a decline in child labor. They recommended introducing a squared variable for land scale to account for this pattern.

Figure 3. The Inverted-U of Child Labor.
(Source: Basu et al., 2010)
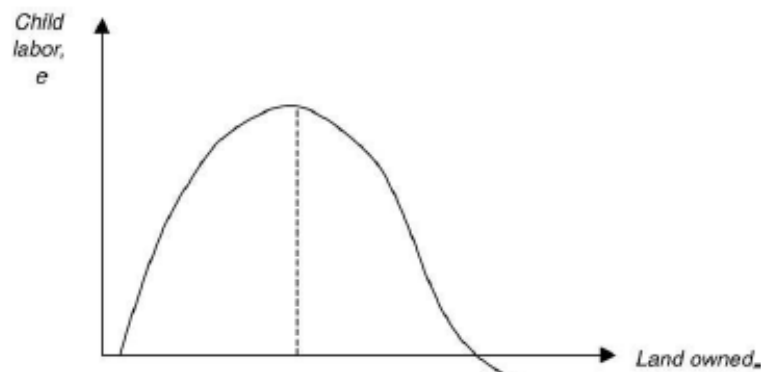
The specific land size mentioned by Basu et al. (2010) was 4 acres, but this study had limitations as it only analyzed small-scale farms in rural areas of India. Dumans, C (2013) expanded the analysis to a national level using data from across Madagascar to address this. In addition to the existing model, cubic and quartic variables for land size are introduced to define the relationship between land and child labor as an inverse W-shape.

Figure 4. Child labor against land area - inverted-W shape
(Source: Dunmas, 2013)
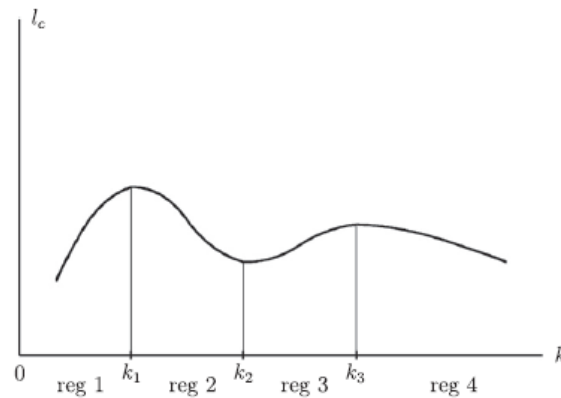
The first situation arises when the labor productivity of land is lower than the parents' wage rate. In this case, parents allocate their time to the labor market, leading to an increase in child labor, depending on the land size. When households do not possess sufficient wealth, the cost of employing external labor exceeds the cost of utilizing child labor, resulting in the use of child labor. During this period, being employed laborers, parents can reduce child labor through increased parental wealth.

The second situation arises when the labor productivity of land is equivalent to the parents' wage rate. In such cases, parents perform both wage labor and land labor concurrently. The increase in land ownership does not increase child labor. Since parents have access to the wage labor market, increasing land holdings reduces child labor.

The third condition refers to situations where the labor productivity of land exceeds the parents' wage rate but falls short of the available labor force. In such cases, the household selects self-sufficiency, and the parents refrain from participating in the wage labor market. Instead, they actively labor on their land and choose not to employ external labor. Consequently, the acquisition of land can lead to an increase in child labor.

The fourth situation pertains to cases where the labor productivity of land matches the wage rate for external labor, allowing parents, who possess extensive land holdings, to hire external labor instead of employing their children.

School Closure

The following explains the main variable in this study, school closures. UNICEF distinguishes school closures with four criteria: COVID-19, natural disasters, man-made disasters, and teacher strikes. Table 2 presents the causes for school closures and their corresponding explanations used in the MICS 2021 survey.

Table 2. Causes of school closures
(Source: UNICEF, 2022)

Causes of School Closures	Explanation
COVID-19	As previously mentioned.
Natural disasters	Floods, cyclones, and epidemics other than COVID-19
Man-made disasters	Fire, building collapse, riots, insecurity, or similar
Strike	Lecturers strike

COVID-19 has had a widespread impact on students, families, and communities, unlike other causes for school closures, such as man-made disasters or teacher strikes. As a result, household poverty may have been exacerbated more than other causes. The school had to quickly transition to online distance learning, which exacerbated existing inequalities in internet access among children. As a result, students who could not attend classes may have participated in agricultural activities to help increase their parents' income.

Natural disasters like floods and droughts are one of the reasons why child labor in agriculture cannot be considered a reliable source of income. Natural disasters decrease agricultural productivity, making child labor and adult labor impossible. Therefore, alternative sources of income should be sought, or assistance from relief organizations should be sought to suspend agricultural activities. However, economically unstable households may be more likely to resort to another type of child labor due to increased poverty caused by natural disasters.

Unexpected and sudden situations like man-made disasters can significantly impact schools and children's education. For example, a school building may become unsafe or inaccessible due to building collapse or fire, or schools may be closed due to riots or security concerns, resulting in safety issues or interrupted transportation and infrastructure. While such disasters may negatively affect the local community long-term, they may

not necessarily be directly related to increased child labor.

Unlike the widespread impact of COVID-19 that affects the whole nation, teacher strikes are typically localized incidents that affect specific schools or regions. The main cause of teacher strikes is the specific demands and grievances of the striking teachers, as well as friction with the government and school administration. Teacher strikes in rural areas with a lack of teachers result in inadequate student education access, as no alternative education options are available. As a result, there is a possibility of an increase in child labor in the agricultural sector.

Chapter 4. Research Methodology

4.1. Probit Model

To examine the impact of school closures due to COVID-19 on child labor, we used a probit regression model in this study. The probit regression model is a type of model used when the dependent variable is binary.

If the dependent variable is binary data, it must necessarily be within the closed interval of 0 and 1, as it is a dichotomy of whether the variable occurs or not. Ordinary Least Square(OLS) cannot be used to estimate binary variables because when estimated through linear regression, there may be instances where the estimated values of the binary dependent variable go beyond the closed interval.

$$\Phi(z) = P(Z \leq z) = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}} e^{-0.5M^2} du, \qquad Z \sim N(0,1) \qquad (1)$$

The probit model employs the cumulative distribution function of the standard normal distribution, the key difference from the logit model used to analyze binary dependent variables. The logit model employs the probability distribution function of the logistic distribution, similar to the cumulative normal distribution. The predictive probabilities between the two are almost identical. The general probit model is outlined below.

$$P(Y = 1|X) = \Phi(X\beta) = \Phi(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n)$$
$$P(Y = 0|X) = 1 - \Phi(X\beta) \qquad (2)$$

Maximum Likelihood Estimation (MLE) is used to estimate the probit model, which seeks to find the parameters that maximize the likelihood function. The equation below pertains to the likelihood function, which calculates the product of the likelihood of each value having come from a normal distribution.

$$L(x|\theta) = \prod_{k=1}^{n} P(x_k|\theta) \qquad (3)$$

The log function is applied to facilitate the estimation of the likelihood function, yielding the log−likelihood function.

$$logL(x|\theta) = \sum_{i=1}^{n} logL(x_i|\theta) \qquad (4)$$

The following is the likelihood function for the probit model. Probit regression involves maximizing this function to estimate the parameters of the variables.

$$L = \prod_{i=1}^{n} [\Phi(X_i\beta)]^{y_i}[1 - \Phi(X_i\beta)]^{1-y_i} \qquad (5)$$

Taking the logarithm of both sides of the equation yields the log−likelihood function presented below.

$$logL = \sum_{i=1}^{n} (y_i \log \Phi(X_i\beta) + (1 - y_i) \log[1 - \Phi(X_i\beta)]) \qquad (6)$$

In a probit model, changes in parameter values cannot determine the effect of a specific variable on the dependent variable when it changes by one unit. Hence, a specific method is required to calculate the marginal effects. The equation used for deriving the marginal effect varies according to the type of independent variable, whether it is continuous or categorical.

$$\frac{d\Phi(X\beta)}{dx_k} = \Phi'(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n)\beta_k \qquad (7)$$

For continuous variables, the marginal effect refers to the change in the dependent variable when the variable increases by one unit. The variable of interest, x_k is used to differentiate the probit model $\Phi(X\beta)$ to determine its effect on the dependent variable. Φ' which is the derivative of the cumulative distribution function. is the probability density function of the standard normal distribution.

$$\Phi(X_1\beta) - \Phi(X_0\beta) \qquad (8)$$

While for categorical variables, it refers to the probability difference between the group with a variable of one and the group with a zero variable. Obtaining the marginal effect helps to understand the overall impact of independent variables on the dependent variable or the effects of different independent variables.

4.2. Tobit Model

In order to identify the characteristics of farming households that increased child labor hours during the pandemic, the study utilized the Tobit model. The Tobit model is employed when the dependent variable takes the form of a continuous variable that is either censored at zero or truncated at specific values. Amemiya (1985) categorized the Tobit model into five different categories. However, the Tobit model used in this research is specifically classified as type 1, and the following equation represents its structure.

$$y_i^* = X_i\beta + \epsilon_i, \epsilon_i \sim N(0, \sigma^2) \ i = 1, 2, \dots, n$$
$$y_i = \begin{cases} y_i^* \ if \ y_i^* > \ y_L \\ y_L \ if \ y_i^* \leq \ y_L \end{cases} \tag{9}$$

The Tobit model exhibits a structure similar to a linear regression model. However, the difference between the general linear regression model and the equation is that the observed dependent variable, y_i is divided into the latent variable y_i^* and the truncation point y_L. The indicator function I is defined as the truncation point in the following equation

$$I(y) = \begin{cases} 0 \ if \ y \ \leq \ y_L \\ 1 \ if \ y > \ y_L \end{cases} \tag{10}$$

The indicator function mentioned above takes 0 when truncation occurs and 1 when no truncation occurs. Accordingly, the likelihood function, expressed in terms of the cumulative distribution function Φ and the probability density function of the normal distribution φ , can be represented as follows.

$$L = \prod_{i=1}^{n} \left[\frac{1}{\sigma} \varphi \left(\frac{y_i - X_i\beta}{\sigma} \right) \right]^{I(y_i)} \left[1 - \Phi \left(\frac{X_i\beta - y_L}{\sigma} \right) \right]^{1 - I(y_i)} \qquad (11)$$

In accordance with this, the log-likelihood function is represented as follows.

$$logL = \sum_{i=1}^{n} I(y_i) log \left[\frac{1}{\sigma} \varphi \left(\frac{y_i - X_i\beta}{\sigma} \right) \right] + (1 - I(y_i)) log \left[1 - \Phi \left(\frac{X_i\beta - y_L}{\sigma} \right) \right]$$
$$= \sum_{y_i > y_L} log \left[\frac{1}{\sigma} \varphi \left(\frac{y_i - X_i\beta}{\sigma} \right) \right] + \sum_{y_i = y_L} log \left[1 - \Phi \left(\frac{X_i\beta - y_L}{\sigma} \right) \right] \qquad (12)$$

In the Tobit model, the parameter values of each independent variable should not be interpreted as marginal effects. Sigelman and Zeng (1999) emphasized three different marginal effect equations in the Tobit model, each associated with a specific expected value.

$$E[y^*] = X_i\beta \qquad (13)$$

$$E[y|y > 0] = X_i\beta + \sigma \frac{\varphi \left(\frac{X_i\beta}{\sigma} \right)}{\Phi \left(\frac{X_i\beta}{\sigma} \right)} \qquad (14)$$

$$E[y] = \Phi \left(\frac{X_i\beta}{\sigma} \right) \left[X_i\beta + \sigma \frac{\varphi \left(\frac{X_i\beta}{\sigma} \right)}{\Phi \left(\frac{X_i\beta}{\sigma} \right)} \right] \qquad (15)$$

The first equation pertains to the marginal effect of the latent variable, describing the impact of a one-unit change in the independent variable on the latent variable.

$$\frac{\partial E[y^*]}{\partial x_k} = \beta_k \qquad (16)$$

The following equation describes the impact of a one-unit change in the independent variable on the expected value of the untruncated observed variable.

$$\frac{\partial E[y|y>0]}{\partial x_k} = \beta_k \left\{ 1 - \frac{\varphi\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)} \left[\frac{X_i\beta}{\sigma} + \frac{\varphi\left(\frac{X_i\beta}{\sigma}\right)}{\Phi\left(\frac{X_i\beta}{\sigma}\right)} \right] \right\} \tag{17}$$

The third equation represents the marginal effects on the expected values of all dependent variables.

$$\frac{\partial E[y]}{\partial x_k} = \Phi\left(\frac{X_i\beta}{\sigma}\right)\beta_k \tag{18}$$

While Wooldridge (2002) suggested reporting the marginal effects of the second and third equations, this study aligns with Greene's (2003) recommendation, prioritizing the marginal effects on the expected values of all dependent variables.

