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The Determinants of Child Labor Participation in Indonesia: A Multilevel Approach

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Abstract

The existence of child labor is an indication that children's rights have not been protected and fulfilled. This study aims to analyze the individual, household socio-economic, and regional contextual factors that influence child labor participation in Indonesia. By finding various factors that cause child labor, the study contributes to helping policymakers take appropriate steps in eliminating child labor. The study uses data from Statistics Indonesia's National Socioeconomic Survey of March 2020, covering 345,000 sample households spread across 34 provinces and 514 districts/municipalities throughout Indonesia. This paper also includes other secondary data from Statistics Indonesia's official publications for regional contextual variables. Using multilevel binary logistic analysis, the results of this study indicate that individual, household socio-economic, and regional contextual factors have effects on child labor participation in Indonesia. One significant finding

of this study is that 73% of the variation in child labor force participation in Indonesia is influenced by differences in household socio-economic characteristics.

Keywords: child labor, multilevel binary logistic, child's protection, poverty, children's rights

1. Introduction

Child labor is a global phenomenon which occurs not only in developing countries but also in developed countries. In its report, the International Labor Organization (ILO) noted that there were 264 million children in employment in 2012. The number then decreased to 218 million people in 2016. As shown in Table 1, the percentage of child labor varies between regions at the global level. Africa recorded the highest percentage of working children at 27.10%. Meanwhile, the Arab States had the lowest percentage at 4.60%.

Table 1. Regional Prevalence of Child Labor, 2016

No	Region	Children in Employment	
		Number (000s)	Prevalence (%)
1	Africa	99.417	27.10
2	Asia and the Pacific	90.326	10.70
3	Americas	17.725	8.80
4	Europe and Central Asia	8.773	6.50
5	Arab States	1.868	4.60

Source: International Labour Organization (2017).

Although child labor occurs globally, there are different motives between working children who live in developed and developing countries. For instance, in developed countries, parents encourag their children to find a job for earning pocket money and learning to live independently (Bellamy, 1997). On the other hand, working children in developing countries are asked

to help with family income. This difference makes child labor more prominent in developing countries than in developed countries. For this reason, the ILO issued ILO Convention No. 138 concerning Minimum Age for Admission to Work and ILO Convention No. 182 on the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor. Rosidah (2012) declared that these conventions are important international instruments because employing children is a violation of human rights.

The Indonesian government is also committed to tackling child labor, especially the worst forms of child labor, by issuing various regulations. This commitment is also recorded in the ratification of the ILO Convention No. 138 concerning the Minimum Age for Children to Work through Indonesian Law No. 20 of 1999 and ILO Convention No. 182 concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor through Law No. 1 of 2000. In addition, Article 68 of Law Number 13 Year 2003 concerning Manpower prohibited employers from employing children. According to Endrawati (2011), these rules are in line with efforts to protect children and their rights, which are guaranteed in Law Number 39 of 1999 concerning Human Rights. Article 64 states that "every child has the right to obtain protection from exploitative activities and any work that endangers him so that it can interfere with his education, physical health, morals, social life, and mental spirituality." The article provides legal protection of children from an economic point of view, including working.

Indonesian Law Number 23 of 2002 concerning Child Protection is also a regulation that protects and ensures children's welfare by providing guarantees for fulfilling children's rights. It is critical to note that no individual or party can take away these rights. Faridah and Afiyani (2019) consider child labor to be economic exploitation. Children must be protected from exploitation because it protects their right to survival. Their time should be used according to their physical, psychological, intellectual, and social development to achieve their goals (Tjahjanto, 2008). Apart from violating children's rights, working children also harm their physical and psychological

well-being. Furthermore, it can even disrupt their ability to work towards a future better life (Usman & Nachrowi, 2004). In fact, childhood is a critical period for growth and development. When this period is misused, it cannot be returned (Irwanto, 2000).

Even though various regulations have been issued, it does not mean that child labor has disappeared. The National Labor Force Survey conducted by Statistics Indonesia shows that 6.35% of children aged 10-17 years worked in 2019. The percentage of working children in Indonesia has fluctuated, as seen in Figure 1. In 2012, the percentage of working children aged 10-17 years reached 9.43%. This rate continued to decline until 2015, where the percentage of working children aged 10-17 years was 5.99%. However, it increased again until 2017, and then fell slightly until 2019. Although child labor has decreased in recent years, it still exists. The country is still unable to fulfill its obligations to protect children's rights, thus the government needs to put more effort into manifesting Indonesia's vision to be free of child labor by 2022.

Figure 1. The Percentage of Working Children Aged 10-17 in Indonesia, 2012-2019.