Chapter 5. Data and Procedure

5.1. Data

This study is based on the UNICEF MICS6 Nigeria (2021) survey. MICS, launched in the mid-1990s, is a program designed to produce internationally comparable data on children and women globally. It involves conducting face-to-face interviews with family members through trained field teams. For 28 years, surveys were conducted in 119 countries, amounting to 355 surveys in total, and these surveys were utilized as data sources for more than 30 sustainable development goal indicators.

MICS6 was conducted with government funding and financial support from Gavi, the Vaccine Alliance, and the Bill & Melinda Gates Foundation (BMGF). The survey was conducted between September and December 2021, with 41,532 households sampled. Of these, 39,632 households participated in the survey, resulting in a response rate of 98.9%. 63,941 children between the ages of 5 and 17 participated in the survey.

A multi-stage, stratified cluster sampling approach was used for sample selection in the survey. Multi-stage Sampling is an approach where the selection of samples occurs in multiple stages, gradually narrowing down the population. Stratified sampling involves dividing the population into distinct homogeneous groups and randomly selecting samples from each group (Taherdoost, 2016).

The sampling frame was constructed based on the 2006 Population and Housing Census of the Federal Republic of Nigeria (NPHC). The primary sampling units (PSUs) selected in the first stage were enumeration areas (EAs) defined for the population census, and household lists were compiled in each sampled EA before selecting household samples in the second stage. The survey areas were divided into six zones, as shown in figure 5.

Figure 5. Regional classification of UNICEF MICS6 Nigeria Survey
(Source: Multiple Indicator Cluster Survey 2021 Statistical Snapshot Report)

Six Geopolitical Zones

5.2. Variables

This section explains each variable. Initially, the dependent variable related to child labor was defined as follows: For each household, one child aged 5-17 years old, randomly selected, was asked about the type of work performed and the time spent working. In order to determine whether the child had worked before, the question asked was, "Since last (day of the week), has (name) performed any of the following activities, even for only one hour?"

Following that, questions were asked regarding paid or unpaid labor for non-household members and economic activities such as labor on family farms or household businesses. For instance, the question asked for child labor in agriculture was, "Did (name) do any work or help on (his/her) own or the household's plot, farm, food garden, or look after animals? For example, growing farm produce, harvesting, feeding, grazing, or milking animals?" Respondents to the survey answered the question with a binary response (yes or no). Four categories of child labor (agriculture, entrepreneurship, sales, and others) were employed in the analysis.

The variables for household wealth included wealth score, agricultural land size, and bank account ownership. The Wealth score utilizes the Wealth index from the Demographic and Health Surveys (DHS), developed by ICF International. This score is computed as a composite indicator of assets through the following procedures. Initially, principal components analysis is conducted to assign weights to consumer durables such as TV, refrigerator, livestock, watch, bicycle, scooter, car, boat, computer, and mobile phone.

Subsequently, initial factor scores are computed for the entire sample, followed by the computation of separate factor scores for urban and rural households. Finally, the urban and rural factor scores are regressed on the initial factor scores to obtain the final wealth score, ranging from -2 to 2, which is assumed to act as a mitigating factor for child labor probability when household assets and property size increase based on previous studies (NBS & UNICEF, 2022; Rutstein et al., 2008).

The question regarding land size was, "How many plots, acres, or hectares of agricultural land do members of this household own?" Respondents provided answers using three units: plot, acre, and hectare. In this research, all measurements were converted to acres for analysis. It was hypothesized that the size of agricultural land would be a factor that increases child labor, as larger land requires more labor.

It was postulated that the possession of a bank account, much like wealth score, would reduce the likelihood of child labor in households, given that banks allow for tasks such as borrowing and depositing. The question regarding bank account ownership was, "Does any member of this household have a bank account?"

School closure, the primary variable of interest, was surveyed among 5-17-year-old children, with questions about why they could not attend school. The question regarding school closure due to COVID-19 was asked: "In the last 12 months, has (name)'s school been closed on a school day for any of the following reasons: COVID-19?" In order to investigate the effect of school closures on child labor, this study examined four specific types of closures (COVID-19, natural disasters, human-made disasters, and teacher strikes), with other reasons excluded from the analysis.

The next set of variables is related to children. The child variables include the child's age and gender. Children are often asked to participate more in the household's economic activities as they age. However, this association is non-linear, with a convex curve shape, and the increase rate decreases at some age. Therefore, the age-squared variable was included in the empirical model.

The relationship between child labor and a child's gender is debated among scholars. This is because the seasonal and unpredictable nature of agricultural work makes it challenging to accurately measure child labor statistics in agriculture. Despite this, J. Galdo's (2020) research suggests that boys are more likely to participate in household agricultural activities, while girls are more likely to participate in household chores. This study examined the hypothesis that boys are more likely to participate in

agricultural labor.

The household head characteristics variable consisted of two variables: the educational level and gender of the household head. The variable for head of household education level was assigned values of 0-4 based on a 5-level educational scale consisting of None, Primary, Junior Secondary (including Vocational/ Innovative Enterprise Programmes (VEI/IEI)), Senior Secondary (including Secondary Technical), and Higher/tertiary. Household education level is generally associated with household income, so it is hypothesized in this study that there is a negative relationship between household education level and child labor, and as household education level increases, the likelihood of children not working also increases.

The relationship between the gender of the household head and child labor is unclear. However, in some cultural contexts, women are responsible for childcare and household chores, while men are responsible for the family's financial needs. In such societies, households headed by women are more likely to face economic difficulties and may send their children to work to make ends meet. Accordingly, this study posits that when the household head is a woman, the children are more likely to be involved in labor activities.

5.3. Descriptive Statistics

Table 3 shows the number of variables used in the analysis and their mean, standard deviation, and minimum and maximum values. The table explains the variables in the following order: child labor (agriculture, family business, Sell Articles, others), household wealth (wealth score, agricultural land size, bank account ownership), school closure (COVID-19, natural disasters, personal accidents, teacher strikes), child characteristics (age, gender), household head characteristics (educational level, gender), and region (North Central, Northeast, Northwest, Southeast, South-South, Southwest).

Table 3. Descriptive Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Child Labor					
Child labor: Worked on Farm	6,474	0.55	0.50	0	1
Child labor: Helped in Family Business	6,470	0.30	0.46	0	1
Child labor: Sell Articles	6,471	0.16	0.37	0	1
Child labor: Any Other Activities	6,472	0.20	0.40	0	1
Hours of Child Labor (Unit: hours/week)	6,474	4.82	7.05	0	61
Household wealth					
Wealth Score	6,474	−0.18	0.85	−1.77	2.65
Agricultural Land Size (Unit: acre)	6,474	6.97	15.01	0.17	175.44
Bank Account	0.56	0.50	0	1	1
School Closure					
School Closure due to COVID19	6,474	0.63	0.48	0	1
School Closure due to Natural Disasters	6,474	0.12	0.32	0	1
School Closure due to Man-made Disasters	6,474	0.09	0.28	0	1
School Closure due to Teacher Strike	6,474	0.13	0.34	0	1
Child Characteristics					
Age	6,474	10.28	2.29	7	14
Gender (Girl)	0.48	0.50	0	1	1
Household Head Characteristics					
Education Level	6,474	1.82	1.46	0	4
Female	0.16	0.37	0	1	1
Region					
North Central	6,474	0.22	0.41	0	1
North East	6,474	0.16	0.37	0	1
North West	6,474	0.16	0.37	0	1
South East	6,474	0.18	0.39	0	1
South South	6,474	0.17	0.38	0	1
South West	6,474	0.10	0.29	0	1

Figure 6 is a bar graph that displays the relationship between child labor and school closure due to COVID-19. There was a high incidence of COVID-19-related school closures among children who engaged in agricultural work, whereas those who did not participate in such work reported relatively fewer school closures.

Figure 6. Histogram between child labor and school closure due to COVID-19 (Source: 2021 UNICEF MICS6 survey)
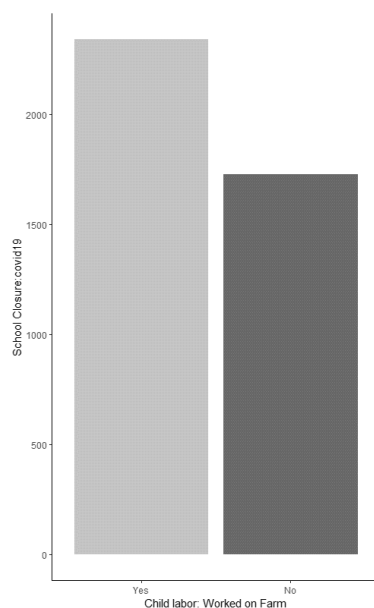
Figure 7 shows the wealth score distribution by child labor in the agriculture sector. Children who participated in agricultural labor tended to cluster around -1 regarding household wealth, while those who did not participate were relatively dispersed around 1.

Figure 7. Wealth Score distribution by Child labor in the agriculture sector (Source: 2021 UNICEF MICS6 survey)

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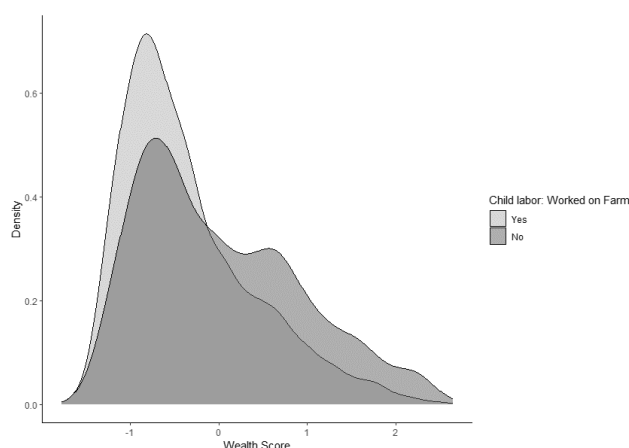
Figure 8 depicts the number of children engaged in agricultural labor and the impact of COVID-19 school closures by region. The northeastern region had the highest number of children involved in agricultural labor, followed by the southeast, south-south, southwest, northwest, and southwest regions. The northeastern and northwest regions experienced the most significant impact from school closures due to COVID-19, while the southwest region had the least. In contrast to other regions, the southwest region stood out for its lower prevalence of child labor in the agricultural sector and fewer school closures due to COVID-19. This can be attributed to the region's relatively higher wealth in Nigeria, which reduces the prevalence of child labor and facilitates remote learning without significant disruptions to regular schooling.

Figure 8. Regional Status of agricultural child labor and School Closures due to COVID-19
(Source: 2021 UNICEF MICS6 survey)

	North Central	North East	North West	South East	South South	South West
Child labor: Worked on Farm	762	646	566	663	638	256
School Closure: COVID-19	824	699	807	614	813	314
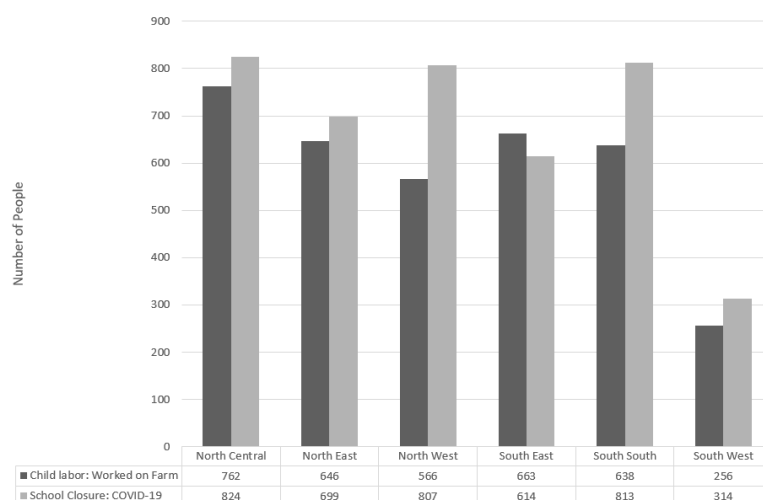
5.4. Empirical Model

The equation presented below provides insights into the effects of school closures on child labor across different categories. Y_{ihj} is a binary dependent variable that denotes whether the i th child of the h th household located in the j region has participated in labor, assigning a value of 1 if the child has worked and 0 if not. W_i is a wealth variable vector that proves the Luxury Axiom and Market Imperfection. The primary variable, $Closure_i$ is a dummy variable for school closures due to COVID−19 and other reasons. X_i represents a vector of child characteristics, while X_h represents a vector of head−of−household characteristics. D_j s a dummy variable for the j region used to control for unobserved fixed effects, and ε_{ihj} represents the error term.

$$\begin{cases} Y_{ihj} = 1 \; if \; Y^*_{ihj} > 0 \\ Y_{ihj} = 0 \; otherwise \end{cases} \quad (19)$$
$$with \; Y^*_{ihj} = \alpha + \beta_1 W_i + \beta_2 Closure_i + \beta_3 X_i + \beta_4 X_h + \beta_4 D_j + \varepsilon_{ihj}$$

The provided equation, utilizing the Tobit model, allows us to assess the impact of the variables on child labor hours. H_{ihj} represents the variable indicating the number of hours worked by the i th child of the h th household residing in region j during the previous week. It is observed only when it is greater than 0; otherwise, it is censored at 0.

$$\begin{cases} H_{ihj} = L_{ihj} \; if \; H^*_{ihj} > 0 \\ H_{ihj} = 0 \; if \; H^*_{ihj} \leq 0 \end{cases} \quad (20)$$
$$with \; H^*_{ihj} = \alpha + \beta_1 W_i + \beta_2 Closure_i + \beta_3 X_i + \beta_4 X_h + \beta_4 D_j + \varepsilon_{ihj}$$

Chapter 6. Results and Discussions

This chapter contains the findings of the model analyses that assess the effects of school closures on child labor within agricultural sectors and the consequences of COVID-19-related school closures on child labor. Through this comparison, it was possible to verify that child labor in the agricultural sector in Nigeria has increased due to COVID-19-related school closures, as previously stated. In addition, COVID-19-related school closures led to a more significant increase in child labor in the agricultural sector than other school closures. The increase in the rate of child labor in the agricultural sector due to COVID-19-related school closures was also higher compared to other sectors.

6.1. School closures

Table 4 presents the results of the impact of school closures on child labor in agriculture. A description of the main variables is provided as follows. As household wealth increases, the likelihood of child labor in agriculture decreases. This corresponds with previous research showing that children are less likely to rely on income from labor when household income is high. The agricultural land size was found to be significant. As the size of the household's land ownership increased, the possibility of children engaging in agricultural labor increased. This finding is in line with prior research showing that land size positively affects children's agricultural labor participation. Nevertheless, the impact is relatively modest compared to that of other variables.

When children experienced school closures due to COVID-19, their likelihood of working in agriculture increased. COVID-19-related mobility restrictions led children into work environments. When experiencing a natural disaster-related school closure, the possibility of children working in agricultural fields decreases. Natural disasters restricted children's mobility, distancing them from the labor environment. If the teacher strike caused a school closure, there would be an increase in the possibility of agricultural child labor. However, the increase was smaller than that of COVID-19-related school closures. In contrast to the COVID-19 pandemic, teacher strikes did not directly affect agricultural household income, leading to a lower likelihood of child labor.

Both child age and gender were significant factors in predicting

agricultural child labor. The older the child, the more likely they were to engage in agricultural labor. It was observed that older children were more likely to be available for agricultural labor. However, the rate of increase decreased as the age increased, as observed from the squared age variable. The probability for girls to engage in agricultural child labor decreased. This finding aligns with previous research indicating that girls are more likely to perform household tasks while boys are more likely to work in agriculture.

The northeast, southeast, south south, and southwest regions were significant among the regional variables. The likelihood of children being involved in agricultural labor in Nigeria's northeast region increased, given the area's predominant agricultural focus on crops such as rice, beans, and cassava. The likelihood of child labor in the agricultural sector increased among children residing in the southeast and south−south regions of Nigeria, where palm production is a significant source of income. The likelihood of child labor in the agricultural sector decreased as children in the southwest region of Nigeria increased. This is because the primary industry in this area is industrial or commercial.

Table 4. Impact of school closures on child labor in agricultural sectors

| | Dependent variable: | | | |
| | Child labor: Worked on Farm | | | |
	(1)	(2)	(3)	(4)
Household wealth				
Wealth Score	−0.38***	−0.37***	−0.37***	−0.37***
	(0.02)	(0.02)	(0.02)	(0.02)
Land Size	0.001***	0.001***	0.001***	0.001***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Bank Account	−0.04	−0.03	−0.03	−0.03
	(0.04)	(0.04)	(0.04)	(0.04)
School Closure				
School Closure due to COVID19	0.23***			
	(0.03)			
School Closure due to Natural Disasters		−0.15***		
		(0.05)		
			0.0002	

School Closure due to Man-made Disasters			(0.06)	
School Closure due to Teacher Strike				0.14***
				(0.05)
Child Characteristics				
Age	0.37***	0.37***	0.37***	0.37***
	(0.08)	(0.07)	(0.07)	(0.07)
Age^2	−0.01***	−0.01***	−0.01***	−0.01***
	(0.004)	(0.004)	(0.004)	(0.004)
Girl	−0.23***	−0.23***	−0.23***	−0.23***
	(0.03)	(0.03)	(0.03)	(0.03)
Household Head Characteristics				
Female	−0.01	−0.01	−0.01	−0.01
	(0.05)	(0.05)	(0.05)	(0.05)
Education Level	−0.01	−0.01	−0.01	−0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Zone				
North East	0.12**	0.15***	0.14***	0.15***
	(0.05)	(0.05)	(0.05)	(0.05)
North West	−0.08	−0.03	−0.04	−0.03
	(0.05)	(0.05)	(0.05)	(0.05)
South East	0.24***	0.22***	0.22***	0.23***
	(0.05)	(0.05)	(0.05)	(0.05)
South South	0.16***	0.21***	0.19***	0.20***
	(0.05)	(0.05)	(0.05)	(0.05)
South West	−0.22***	−0.25***	−0.24***	−0.22***
	(0.06)	(0.06)	(0.06)	(0.06)
Constant	−2.54***	−2.42***	−2.43***	−2.42***
	(0.38)	(0.38)	(0.38)	(0.38)
Observations	6,466	6,466	6,466	6,466
Log Likelihood	−4,041.29	−4,059.11	−4,063.38	−4,059.42
Akaike Inf. Crit.	8,112.57	8,148.23	8,156.76	8,148.85

Psuedo R2	0.093	0.089	0.088	0.089

Note: *p<0.1 **p<0.05 ***p<0.01

Table 5 illustrates the marginal effects of school closures on child labor in the agricultural sector. Regarding all other conditions being equal, school closures due to COVID-19 could potentially increase child labor in the agriculture sector by 8%. Natural disaster-related closures had the potential to decrease child labor in the agriculture sector by 5%. Teacher strike-related closures increase child labor in the agriculture sector by 5%. These results indicate that the impact of COVID-19-related school closures was more significant than other types of school closures.

Table 5. Marginal Effects of School closures on agricultural child labor

	Independent Variable: School Closure			
	COVID19	Natural Disasters	Man-made Disasters	Teacher Strike
Child labor: Worked on Farm	0.08***	−0.05**	0.00	0.05**
	(0.01)	(0.02)	(0.02)	(0.02)

Note: *p<0.1 **p<0.05 ***p<0.01

6.2. Types of Child Labor

Table 6 presents the results of an analysis to examine the impact of school closures due to COVID-19 on child labor by sector. The comparison of major variables is as follows. For child labor in agriculture, the probability of engaging in child labor decreased as the family's wealth increased. Similar results were found for selling goods or other child labor but with less impact. The finding confirms that wealth size has a more significant effect on child labor in the agricultural sector compared to other sectors.

COVID-19-related school closures acted as a factor in increasing all forms of child labor. However, the impact of COVID-19-related school closures on child labor in the agricultural sector was greater than in other sectors. The agricultural sector showed an 8% increase. A 3% increase in child labor was observed in the case of family-operated businesses. In comparison, child labor in the sale of goods experienced a 2% increase, and other forms of child labor witnessed a 4% increase. As a result, agricultural child labor was the most affected by the school closures due to COVID-19.

Age was statistically significant for child labor in agriculture and sales.

As the child's age increases, their likelihood of being available for labor increases in both types of child labor. In addition, the child's squared variable demonstrates a decline in the magnitude of increase as age increases. Only in agricultural child labor, the gender of the child was found to be statistically significant. This is because there are challenging working conditions for girls in the agricultural sector, while there is no gender-based difference in other forms of child labor.

Except for child labor in agriculture, the education level of the household head was statistically significant for all other sectors. The education level of the household head had a decreasing effect on child labor in other sectors., However, there was no relationship between the education level of the household head and child labor in agriculture.

Lastly, the description of regional variables is as follows. Agricultural and family enterprise child labor was statistically significant in the Northeast region. This is because the region is relatively poor and requires child laborers. The northwest region showed statistically significant differences in child labor between family-based enterprises and other types of work. The region is known for its developed mining industry, which may have contributed to child labor in these areas.

In the southern and southwestern regions, there was a positive relationship between child labor in agriculture and a negative relationship between child labor in selling goods and other types of child labor. This is because that area is a region that produces major income crops like palm. In the Southwest region, Nigeria's most economically developed region, there was a negative correlation between child labor.

Table 6. Impact of school closure due to COVID-19 on different types of child labors

	Dependent variable: Child Labor			
	Worked on Farm	Helped in Family Business	Sell Articles	Any other Activities
Household wealth				
Wealth Score	−0.38***	0.02	−0.18***	−0.12***
	(0.02)	(0.02)	(0.03)	(0.03)
Land Size	0.001***	0.0003	0.0002	−0.0000
	(0.0002)	(0.0002)	(0.0002)	(0.0002)

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Bank Account	−0.04	−0.02	−0.01	0.04
	(0.04)	(0.04)	(0.05)	(0.05)
School Closure				
School Closure due to COVID19	0.23***	0.09***	0.08**	0.14***
	(0.03)	(0.04)	(0.04)	(0.04)
Child Characteristics				
Age	0.37***	0.10	0.25***	0.13
	(0.08)	(0.08)	(0.09)	(0.09)
Age^2	−0.01***	−0.0004	−0.01*	−0.002
	(0.004)	(0.004)	(0.004)	(0.004)
Girl	−0.23***	0.03	−0.04	−0.03
	(0.03)	(0.03)	(0.04)	(0.04)
Household Head Characteristics				
Female	−0.01	−0.02	−0.001	−0.04
	(0.05)	(0.05)	(0.06)	(0.05)
Education Level	−0.01	−0.03**	−0.04**	−0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Zone				
North East	0.12**	0.11**	0.01	0.06
	(0.05)	(0.05)	(0.06)	(0.06)
North West	−0.08	0.20***	0.07	0.34***
	(0.05)	(0.06)	(0.06)	(0.06)
South East	0.24***	0.01	−0.16**	−0.21***
	(0.05)	(0.06)	(0.06)	(0.06)
South South	0.16***	0.09	−0.29***	−0.19***
	(0.05)	(0.06)	(0.07)	(0.06)
South West	−0.22***	0.08	−0.30***	−0.31***
	(0.06)	(0.07)	(0.08)	(0.08)
Constant	−2.54***	−1.64***	−2.62***	−2.03***
	(0.38)	(0.40)	(0.46)	(0.44)
Observations	6,466	6,462	6,463	6,464
Log Likelihood	−4,041.29	−3,835.24	−2,767.71	−3,023.68
Akaike Inf. Crit.	8,112.57	7,700.48	5,565.41	6,077.35

Psuedo R2	0.093	0.026	0.044	0.054

Table 7 presents the marginal effects of school closures due to COVID-19 on child labor by type of work. The agricultural sector showed an 8% increase. A 3% increase in child labor was observed in the case of family-operated businesses. In comparison, child labor in the sale of goods experienced a 2% increase, and other forms of child labor witnessed a 4% increase. As a result, agricultural child labor was the most affected by the school closures due to COVID-19.