Source: *Ministry of Women Empowerment and Child Protection; Statistics Indonesia* (2017), (2018), (2019) and *Ministry of Women Empowerment and Child Protection* (2020)

Child labor is a serious problem because it is closely related to exploitation and dangerous work. In addition, it impedes children's physical, psychological, and social development, as well as depriving children of the opportunity to obtain an education (Ray, 2000; Wahyuni, 2017). Bellamy (1997) finds that children who work at an early age usually come from low-income families with low education. Therefore, it can be assumed that work can prevent children from gaining the full benefits of school and hence can lead them to long-term poverty and low-wage employment.

In Indonesia, poverty is also the main cause of working children. Employing children for some people is a necessity, especially for the poor (Usman & Nachrowi, 2004). Iryani and Priyarsono (2013) calculated the severity of child labor exploitation in Indonesia, and shows that DKI Jakarta, Banten, and West Java have become provinces with severe child labor exploitation, where exploitation is defined in the National Labor Force Survey by working hours, school participation, and wages. According to Purwanti (2014), there is a difference between boys and girls on the decision to work or go to school. These two activities are also influenced by the gender of the household head, parental education, and income. Location of residence only affects the intensity of working children and not children's education. Indrasari (2019) concludes that there is a relationship between land and working children in Indonesia, especially in agricultural families. The results of this study confirm that the wealth paradox and luxury axiom apply to working children in Indonesia, especially to agricultural families living in rural areas. In other words, the number of working hours for children in families with larger landholdings will be more than for children in families with smaller landholdings, given that consumption expenditure per capita is the same.

This paper aims to analyze individual, household socio-economic, and regional contextual factors that influence child labor participation in Indonesia. The findings on various factors that are related to child labor can help policymakers to take appropriate steps needed to abolish child labor.

Children are the nation's next generation and have a strategic role to nourish the existence of the nation in the future. Therefore, children's rights need to be guaranteed and protected to allow them to access the broadest set of possible opportunities so that they can grow and develop optimally, physically, mentally, and socially.

This paper consists of four main parts. Section 2 reviews key studies in the area of child labor. In Section 3 presents the data and methodology to elaborate on how we collect and analyze the data. Key results are summarized in Section 4, followed by a detailed discussion of to what extent the results are relevant to previous studies. Finally, conclusions are presented in Section 5.

2. Literature Review

According to the ILO (2008), to find out why children work, it is necessary to know the parents' reasons to involve their children in work rather than school. Children have little power to control their allocation of time. Therefore, it is necessary to see the individual, household, and regional contextual factors that influence the causes of child labor.

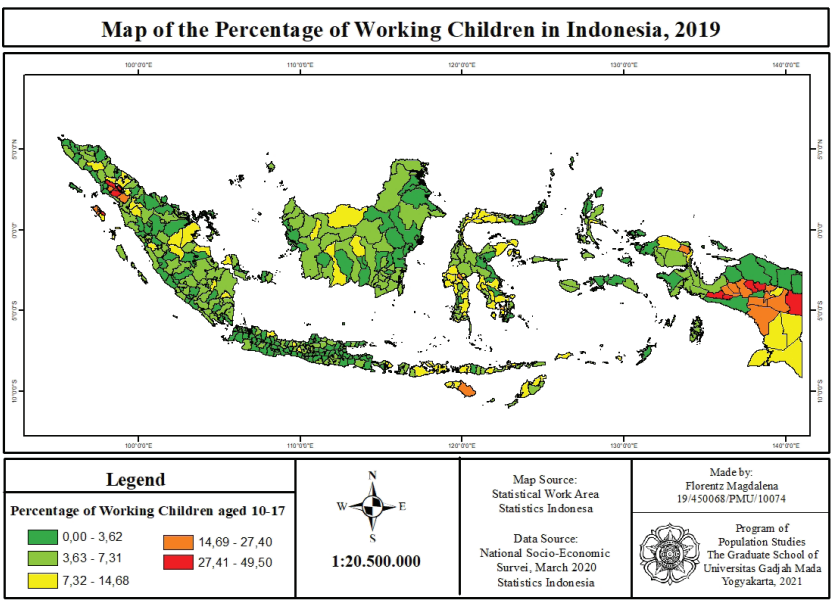
At the individual level, Becker (1965) proposes a time allocation theory that explains an individual's decision to work or to take leisure time. This behavior is based on the concept of opportunity cost, which in this framework is wages. Individuals will not have income if they choose not to work. If the opportunity cost for leisure time increases, it will cause more time to be diverted to work (Herlina, 2016). The value of a child's time depends on the child's age (Edmonds, 2003). Older children can earn higher wages and be more productive in domestic work. For younger children, the chances of returning to education are quite high. Thus, they can spend all or most of their time in school. However, at some point, older children tend to have less time allocated to studying as job opportunities gradually increase. Basu (1999) also shows that child labor decisions are related to bargaining

between parents and children within the household.