Table 7. Marginal Effects of School Closure due to COVID-19 on different types of child labor

	Dependent variable: Child Labor			
	Worked on Farm	Helped in Family Business	Sold Articles	Other Activities
School Closure due to COVID-19	0.08***	0.03**	0.02*	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)

Note: *p<0.1 **p<0.05 ***p<0.01

Consequently, the earlier research question can be answered. There is a possibility of an 8% increase in child labor in Nigeria's agriculture sector due to COVID-19-related school closures, and this impact is more significant than that of other types of school closures.

The explanation of school closures due to COVID-19 reveals that, unlike other school closures, COVID-19 has a broad impact on families and local communities. COVID-19 has compelled individuals to limit social contact, leading to a decline in the labor market, economic isolation of households, and children's concentration on agricultural activities amidst a reduction in educational opportunities.

Additionally, the pandemic has caused disruptions in labor supply in Nigeria's agricultural sector. To prevent the spread of COVID-19, the mobility of adult agricultural workers has been restricted. Considering the labor-intensive nature of Nigeria's main crops, such as yams, cassava, rice, and maize, the inability to hire agricultural laborers led to a rise in family labor, including child labor. This is why child labor in the agricultural sector was significantly affected by COVID-19-related school closures.

6.3. Hours of Child labor and Farm Characteristics

Table 8 illustrates the marginal effects of factors on child labor hours. The first model is built upon the findings of Basu et al. (2010), demonstrating an inverse U-shaped relationship between child labor and land size. The second model is based on Dunmas' (2013) study, which reveals an inverse W-shaped relationship between child labor and land size. Given that this study relies on a nationwide survey in Nigeria, the interpretation of the inverse W-shaped model is deemed more suitable, and the following description explains this decision.

As the Wealth Score increased by one unit, the child labor hours decreased by -1.97. In the case of school closures due to the pandemic, child labor increased by 1.47 hours. An increase of one year in the child's age led to a 2.65-hour increase in child labor hours, although the magnitude of this effect decreased as the child's age advanced. Increasing parental education level was associated with a 0.18-hour decrease in child labor.

Children residing in the northwest region had higher child labor hours than those in the north-central region. This is presumed to be due to the relative poverty of the northwest region compared to the north-central region. Child labor hours were reduced for children residing in the southwest region, which is likely attributed to the region's status as the most affluent area in Nigeria.

Table 8. Marginal Effects of Factors on Child Labor Hours

	Dependent variable: Hours of Child labor	
	Inverted-U Shape	Inverted-W Shape
Wealth Score	-2.01***	-1.97***
	(0.19)	(0.19)
School Closure due to COVID19	1.46***	1.47***
	(0.26)	(0.26)
Child Age	2.69***	2.65***
	(0.58)	(0.58)
Child Age^2	-0.07***	-0.08***
	(0.03)	(0.03)
Girl	-1.49***	-1.49***
	(0.25)	(0.25)
Female Household Head	-0.42	-0.36
	(0.37)	(0.37)

Education level of Household Head	−0.19* (0.09)	−0.19* (0.09)
Agricultural Land Size	0.01*** (0.01)	0.04*** (0.01)
Agricultural Land Size^2	−1.42e−05*** (3.80e−06)	−1.91e−04*** (5.41e−05)
Agricultural Land Size^3		3.20e−07*** (1.07e−07)
Agricultural Land Size^4		−1.65e−10** (6.00e−11)
Bank Account	−0.11 (0.31)	−0.13 (0.31)
Zone		
North East	0.36 (0.41)	0.24 (0.41)
North West	2.21*** (0.41)	2.19*** (0.41)
South East	−0.41 (0.42)	−0.15 (0.43)
South South	−0.18 (0.42)	−0.03 (0.42)
South West	−2.68*** (0.50)	−2.69*** (0.50)
Observations	6,466	6,466
Log Likelihood	−16639.83	−16633.94
Akaike Inf. Crit.	33313.7	33305.90
Bayesian Inf. Crit.	33428.8	33434.6
Note:		*p < 0.1, **p < 0.05, ***p<0.01

The changes in child labor hours according to land size can be observed in Figure 9. Consistent with Dunmas's (2013) study, it exhibited four regimes due to the imperfections in the labor market of developing countries. From 0 to 20 acres, regime 1 exhibited an increasing pattern in child labor, followed by Regime 2, indicating a decrease from 20 to 60 acres. In the range of 60 to 140 acres, regime 3 emerged with child labor for autarky, and once it surpassed 140 acres, regime 4 showed a decline in child labor.

The results indicate that households with up to 20 acres continuously increase child labor due to parental involvement in wage labor. From 20 to 60 acres, households combine farming and wage labor, and although child

labor can be present, it decreases with the rise in parental wealth. The range of 60 to 140 acres represents households with a certain level of wealth, where both parents and children contribute to agricultural income enhancement. Beyond 140 acres, households employ external laborers.

Figure 9. Changes in Child labor hours by agricultural land area during COIVD－19 situation
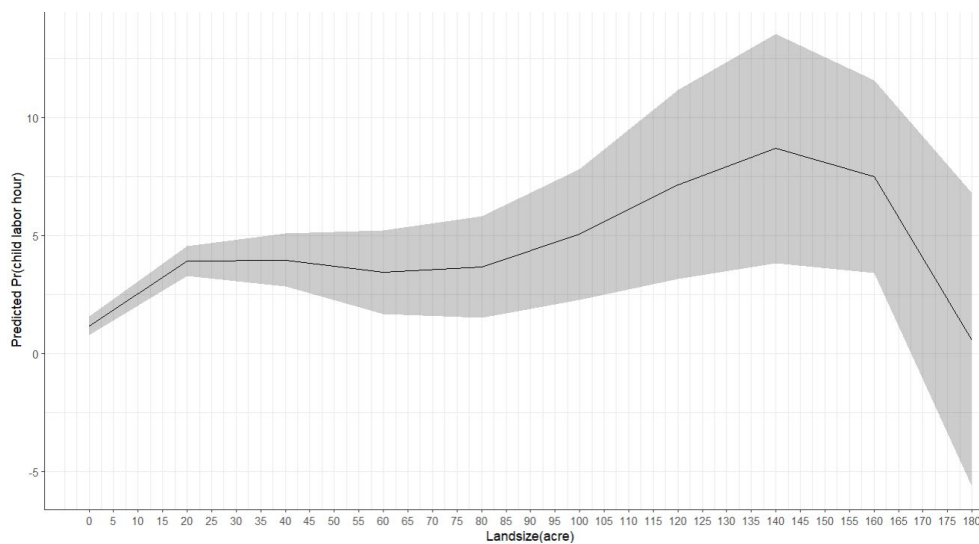
During COVID－19, households with land below 140 acres predominantly witnessed increased child labor. However, this study pays special attention to households with land sizes of 20 acres or less, where parents are small－scale farmers and wage laborers in COVID－19. For these vulnerable households, a decreased parental wage income leads to increased child labor. Therefore, households with land sizes of 20 acres or less require additional external support under the circumstances of COVID－19.

Chapter 7. Conclusion

This study investigated the factors responsible for the increase in child labor during the pandemic while examining the impact of COVID-19-related school closures on child labor in the agriculture sector. Poverty is still a significant factor contributing to child labor in Nigeria during the pandemic, and parents' income level plays a vital role, based on the Luxury Axiom. Comparing the impact of school closures on child labor in the agricultural sector, the school closures due to COVID-19 had the most significant impact on agriculture. When comparing the impact of school closures due to COVID-19 on different types of child labor, child labor in agriculture was more affected than other types of child labor.

Moreover, due to COVID-19-related school closures, children were found to engage in an extra 1.4 hours of work. Through the lens of the theory of Labor Market Failure, it is recognized that households with land sizes of 20 acres or less experienced a greater need for external support during the pandemic situation of COVID-19.

The policy implications that can be drawn from this are that in a large-scale epidemic like COVID-19, differentiated in-kind support such as emergency relief funds or food assistance should be made to eliminate child labor. Remarkably, this support should be amplified for small-scale farms with 20 acres or less, which are more vulnerable. This is because poverty remains the primary driver of child labor, and during the pandemic, poverty is exacerbated in these small-scale farms (Sheyoputri et al., 2022; Mohammed., 2023).

However, considering that most countries where child labor occurs are developing countries, it is improbable for those governments to provide relief funds. A more practical alternative would be for international organizations such as UNICEF or WFP to assist with cash transfer programs. During the pandemic, UNICEF collaborated with a multinational company, Airtel Africa, to expand mobile cash transfer services to families. (UNICEF, 2020). Consequently, cash assistance was provided to children affected by school closures in Sub-Saharan Africa. Parents can overcome the economic crisis and no longer subject children to agricultural labor. During the pandemic, all children can maintain their rights and well-being. Thus, this study recommends increasing international organizations' cash transfer programs to eliminate child labor in the agricultural sector during the pandemic.

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국문초록

본 연구에서는 2021년 나이지리아 유니세프 6차 다중지표 클러스터 조사(MICS6)를 사용하여 코로나 19로 인한 휴교령이 농업분야 아동노동에 미치는 영향을 분석하였다. 사치재 공리에 따라 가계 빈곤이 아동노동의 주요 원인이라는 것을 기초로 설계하였다. 연구는 아동노동 여부에 미치는 영향을 파악하기 위해 1차적으로 프로빗 모형을 설계하여 분석하였다. 코로나19로 인한 휴교령이 농업부문 아동노동에 미치는 영향을 조사하기 위해 휴교령 별로 농업분야 아동노동에 미치는 영향을 비교하고, 코로나19로 인한 학교 휴교령이 아동노동 유형별로 미치는 영향을 비교하였다. 분석결과, 코로나19로 인한 휴교령은 농업분야 아동노동에 8% 증가하는 요인으로 나타났으며, 타 휴교령으로 인한 수치보다 더 컸다. 또한, 물품판매와 같은 다른 유형의 아동노동에 미치는 수치보다 농업분야의 아동노동이 코로나 19로 인한 영향이 더 컸다. 추가로 아동노동 시간에 미치는 영향을 확인하기 위해 토빗 모형을 활용하여 분석하였다. 해당 연구 결과, 코로나 19로 인한 휴교령으로 인해 아동의 노동시간이 일주일에 1.4시간 추가로 증가하게 되었음을 파악하였다. 추가로 코로나 19 확산 시기 동안 20에이커 이하 농가들은 충분한 부를 가지고 있지 않아 비자발적으로 아동 노동을 더 시킨다는 사실을 확인할 수 있었다. 이에 본 연구는 코로나19 상황 속에 농가의 빈곤이 여전히 아동노동의 주요한 원인이고, 코로나19로 인한 휴교령이 농업분야 아동노동을 인과적으로 증가시켰음을 확인했다는 점에서 의의를 갖는다.

Appendix 1. Luxury Axiom and Substitution Axiom

This study is built upon two primary assumptions proposed by Basu and Van (1998). The first is the luxury axiom, which posits that a child's leisure time is a luxury good and that children are only sent to work when their parents have very low income and cannot afford to provide them with such a luxury. The second assumption is the Substitution Axiom, which states that child labor and adult labor can be substituted for one another. C Fan's (2011) study is referenced as proof for this idea.

The utility function of parents is given as follows: c is the household consumption, h is the child´s human capital, and l is the child's leisure time. δ and θ represent the coefficients for child's human capital and leisure time, respectively.

$$U = ln(c) + \delta ln(h) + \theta l \tag{21}$$

A child's production function of human capital is expressed in a Cobb-Douglas form, consisting of monetary capital (x) and study time (s).

$$h = x^{\alpha} s^{\beta} \tag{22}$$

Therefore, the utility function of parents can be modified as follows.

$$U = ln(c) + \alpha \delta ln(x) + \beta \delta \, ln(s) + \theta l \tag{23}$$

All children's time is composed of labor time (e), study time (s), and leisure time (l).

$$e + s + l = 1 \tag{24}$$

The budget constraint for parents is expressed as the following equation, where w denotes the parental wage and γ represents the degree of substitutability between child labor and adult labor.

$$c + x = w + e\gamma w \tag{25}$$

The equation can be restated in terms of the child's hours as follows:

$$c + x + \gamma ws + \gamma wl = w + \gamma w \qquad (26)$$

Lastly, the formula related to the household's subsistence constraint (Φ) can be expressed as follows. Household consumption exceeds or is equal to the minimum subsistence level.

$$c \geq \Phi \qquad (27)$$

Parental utility maximization can be represented by the following Lagrangian equation. This equation is formulated under the assumption that the household's consumption exceeds the subsistence level, that is, the constraint of subsistence consumption is not binding. ($c > \Phi$)

$$L = ln(c) + \alpha\delta ln(x) + \beta\delta \ln(s) + \theta l$$
$$+\lambda(w + \gamma w - c - x - \gamma ws - \gamma wl) \qquad (28)$$

The following are the first−order conditions (FOCs) that satisfy this equation.

$$\frac{\partial L}{\partial c} = \frac{1}{c} - \lambda = 0 \qquad (29)$$

$$\frac{\partial L}{\partial x} = \frac{\alpha\delta}{x} - \lambda = 0 \qquad (30)$$

$$\frac{\partial L}{\partial s} = \frac{\beta\delta}{s} - \lambda\gamma w = 0 \qquad (31)$$

$$\frac{\partial L}{\partial l} = \theta - \lambda\gamma w \leq 0, (with\ strict\ equality\ holds\ if\ l > 0) \qquad (32)$$

If the subsistence constraint is binding, household consumption equals the minimum level of consumption ($c = \Phi$). The Lagrangian equation can be expressed as follows.

$$L = ln\Phi + \alpha\delta ln(x) + \beta\delta \ln(s) + \theta l$$
$$+\lambda(w + \gamma w - c - x - \gamma ws - \gamma wl) \qquad (33)$$

The first-order conditions (FOCs) resulting from this are as follows.

$$\frac{\partial L}{\partial x} = \frac{\alpha\delta}{x} - \lambda = 0 \qquad (34)$$

$$\frac{\partial L}{\partial s} = \frac{\beta\delta}{s} - \lambda\gamma w = 0 \qquad (35)$$

$$\frac{\partial L}{\partial l} = \theta - \lambda\gamma w \leq 0, (\textit{with strict equality holds if } l > 0) \qquad (36)$$

Two lemmas ensue from this.

Lemma 1

Child labor hours and leisure time are primarily determined by the child's relative labor productivity (γ) when the household consumption exceeds the subsistence level. As the productivity of child labor increases, they work more and have less leisure time. This equation represents the scenarios when the coefficient (θ) for leisure time is greater or smaller than the coefficient for child's study time ($\beta\delta$).

(1) When $\beta\delta > \theta$

Condition	Result
$\gamma < \dfrac{\theta}{1 + \alpha\delta + \beta\delta - \theta}$	$e = 0, l > 0$
$\dfrac{\theta}{1 + \alpha\delta + \beta\delta - \theta} < \gamma < \dfrac{\theta}{1 + \alpha\delta}$	$e = 0, l = 0$
$\gamma > \dfrac{\theta}{1 + \alpha\delta}$	$e > 0, l = 0$

(2) When $\beta\delta < \theta$

Condition	Result
$\gamma < \dfrac{\beta\delta}{1 + \alpha\delta}$	$e = 0, l > 0$
$\dfrac{\beta\delta}{1 + \alpha\delta} < \gamma < \dfrac{\theta}{1 + \alpha\delta + \beta\delta - \theta}$	$e > 0, l > 0$

$\gamma > \dfrac{\theta}{1 + \alpha\delta + \beta\delta - \theta}$	$e > 0, l = 0$

Lemma 2

The following content elucidates the attributes of scenarios in which the subsistence constraint is binding versus those in which it is not.

(1) For the survival constraint to be binding ($c = \Phi$), the wage (w) must be less than $\dfrac{\theta}{\gamma}\Phi$ when the relative labor productivity of a child (γ) is less than or equal to $\dfrac{\theta}{1+\alpha\delta+\beta\delta-\theta}$

$$\gamma \le \frac{\theta}{1 + \alpha\delta + \beta\delta - \theta} \Rightarrow \left(c = \Phi \Leftrightarrow w < \frac{\theta}{\gamma}\Phi \right) \tag{37}$$

(2) If the relative labor productivity of a child (γ) is greater than $\dfrac{\theta}{1+\alpha\delta+\beta\delta-\theta}$, the wage ($w$) must be less than $\dfrac{1+\alpha\delta+\beta\delta}{1+\gamma}\Phi$ for the survival constraint to bind. ($c = \Phi$)

$$\gamma > \frac{\theta}{1 + \alpha\delta + \beta\delta - \theta} \Rightarrow \left(c = \Phi \Leftrightarrow w < \frac{1 + \alpha\delta + \beta\delta}{1 + \gamma}\Phi \right) \tag{38}$$

(3) The survival constraint is not binding if the wage (w) is greater than the maximum value of $\dfrac{\theta}{\gamma}\Phi$ or $\dfrac{1+\alpha\delta+\beta\delta}{1+\gamma}\Phi$

$$w > max\left(\frac{\theta}{\gamma}\Phi, \frac{1 + \alpha\delta + \beta\delta}{1 + \gamma}\Phi \right) \Rightarrow c > \Phi \tag{39}$$

Two propositions can be drawn from this.

Proposition 1

The following provides an explanation of the circumstances when household consumption is equal to the minimum subsistence level. ($c = \Phi$)

(1) An increase in parental wages causes child labor to decrease when

child labor exists.

$$\frac{de}{dw} < 0 \qquad (40)$$

(2) Child labor (e) is always present when wages fall below the minimum consumption level ($w < \Phi$).

$$e = 1 - s - l = \frac{\alpha\delta}{\theta} + \frac{\Phi}{\gamma w} - \frac{1}{\gamma} > 0 \qquad (41)$$

(3) Furthermore, as the child's relative labor productivity increases, the child labor hours decrease. This is due to the fact that household consumption is at the subsistence level. As the household reaches the minimum consumption, the child who works relatively efficiently spends less time on work.

$$\frac{de}{d\gamma} < 0 \qquad (42)$$

Proposition 2

The preceding Lemma 2 states that if the wage (w) exceeds the maximum value of $\frac{\theta}{\gamma}\Phi$ or $\frac{1+\alpha\delta+\beta\delta}{1+\gamma}\Phi$, the survival constraint is not binding. ($c > \Phi$) As a result, the following results are obtained.

(1) If the relative labor productivity of the child (γ) is greater than ($\frac{\min(\beta\delta,\theta)}{1+\alpha\delta}$), child labor will exist. This means that there is a minimum threshold for the relative labor productivity of child labor to exist.

$$\gamma > \frac{\min(\beta\delta, \theta)}{1 + \alpha\delta} \qquad (43)$$

(2) If child labor exists, the amount of time spent on child labor increases as the child's relative labor productivity (γ) increases. The substitutability between child labor and adult labor is a significant factor in determining child labor.

5 0

$$\frac{de}{d\gamma} > 0 \qquad\qquad (44)$$

(3) Child labor hours are independent of parental income. Thus, if not bound by subsistence constraints, child labor is not determined by parental income.

$$\frac{de}{dw} = 0 \qquad\qquad (45)$$

Proposition 1 describes the situation of households living at the minimum subsistence level. In summary, Proposition 1 states that when a household is at the minimum subsistence level, an increase in parental wages reduces child labor, and if the minimum consumption required for subsistence exceeds parental wages, child labor becomes inevitable.

Proposition 2 explains the circumstances of households that exceed the minimum subsistence level. Within the high-wage scenario, child labor is present when the relative labor productivity of child labor exceeds a particular threshold. Moreover, an increase in child labor hours necessitates an increase in the relative labor productivity of children. Once households surpass survival constraints, child labor hours become independent of parental income.

The characteristics of child labor differ based on the minimum subsistence situation, showcasing how the Luxury Axiom and Substitution Axiom manifest in distinct scenarios. This study is designed using these theoretical frameworks.

Appendix 2. MULTIPLE INDICATOR CLUSTER SURVEY (MICS), 2021 QUESTIONNAIRES

■■■MICS

HOUSEHOLD QUESTIONNAIRE
Nigeria Multiple Indicator Cluster Survey, 2021

nbs

HOUSEHOLD INFORMATION PANEL		HH
HH1. *Cluster number:* ___ ___ ___	**HH2**. *Household number:* ___ ___	
HH3. *Interviewer's name and number:* NAME	**HH4**. *Supervisor's name and number:* NAME	
HH5. *Day / Month / Year of interview:* ___ ___ / ___ ___ / 2 0 2 1	**HH6**. *Area:*	URBAN .... 1 RURAL 2
HH7. *State name and code:* NAME _____ ___ ___	**HH8**. *Is the household selected for Questionnaire for Men?*	YES .... 1 NO 2

Check that the respondent is a knowledgeable member of the household and at least 18 years old before proceeding. You may only interview a child age 15-17 if there is no adult member of the household or all adult members are incapacitated. You may not interview a child under age 15.	**HH11**. *Record the time.* HOURS : MINUTES ___ ___ : ___ ___

HH12. Hello, my name is (*your name*). We are from the National Bureau of Statistics. We are conducting a survey about the situation of children, families and households. I would like to talk to you about these subjects. This interview usually takes about **45** minutes. Following this, I may ask to conduct additional interviews with you or other individual members of your household. All the information we obtain will remain strictly confidential and anonymous. If you do not wish to answer a question or stop the interview, please let me know. May I start now?

YES...1 NO / NOT ASKED...2	1 ⇨ LIST OF HOUSEHOLD MEMBERS 2 ⇨ HH46

HH46. *Result of Household Questionnaire interview:* *Discuss any result not completed with Supervisor.*	COMPLETED.. 01 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT................................ 02 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME................... 03 REFUSED... 04 DWELLING VACANT OR ADDRESS NOT A DWELLING .... 05 DWELLING DESTROYED.. 06 DWELLING NOT FOUND .... 07 OTHER (*specify*) _____ 96

HH47. *Name and line number of the respondent to Household Questionnaire interview:* NAME _____ ___ ___	To be filled after the Household Questionnaire is completed TOTAL NUMBER	To be filled after <u>all</u> the questionnaires are completed COMPLETED NUMBER	
HOUSEHOLD MEMBERS	**HH48**		
WOMEN AGE 15-49	**HH49** ___ ___	**HH53**	___ ___
If household is selected for Questionnaire for Men: MEN AGE 15-49	**HH50** ___ ___	**HH54**	___ ___
CHILDREN UNDER AGE 5	**HH51** ___ ___	**HH55**	___ ___
CHILDREN AGE 5-17	**HH52** ___ ___	**HH56**	ZERO ..... 0 ONE 1

First complete HL2-HL4 vertically for all household members, starting with the head of the household. Once HL2-HL4 are complete for all members, <u>make sure to probe</u> for additional members: Those that are not currently at home, any infants or small children and any others who may not be family (such as servants, friends) but who usually live in the household. Then, ask questions HL5-HL20 for each member one at a time. If additional questionnaires are used, indicate by ticking this box: …………………………………………… ☐

HL.1. Line number	HL.2. First, please tell me the name of each person who usually lives here, starting with the head of the household. Probe for additional household members.	HL.3. What is the relationship of (name) to (name of the head of household)?	HL.4. Is (name) male or female? 1 MALE 2 FEMALE	HL.5. What is (name)'s date of birth? 98 DK 9998 DK	HL.6. How old is (name)? Record in completed years. If age is 95 or above, record '95'.	HL.8. Record line number if woman and age 15-49.	HL.9. Record line number if man, age 15-49 and HH8 is yes.	HL.10. Record line number if age 0-4.	HL.11. Age 0-17? 1 YES 2 NO ⇨ Next Line	HL.12. Is (name)'s natural mother alive? 1 YES 2 NO ⇨ HL16 8 DK ⇨ HL16	HL.13. Does (name)'s natural mother live in this household? 1 YES 2 NO ⇨ HL15	HL.14. Record the line number of mother and go to HL16.	HL.15. Where does (name)'s natural mother live? 1 ABROAD 2 IN ANOTHER HOUSEHOLD IN THE SAME STATE 3 IN ANOTHER HOUSEHOLD IN ANOTHER STATE 4 INSTITUTION IN THIS COUNTRY 8 DK	HL.16. Is (name)'s natural father alive? 1 YES 2 NO ⇨ HL20 8 DK ⇨ HL20	HL.17. Does (name)'s natural father live in this household? 1 YES 2 NO ⇨ HL19	HL.18. Record the line number of father and go to HL20.	HL.19. Where does (name)'s natural father live? 1 ABROAD 2 IN ANOTHER HOUSEHOLD IN THE SAME STATE 3 IN ANOTHER HOUSEHOLD IN ANOTHER STATE 4 INSTITUTION IN THIS COUNTRY 8 DK	HL.20. Copy the line number of mother from HL14. If blank, ask: Who is the primary caretaker of (name)? If 'No one' for a child age 15-17, record '90'.
LINE	NAME	RELATION*	M F	MONTH YEAR	AGE	W 15-49	M 15-49	0-4	Y N	Y N DK	Y N	MOTHER		Y N DK	Y N	FATHER		
01		0 1	1 2	___ ___	__ __	01	01	01	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
02		___	1 2	___ ___	__ __	02	02	02	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
03		___	1 2	___ ___	__ __	03	03	03	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
04		___	1 2	___ ___	__ __	04	04	04	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
05		___	1 2	___ ___	__ __	05	05	05	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
06		___	1 2	___ ___	__ __	06	06	06	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
07		___	1 2	___ ___	__ __	07	07	07	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
08		___	1 2	___ ___	__ __	08	08	08	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
09		___	1 2	___ ___	__ __	09	09	09	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
10		___	1 2	___ ___	__ __	10	10	10	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
11		___	1 2	___ ___	__ __	11	11	11	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
12		___	1 2	___ ___	__ __	12	12	12	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
13		___	1 2	___ ___	__ __	13	13	13	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
14		___	1 2	___ ___	__ __	14	14	14	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___
15		___	1 2	___ ___	__ __	15	15	15	1 2	1 2 8	1 2	___	1 2 3 4 8	1 2 8	1 2	___	1 2 3 4 8	___

* Codes for **HL3**: Relationship to head of household:
01 HEAD
02 SPOUSE / PARTNER
03 SON / DAUGHTER
04 SON-IN-LAW / DAUGHTER-IN-LAW
05 GRANDCHILD
06 PARENT
07 PARENT-IN-LAW
08 BROTHER / SISTER
09 BROTHER-IN-LAW / SISTER-IN-LAW
10 UNCLE/AUNT
11 NIECE / NEPHEW
12 OTHER RELATIVE
13 ADOPTED / FOSTER / STEPCHILD
14 SERVANT (LIVE-IN)
96 OTHER (NOT RELATED)
98 DK

5 3

ED1. Line number	ED2. Name and age. Copy names and ages of all members of the household from HL2 and HL6 to below, to next page of the module (Education 2), and to the following Non-formal Education module.		ED3. Age 3 or above? 1 YES 2 NO ↺ Next Line	ED4. Has (name) ever attended formal school or any Early Childhood Education programme? 1 YES ↺ ED5 2 NO	ED4A. Has (name) ever attended non-formal education, such as Qur'anic/Madrasa/Islamic school, trade apprenticeship, basic education/literacy course, or similar organised learning? 1 YES ↺ Next Line 2 NO ↺ Next Line 8 DK ↺ Next Line	ED5. What is the highest level and grade or year of formal school (name) has ever attended? LEVEL: 00 ECCDE ↺ ED7 11 PRIMARY 21 JUNIOR SECONDARY 22 VEI/IEI 31 SENIOR SECONDARY 32 SECONDARY TECHNICAL 41 HIGHER/TERTIARY 98 DK ↺ ED7	GRADE/ YEAR: 98 DK ↺ ED7	ED6. Did (name) ever complete that (grade/ year)? 1 YES 2 NO 8 DK	ED7. Age 3-24? 1 YES 2 NO ↺ Next Line	ED8. Check ED4: Ever attended formal school or ECE? 1 YES 2 NO ↺ Next Line
LINE	NAME	AGE	YES NO	YES NO	YES NO DK	LEVEL	GRADE/YEAR	Y N DK	Y N	Y N
01		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
02		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
03		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
04		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
05		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
06		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
07		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
08		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
09		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
10		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
11		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2
12		_ _	1 2	1 2	1 2 8	00 11 21 22 31 32 41 98	_ _ _ _	1 2 8	1 2	1 2

Codes for grade/year in ED5, ED10 and ED16

Primary	Junior Secondary	Vocational enterprise institutions programmes/Innovation Enterprise Institution	Senior Secondary	Secondary Technical	Higher/Tertiary
Primary 1 01	JSS 1 01	VEI/IEI 1 01	SS1 01	ST1 01	NCE 01
Primary 2 02	JSS 2 02	VEI/IEI 2 02	SS2 02	ST2 02	AL/OND 02
Primary 3 03	JSS 3 03	VEI/IEI 3 03	SS3 03	ST3 03	Higher Technical/TTC 03
Primary 4 04					HND 04
Primary 5 05					BSc 05
Primary 6 06					Post Graduate 06

5 4

ED1. Line number	ED2. Name and age.	ED9. At any time during the current (2020-2021) school year did (*name*) attend formal school or any Early Childhood Education programme?	ED10. During the current (2020-2021) school year, which level and grade or year of formal school is (*name*) attending?		ED11. Is (he/she) attending a public school?	ED12. In the current (2020-2021) school year, has (*name*) received any school tuition support?	ED13. Who provided the tuition support?	ED14. For the current (2020-2021) school year, has (*name*) received any material support or cash to buy shoes, exercise books, notebooks, school uniforms or other school supplies?	ED15. At any time during the previous (2019-2020) school year did (*name*) attend formal school or any Early Childhood Education programme?	ED16. During that previous (2019-2020) school year a year ago, which level and grade or year did (*name*) attend?	
		1 YES 2 NO ⇨ *ED15*	LEVEL: 00 ECCDE ⇨ *ED15* 11 PRIMARY 21 JUNIOR SECONDARY 22 VEI/IEI. 31 SENIOR SECONDARY 32 SECONDARY TECHNICAL 41 HIGHER/ TERTIARY 98 DK	GRADE/ /YEAR: 98 DK	*If "Yes", record '1'. If "No", probe to code who controls and manages the school.* 1 YES, PUBLIC (FEDERAL, STATE, LG) 2 NO, RELIGIOUS/ FAITH ORG. 3 NO, PRIVATE 6 NO, OTHER 8 DK	*If "Yes", probe to ensure that support was not received from family, other relatives, friends or neighbours.* 1 YES 2 NO ⇨ *ED14* 8 DK ⇨ *ED14*	*Record all mentioned.* A GOVT./ PUBLIC (FEDERAL, STATE, LG) B RELIGIOUS/ FAITH ORG. C PRIVATE. X OTHER Z DK	*If "Yes", probe to ensure that support was not received from family, other relatives, friends or neighbours.* 1 YES 2 NO 8 DK	1 YES 2 NO ⇨ *Next line* 8 DK ⇨ *Next Line*	LEVEL: 00 ECCDE ⇨ *Next line* 11 PRIMARY 21 JUNIOR SECONDARY 22 VEI/IEI. 31 SENIOR SECONDARY 32 SECONDARY TECHNICAL 41 HIGHER/ TERTIARY 98 DK	GRADE/ YEAR: 98 DK
LINE	NAME	AGE	YES NO	LEVEL	GRADE/ YEAR	AUTHORITY	YES NO DK	TUITION	YES NO DK	YES NO DK	LEVEL	GRADE/ YEAR
01		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
02		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
03		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
04		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
05		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
06		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
07		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
08		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
09		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
10		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
11		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___
12		___ ___	1 2	00 11 21 22 31 32 41 98	___ ___	1 2 3 6 8	1 2 8	A B C X Z	1 2 8	1 2 8	00 11 21 22 31 32 41 98	___ ___

Codes for grade/year in ED5, ED10 and ED16					
Primary Primary 1 ....01 Primary 2 ....02 Primary 3 ....03 Primary 4 ....04 Primary 5 ....05 Primary 6 06	**Junior Secondary** JSS 1 ....01 JSS 2 ....02 JSS 3 03	**Vocational enterprise institutions programmes/Innovation Enterprise Institution** VEI/IEI 1 ....01 VEI/IEI 2 ....02 VEI/IEI 3 03	**Senior Secondary** SS1 ....01 SS2 ....02 SS3 03	**Secondary Technical** ST1 ....01 ST2 ....02 ST3 03	**Higher/Tertiary** NCE .... 01 AL/OND .... 02 Higher Technical/TTC .... 03 HND .... 04 BSc .... 05 Post Graduate 06

5 5

HOUSEHOLD CHARACTERISTICS		HC
HC1A. What is the religion of (*name of the head of the household from HL2*)?	CHRISTIANITY .... 1 ISLAM .... 2 TRADITIONAL .... 3 OTHER RELIGION (*specify*) _____ 6 NO RELIGION.. 7	
HC1B. What is the mother tongue or native language of (*name of the head of the household from HL2*)?	HAUSA .... 11 IGBO .... 12 YORUBA .... 13 FULANI .... 14 KANURI .... 15 IJAW .... 16 TIV .... 17 IBIBIO .... 18 EDO .... 19 OTHER LANGUAGE (*specify*) _____ 96	
HC2. To what ethnic group does (*name of the head of the household from HL2*) belong?	HAUSA .... 11 IGBO .... 12 YORUBA .... 13 FULANI .... 14 KANURI .... 15 IJAW .... 16 TIV .... 17 IBIBIO .... 18 EDO .... 19 OTHER LANGUAGE (*specify*) _____ 96	
HC3. How many rooms do members of this household usually use for sleeping?	NUMBER OF ROOMS .... __ __	

HC4. *Main material of the dwelling floor.*
 	
Record observation.
 	
If observation is not possible, ask the respondent to determine the material of the dwelling floor.
	NATURAL FLOOR
	  EARTH / SAND 11
	  DUNG 12
	RUDIMENTARY FLOOR
	  WOOD PLANKS.. 21
	  PALM / BAMBOO 22
	FINISHED FLOOR
	  PARQUET OR POLISHED WOOD 31
	  VINYL OR ASPHALT STRIPS 32
	  CERAMIC TILES.. 33
	  CEMENT... 34
	  CARPET (WALL-TO-WALL) 35
	
	OTHER (*specify*) _____ 96	

5 6

HC5. *Main material of the roof.*
 	
Record observation.
	NO ROOF..11
	NATURAL ROOFING
	   THATCH / PALM LEAF.............................12
	
	RUDIMENTARY ROOFING
	   RUSTIC MAT 21
	   PALM / BAMBOO 22
	   WOOD PLANKS...23
	   CARDBOARD 24
	FINISHED ROOFING
	   METAL / TIN 31
	   WOOD..32
	   CALAMINE / CEMENT FIBRE....................33
	   CERAMIC TILES...34
	   CEMENT..35
	   ROOFING SHINGLES.................................36
	
	OTHER (*specify*) _____ 96	

HC6. *Main material of the exterior walls.*
 	
Record observation.
	NO WALLS...11
	NATURAL WALLS
	   CANE / PALM / TRUNKS 12
	   DIRT..13
	RUDIMENTARY WALLS
	   BAMBOO WITH MUD...............................21
	   STONE WITH MUD 22
	   UNCOVERED ADOBE...............................23
	   PLYWOOD 24
	   CARDBOARD 25
	   REUSED WOOD...26
	FINISHED WALLS
	   CEMENT..31
	   STONE WITH LIME / CEMENT 32
	   BRICKS...33
	   CEMENT BLOCKS.....................................34
	   COVERED ADOBE 35
	   WOOD PLANKS / SHINGLES 36
	
	OTHER (*specify*) _____ 96	

HC7. Does your household have:		YES	NO	
[A] Non-mobile telephone?	NON-MOBILE TELEPHONE..............1		2	
[B] A radio?	RADIO 1		2	
[C] A sewing machine?	A SEWING MACHINE........................1		2	
[D] A clock?	A CLOCK..1		2	
[E] Generator?	GENERATOR 1		2	
[F] A manufactured bed?	A MANUFACTURED BED................1		2	
[G] A cushioned chair?	A CUSHIONED CHAIR 1		2	
[H] Bed?	BED...1		2	
[I] Cupboard?	CUPBOARD 1		2	
HC8. Does your household have electricity? *If yes, probe on what is the <u>main</u> source of electricity.*	YES, INTERCONNECTED GRID ....1 YES, OFF-GRID (GENERATOR/INVERTER/SOLAR).............2 NO..3			3⇨*HC10*
HC9. Does your household have the following items that run on electricity?		YES	NO	
[A] A television?	TELEVISION 1		2	
[B] A refrigerator?	REFRIGERATOR 1		2	
[C] Air conditioner?	AIR CONDITIONER 1		2	
[D] A fan?	A FAN...1		2	
[E] A water heater?	A WATER HEATER............................1		2	
[F] VCR, VCD, DVD?	VCR, VCD, DVD 1		2	
[G] A blender, mixer or food processor?	A BLENDER/MIXER 1		2	
[H] Electric iron?	ELECTRIC IRON.................................1		2	

HC10. Does any member of your household own:		YES	NO	
[A] A wristwatch?	WRISTWATCH 1		2	
[B] A bicycle?	BICYCLE 1		2	
[C] A motorcycle or scooter?	MOTORCYCLE / SCOOTER 1		2	
[D] An animal-drawn cart?	ANIMAL-DRAWN CART 1		2	
[E] A car, truck or van?	CAR / TRUCK / VAN 1		2	
[F] A boat with a motor?	BOAT WITH MOTOR 1		2	
[G] a tricycle (KEKE-NAPEP)?	TRICYCLE (KEKE-NAPEP) 1		2	
HC11. Does any member of your household have a computer or a tablet?	YES .... 1 NO 2			
HC12. Does any member of your household have a mobile telephone?	YES .... 1 NO 2			
HC13. Does your household have access to internet at home?	YES .... 1 NO 2			
HC14. Do you or someone living in this household own this dwelling? *If 'No', then ask:* Do you rent this dwelling from someone not living in this household? *If 'Rented from someone else', record '2'. For other responses, record '6' and specify.*	OWN .... 1 RENT .... 2 OTHER *(specify)* _____ 6			
HC15. Does any member of this household own any land that can be used for agriculture?	YES .... 1 NO 2			2⇨HC17
HC16. How many plots, acres or hectares of agricultural land do members of this household own? *First record the unit of measurement. If size is less than 1, record '00'. If 95 or more, record '95'. If unknown, record '998'.*	PLOTS ....1 ___ ___ ACRES ....2 ___ ___ HECTARES ....3 ___ ___ DK 998			
HC17. Does this household own any livestock, herds, other farm animals, or poultry?	YES .... 1 NO 2			2⇨HC19

5 9

HC18. How many of the following animals does this household have? [A] Milk cows or bulls? [B] Other cattle? [C] Horses, donkeys or mules? [D] Goats? [E] Sheep? [F] Chickens? [G] Pigs? [H] Camels? [I] Ducks? [K] Cultured fish? [L] Rabbits [M] Grass cutters? [N] Quails? *If none, record '00'. If 95 or more, record '95'.* *If unknown, record '98'.*	MILK COWS OR BULLS .... ___ ___ OTHER CATTLE............................... ___ ___ HORSES, DONKEYS OR MULES .... ___ ___ GOATS .... ___ ___ SHEEP... ___ ___ CHICKENS .... ___ ___ PIGS .... ___ ___ CAMELS... ___ ___ DUCKS .... ___ ___ CULTURED FISH .... ___ ___ RABBIT .... ___ ___ GRASS CUTTER................................ ___ ___ QUAIL .... ___ ___
HC19. Does any member of this household have a bank account?	YES .... 1 NO.. 2

6 0

HOUSEHOLD ENERGY USE		EU

EU1. In your household, what type of cookstove is <u>mainly</u> used for <u>cooking</u>?	ELECTRIC STOVE 01
	SOLAR COOKER 02
	LIQUEFIED PETROLEUM GAS (LPG)/
	   COOKING GAS STOVE 03
	PIPED NATURAL GAS STOVE.......................... 04
	BIOGAS STOVE 05
	LIQUID FUEL STOVE 06
	MANUFACTURED SOLID FUEL STOVE 07
	TRADITIONAL SOLID FUEL STOVE 08
	THREE STONE STOVE / OPEN FIRE 09
	
	OTHER (*specify*) _____ 96
	
	NO FOOD COOKED IN
	   HOUSEHOLD 97
		01⇨*EU5*
		02⇨*EU5*
		
		03⇨*EU5*
		04⇨*EU5*
		05⇨*EU5*
		06⇨*EU4*
		
		09⇨*EU4*
		
		96⇨*EU4*
		
		97⇨*EU9*

EU2. Does it have a chimney?	YES .... 1 NO .... 2 DK 8	
EU3. Does it have a fan?	YES .... 1 NO .... 2 DK 8	⇨*EU4*

EU4. What type of fuel or energy source is used in this cookstove?
 	
If more than one, record the main energy source for this cookstove.
	GASOLINE / DIESEL 02
	KEROSENE / PARAFFIN..................................... 03
	COAL / LIGNITE 04
	CHARCOAL 05
	WOOD 06
	CROP RESIDUE / GRASS /
	   STRAW / SHRUBS 07
	ANIMAL DUNG / WASTE 08
	PROCESSED BIOMASS (PELLETS) OR
	   WOODCHIPS 09
	SAWDUST 11
	
	OTHER (*specify*) _____ 96	

EU5. Is the cooking usually done in the house, in a separate building, or outdoors?
 	
If in main house, probe to determine if cooking is done in a separate room.
 	
If outdoors, probe to determine if cooking is done on veranda, covered porch, or open air.
	IN MAIN HOUSE
	   NO SEPARATE ROOM 1
	   IN A SEPARATE ROOM 2
	
	IN A SEPARATE BUILDING................................ 3
	
	OUTDOORS
	   OPEN AIR 4
	   ON VERANDA OR COVERED PORCH 5
	
	OTHER (*specify*) _____ 6	

6 1

EU9. At night, what does your household <u>mainly</u> use to <u>light</u> the household?	ELECTRICITY 01
	SOLAR LANTERN 02
	RECHARGEABLE FLASHLIGHT,
	    TORCH OR LANTERN 03
	BATTERY POWERED FLASHLIGHT,
	    TORCH OR LANTERN 04
	BIOGAS LAMP 05
	GASOLINE LAMP 06
	
	KEROSENE OR PARAFFIN LAMP 07
	CHARCOAL 08
	WOOD 09
	CROP RESIDUE / GRASS /
	    STRAW / SHRUBS 10
	ANIMAL DUNG / WASTE 11
	OIL LAMP 12
	CANDLE 13
	
	OTHER (*specify*) _____ 96
	
	NO LIGHTING IN HOUSEHOLD 97	

6 2

FOOD INSECURITY EXPERIENCE (COVID-19 VERSION/1 MONTH VERSION)		FE
FE1. Now I would like to ask you some questions about food. During the last 1 year, was there a time when you or others in your household worried about not having enough food to eat because of a lack of money or other resources?	YES .... 1 NO .... 2 DK 8	2⇨*FE2*
FE1A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE1B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	
FE2. During the last 1 year, was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?	YES .... 1 NO .... 2 DK 8	2⇨*FE3*
FE2A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE2B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	
FE3. During the last 1 year, was there a time when you or others in your household ate only a few kinds of foods because of a lack of money or other resources?	YES .... 1 NO .... 2 DK 8	2⇨*FE4*
FE3A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE3B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	
FE4. During the last 1 year, was there a time when you or others in your household had to skip a meal because there was not enough money or other resources to get food?	YES .... 1 NO .... 2 DK 8	2⇨*FE5*
FE4A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	

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FE4B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	
FE5. During the last 1 year, was there a time when you or others in your household ate less than you thought you should because of a lack of money or other resources?	YES .... 1 NO .... 2 DK 8	2⇨*FE6*
FE5A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE5B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	
FE6. During the last 1 year, was there a time when your household ran out of food because of a lack of money or other resources?	YES .... 1 NO .... 2 DK 8	2⇨*FE7*
FE6A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE6B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	2⇨*FE7* 8⇨*FE7*
FE6C. How often did this happen during the last 1 month? Would you say: rarely, sometimes or often? *Probe:* Would you say 1-2 times, 3-10 times or more than 10 times during the last 1 month?	RARELY (1 OR 2 TIMES)................................. 1 SOMETIMES (3-10 TIMES).............................. 2 OFTEN (MORE THAN 10 TIMES) 3	
FE7. During the last 1 year, was there a time when you or others in your household were hungry but did not eat because there was not enough money or other resources for food?	YES .... 1 NO .... 2 DK 8	2⇨*FE8*
FE7A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO .... 2 DK 8	
FE7B. Did this happen in the last 1 month?	YES .... 1 NO .... 2 DK 8	2⇨*FE8* 8⇨*FE8*
FE7C. How often did this happen during the last 1 month? Would you say: rarely, sometimes or often? *Probe:* Would you say 1-2 times, 3-10 times or more than 10 times during the last 1 month?	RARELY (1 OR 2 TIMES)................................. 1 SOMETIMES (3-10 TIMES).............................. 2 OFTEN (MORE THAN 10 TIMES) 3	

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FE8. During the last 1 year, was there a time when you or others in your household went without eating for a whole day because of a lack of money or other resources?	YES .... 1 NO.. 2 DK.. 8	2⇨*End*
FE8A. Was this specifically due to the COVID-19 crisis?	YES .... 1 NO.. 2 DK.. 8	
FE8B. Did this happen in the last 1 month?	YES .... 1 NO.. 2 DK.. 8	2⇨*End* 8⇨*End*
FE8C. How often did this happen during the last 1 month? Would you say: rarely, sometimes or often? *Probe:* Would you say 1-2 times, 3-10 times or more than 10 times during the last 1 month?	RARELY (1 OR 2 TIMES)................................. 1 SOMETIMES (3-10 TIMES)............................. 2 OFTEN (MORE THAN 10 TIMES) 3	

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QUESTIONNAIRE FOR CHILDREN AGE 5-17
Nigeria Multiple Indicator Cluster Survey, 2021

nbs

5-17 CHILD INFORMATION PANEL		FS
FS1. Cluster number: ___ ___ ___ ___	**FS2**. Household number: ___ ___	
FS3. Child's name and line number: NAME _____ ___ ___	**FS4**. Mother's / Caretaker's name and line number: NAME _____ ___ ___	
FS5. Interviewer's name and number: NAME _____ ___ ___	**FS6**. Supervisor's name and number: NAME _____ ___ ___	
FS7. Day / Month / Year of interview: ___ ___ / ___ ___ / 2 0 2 1	**FS8**. Record the time:	HOURS : MINUTES ___ ___ : ___ ___

Check respondent's age in HL6 in LIST OF HOUSEHOLD MEMBERS, HOUSEHOLD QUESTIONNAIRE: If age 15-17, verify that adult consent for interview is obtained (HH33 or HH39) or not necessary (HL20=90). If consent is needed and not obtained, the interview must not commence and '06' should be recorded in FS17. The respondent must be at least 15 years old. In the very few cases where a child age 15-17 has no mother or caretaker identified in the household (HL20=90), the respondent will be the child him/herself.		
FS9. Check completed questionnaires in this household: Have you or another member of your team interviewed this respondent for another questionnaire?	YES, INTERVIEWED ALREADY......1 NO, FIRST INTERVIEW 2	1⇨FS10B 2⇨FS10A
FS10A. Hello, my name is (*your name*). We are from National Bureau of Statistics. We are conducting a survey about the situation of children, families and households. I would like to talk to you about (*child's name from FS3*)'s health and well-being. This interview will take about **30** minutes. All the information we obtain will remain strictly confidential and anonymous. If you wish not to answer a question or wish to stop the interview, please let me know. May I start now?	**FS10B**. Now I would like to talk to you about (*child's name from FS3*)'s health and well-being in more detail. This interview will take about **30** minutes. Again, all the information we obtain will remain strictly confidential and anonymous. If you wish not to answer a question or wish to stop the interview, please let me know. May I start now?	
YES .... 1 NO / NOT ASKED 2	1⇨CHILD'S BACKGROUND Module 2⇨FS17	

FS17. Result of interview for child age 5-17 years *Codes refer to the respondent.* *Discuss any result not completed with Supervisor.*	COMPLETED...01 NOT AT HOME...02 REFUSED...03 PARTLY COMPLETED...04 INCAPACITATED 　(specify) _____ 05 NO ADULT CONSENT FOR MOTHER/ 　CARETAKER AGE 15-17 ....06 OTHER (specify) _____ 96

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CHILD'S BACKGROUND		CB
CB1. *Check the respondent's line number (FS4) in 5-17 CHILD INFORMATION PANEL and the respondent to the HOUSEHOLD QUESTIONNAIRE (HH47): Is this respondent also the respondent to the HOUSEHOLD QUESTIONNAIRE?*	YES, RESPONDENT IS THE SAME, FS4=HH47 ....1 NO, RESPONDENT IS NOT THE SAME, FS4≠HH47 2	1⇨*CB11*

CB2. In what month and year was (*name*) born?
 	
 Month and year <u>must</u> be recorded.
	DATE OF BIRTH
	   MONTH................................... __ __
	
	   YEAR ....2 0 __ __	

CB3. How old is (*name*)? *Probe:* How old was (*name*) at (his/her) last birthday? *Record age in completed years.* *If responses to CB2 and CB3 are inconsistent, probe further and correct.*	AGE (IN COMPLETED YEARS) .... __ __	
CB4. Has (*name*) ever attended school or any early childhood education programme?	YES ....1 NO 2	2⇨*CB11*
CB5. What is the highest level and grade or year of school (*name*) has ever attended?	EARLY CHILDHOOD EDUCATION .... 000 PRIMARY ....**11** __ __ JUNIOR SECONDARY ....**21** __ __ VEI/IEI ....**22** __ __ SENIOR SECONDARY ....**31** __ __ SECONDARY TECHNICAL ....**32** __ __ HIGHER/ TERTIARY ....**41** __ __	000⇨*CB7*
CB6. Did (he/she) ever complete that (grade/year)?	YES ....1 NO 2	
CB7. At any time during the current (2020-2021) school year did (*name*) attend school or any early childhood education programme?	YES ....1 NO 2	2⇨*CB9*
CB8. During the current school year, which level and grade or year is (*name*) <u>attending</u>?	EARLY CHILDHOOD EDUCATION .... 000 PRIMARY ....**11** __ __ JUNIOR SECONDARY ....**21** __ __ VEI/IEI ....**22** __ __ SENIOR SECONDARY ....**31** __ __ SECONDARY TECHNICAL ....**32** __ __ HIGHER/ TERTIARY ....**41** __ __	
CB9. At any time during the previous school year did (*name*) attend school or any early childhood education programme?	YES ....1 NO 2	2⇨*CB11*
CB10. During that previous school year, which level and grade or year did (*name*) <u>attend</u>?	EARLY CHILDHOOD EDUCATION .... 000 PRIMARY ....**11** __ __ JUNIOR SECONDARY ....**21** __ __ VEI/IEI ....**22** __ __ SENIOR SECONDARY ....**31** __ __ SECONDARY TECHNICAL ....**32** __ __ HIGHER/ TERTIARY ....**41** __ __	

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CB11. Is (*name*) covered by any health insurance?	YES ....1 NO 2	2⇨*End*

CB12. What type of health insurance is (*name*) covered by?
 	
Record all mentioned.
	MUTUAL HEALTH ORGANIZATION /
	   COMMUNITY-BASED HEALTH
	   INSURANCE...A
	HEALTH INSURANCE THROUGH
	   EMPLOYER .... B
	SOCIAL SECURITY (NATIONAL HEALTH
	   INSURANCE SCHEME, STATE HEALTH
	   INSURANCE SCHEME).............................. C
	OTHER PRIVATELY PURCHASED
	   COMMERCIAL HEALTH INSURANCE ...D
	
	OTHER (*specify*) _____ X	

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CHILD LABOUR		CL
CL1. Now I would like to ask about any work (*name*) may do. Since last (*day of the week*), did (*name*) do any of the following activities, even for only one hour? [A] Did (*name*) do any work or help on (his/her) own or the household's plot, farm, food garden or looked after animals? For example, growing farm produce, harvesting, or feeding, grazing or milking animals? [B] Did (*name*) help in a family business or a relative's business with or without pay, or run (his/her) own business? [C] Did (*name*) produce or sell articles, handicrafts, clothes, food or agricultural products? [X] Since last (*day of the week*), did (*name*) engage in any <u>other</u> activity in return for income in cash or in kind, even for only one hour?	YES NO WORKED ON PLOT, FARM, FOOD GARDEN, LOOKED AFTER ANIMALS ....1 2 HELPED IN FAMILY / RELATIVE'S BUSINESS / RAN OWN BUSINESS ....1 2 PRODUCE / SELL ARTICLES / HANDICRAFTS / CLOTHES / FOOD OR AGRICULTURAL PRODUCTS.........1 2 ANY OTHER ACTIVITY 1 2	
CL2. *Check CL1, [A]-[X]:*	AT LEAST ONE 'YES' ....1 ALL ANSWERS ARE 'NO' 2	2⇨CL7
CL3. Since last (*day of the week*) about how many hours did (*name*) engage in (this activity/these activities), in total? *If less than one hour, record '00'.*	NUMBER OF HOURS.................................__ __	
CL4. (Does the activity/Do these activities) require carrying heavy loads?	YES...1 NO 2	
CL5. (Does the activity/Do these activities) require working with dangerous tools such as knives and similar or operating heavy machinery?	YES...1 NO 2	

CL6. How would you describe the work environment of (*name*)?		
[A] Is (he/she) exposed to dust, fumes or gas?	YES..1 NO 2	
[B] Is (he/she) exposed to extreme cold, heat or humidity?	YES..1 NO 2	
[C] Is (he/she) exposed to loud noise or vibration?	YES..1 NO 2	
[D] Is (he/she) required to work at heights?	YES..1 NO 2	
[E] Is (he/she) required to work with chemicals, such as pesticides, glues and similar, or explosives?	YES..1 NO 2	
[X] Is (*name*) exposed to other things, processes or conditions bad for (his/her) health or safety?	YES..1 NO 2	
CL7. Since last (*day of the week*), did (*name*) fetch water for household use?	YES..1 NO 2	2⇨*CL9*
CL8. In total, how many hours did (*name*) spend on fetching water for household use, since last (*day of the week*)? *If less than one hour, record '00'.*	NUMBER OF HOURS..................... __ __	
CL9. Since last (*day of the week*), did (*name*) collect firewood for household use?	YES..1 NO 2	2⇨*CL11*
CL10. In total, how many hours did (*name*) spend on collecting firewood for household use, since last (*day of the week*)? *If less than one hour, record '00'.*	NUMBER OF HOURS..................... __ __	
CL11. Since last (*day of the week*), did (*name*) do any of the following for this household?	YES NO	
[A] Shopping for the household?	SHOPPING FOR HOUSEHOLD 1 2	
[B] Cooking?	COOKING 1 2	
[C] Washing dishes or cleaning around the house?	WASHING DISHES / CLEANING HOUSE................1 2	
[D] Washing clothes?	WASHING CLOTHES 1 2	
[E] Caring for children?	CARING FOR CHILDREN 1 2	
[F] Caring for someone old or sick?	CARING FOR OLD / SICK 1 2	
[X] Other household tasks?	OTHER HOUSEHOLD TASKS 1 2	

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CL12. *Check CL11, [A]-[X]:*	AT LEAST ONE 'YES' ....1 ALL ANSWERS ARE 'NO' 2	2⇨*End*
CL13. Since last (***day of the week***), about how many hours did (***name***) engage in (this activity/these activities), in total? *If less than one hour, record '00'*	NUMBER OF HOURS................................... __ __	

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PARENTAL INVOLVEMENT		PR
PR1. *Check CB3: Child's age?*	AGE 5-6 YEARS...1 AGE 7-14 YEARS..2 AGE 15-17 YEARS..3	1⇨End 3⇨End
PR2. At the end of this interview, I will ask you if I can talk to (*name*). If (he/she) is close, can you please ask (him/her) to stay here. If (*name*) is not with you at the moment, could I ask that you now arrange for (him/her) to return? If that is not possible, we will later discuss a convenient time for me to call back.		
PR3. Excluding school text books and holy books, how many books do you have for (*name*) to read at home?	NONE..00 NUMBER OF BOOKS ....0___ TEN OR MORE BOOKS...............................10	
PR4. *Check CB7: In the current school year, did the child attend school or any early childhood education programme?* *Check ED9 in the EDUCATION Module in the HOUSEHOLD QUESTIONNAIRE for child if CB7 was not asked.*	YES, CB7/ED9=1 ....1 NO, CB7/ED9=2 OR BLANK 2	2⇨End
PR5. Does (*name*) ever have homework?	YES ....1 NO ....2 DK 8	2⇨PR7 8⇨PR7
PR6. Does anyone help (*name*) with homework?	YES ....1 NO ....2 DK 8	
PR7. Does (*name*)'s school have a school governing body in which parents can participate such as a parent teacher association or PTA, or a school-based management committee or SBMC?	YES ....1 NO ....2 DK..8	2⇨PR10 8⇨PR10
PR8. In the last 12 months, have you or any other adult from your household attended a meeting called by this school governing body?	YES ....1 NO..2 DK 8	2⇨PR10 8⇨PR10
PR9. During any of these meetings, was any of the following discussed: [A] A plan for addressing key education issues faced by (*name*)'s school? [B] School budget or use of funds received by (*name*)'s school?	YES NO DK PLAN FOR ADRESSING SCHOOL'S ISSUES.........................1 2 8 SCHOOL BUDGET 1 2 8	
PR10. In the last 12 months, have you or any other adult from your household received a school or student report card, report sheet, or online report for (*name*)?	YES ....1 NO ....2 DK..8	

PR11. In the last 12 months, have you or any adult from your household gone to (*name*)'s school for any of the following reasons?	YES NO DK	
[A] A school celebration or a sport event?	CELEBRATION OR SPORT EVENT 1 2 8	
[B] To discuss (*name*)'s progress with (his/her) teachers?	TO DISCUSS PROGRESS WITH TEACHERS........................... 1 2 8	
PR12. In the last 12 months, has (*name*)'s school been closed on a school day due to any of the following reasons:	YES NO DK	
[A] COVID-19?	COVID--19.. 1 2 8	
[B] Natural disasters, such as flood, cyclone, and epidemics other than COVID-19?	NATURAL DISASTERS 1 2 8	
[C] Man-made disasters, such as fire, building collapse, riots, insecurity or similar?	MAN-MADE DISASTERS 1 2 8	
[D] Teachers strike or lecturers strike?	TEACHER STRIKE 1 2 8	
[X] Other?	OTHER 1 2 8	
PR13. In the last 12 months, was (*name*) unable to attend class due to (his/her) teacher being absent?	YES .... 1 NO .... 2 DK 8	
PR14. *Check PR12[C] and PR13: Any 'Yes' recorded?*	YES, PR12[D]=1 OR PR13=1 .... 1 NO... 2	2⇨*End*
PR15. When (*teacher strike or lecturers*) happened did you or any other adult member of your household contact any school officials or school governing body representatives?	YES .... 1 NO .... 2 DK.. 8	

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