Various empirical studies show a close relationship between child labor and poverty, where child labor is both a cause and a consequence of poverty (Aqil, 2012; Blunch & Verner, 2000; Ray, 2000; Salmon, 2005). Narayan, Pritchett, and Kapoor (2009) declare that the poor are good fighters and find various ways to get out of poverty, including relying on their physical strength. White (1991) finds that the survival strategy adopted by poor households in Java is a passive approach, whereby they maximize the use of labor in the household, followed by assets and limited capital. Similarly, a study by Sulistyastuti and Faturochman (2000) shows that children contribute to the household economy in addition to the household head and wife in order to survive.

Jensen (2000) reveals that the decision for children to enter the labor market is also influenced by factors outside the household, or so-called regional contextual factors. Edmonds and Thevenon (2019) add that child labor is a heterogeneous phenomenon, resulting in different numbers across regions within the country. According to Figure 2, the percentage of working children varies by regency/municipality in Indonesia. Regencies and municipalities that have a high percentage of working children are indicated in red. The highest percentage of working children aged 10-17 years is in Tolikara regency of Papua province, reaching 49.50%. Meanwhile, the percentage of working children aged 10-17 years in Java Island ranges from 0.25 to 5.89%.

Figure 2. Distribution of the Percentage of Working Children aged 10-17 by Regency/ Municipality in Indonesia, 2019



Source: Adapted from the National Socio-Economic Survey 2019

Researchers from various countries have carried out multiple studies on child labor. For example, Webbink, Smits, and de Jong (2013) study the determinants of child labor aged 8-13 years in 18 developing countries using demographic and health survey data. Using two-level binary logistic analysis, they show that resources and structural characteristics affect child labor at the household level. However, cultural characteristics have no effect. For regional contextual factors, more children work in rural areas. Webbink, Smits, and de Jong (2015) analyze the determinants of paid child labor in 16 low-income countries in Africa and Asia using a two-level Tobit Regression. Utama and Handayani (2020) explore child labor from a demand and supply point of view. They conducted a study on labor in Indonesia using the National Socio-Economic survey and the Village Potential data in 2018. Using binary

logistic regression, their research shows that the presence of Micro Small Industries (IMK) and poverty status play roles in children's employment.

Cahyani (2019) examines individual, household, and contextual factors that affect child labor aged 5-17 years in Indonesia using the 2017 National Labor Force Survey data. These data were processed using multilevel binary logistic analysis. The research suggests that individual factors, including age, gender, and children's education, in addition to household factors, including the residence area, the number of household members, gender of household head, education level of household head, main occupation, and status of household head's occupation, contribute to child labor.

Although this study has similar goals as previous studies, different concepts and definitions of child labor and variables are used in the analysis. Cahyani (2019) used children aged 5-17 years who work and are involved in hazardous work as indicated by working hours. Pakistan, for example, defines child labor as "paid work," and Vietnam as "work that is dangerous to the future and well-being of children" (Edmonds, 2007). The concept of child labor used in this study is working children, for example those aged 18 years and under and engaged in any activity that falls within the National Accounts System (SNN) production limit for at least one hour during the reference week. By capturing all working children, all working children can be described without exception. In addition, this study uses the regency/municipality as the contextual region to analyze differences at the regional level. Various previous studies on child labor use regional contextual variables with estimation at the provincial level. By using regional data at the regency/municipality level, the level of regional characteristics that can be captured is more accurate than using only the provincial level.

3. Data and Methodology

3.1 Research Design

At the end of 2008, the 18th International Conference of Labor Statistics (ICLS) produced a definition of working children. The concept of working children is "those who are involved in activities that fall within the production limit in the National Accounts System (SNN) for at least one hour during the reference period." This concept of child labor is used in this paper and is consistent with the concept used by Statistics Indonesia, which defines labor as an activity of doing work carried out by someone with the intention of earning or helping to earn at least one hour of income or profit continuously in the past week. This work activity includes those who are currently working and those who have a job, but during the past week they are temporarily unemployed. Further, the term "labor" refers to Law No. 13 of 2003 concerning Manpower Article 1 Paragraph 2. It is defined as anyone who can do work to produce goods and/or services to meet their own needs and community. The present study also limits the term "children" to those under 18 years old, in accordance with Law Number 23 of 2002 concerning Child Protection. However, the employment data collection in the National Socio-Economic Survey uses an age limit of 10 years and above. Therefore, the concept of children used here refers to ages 10-17 years.

This quantitative study uses primary survey data to compile the dependent and independent variables at the individual and household levels. The data were gathered from Statistics Indonesia's 2020 National Socio-Economic Survey. The sample includes 194,267 children aged 10-17 years. The children in the sample come from 142,975 households spread across 514 regencies/municipalities. Secondary data is also obtained from Statistics Indonesia's official publications and are used to compile independent variables at the regional level. See Table A.1 in the appendix for a description of the variables used in the analysis.

3.2 Estimation Techniques

To achieve the research objectives, we employ inferential analysis using a multilevel binary logistic method. In particular, the analysis uses a three-level regression model (level 1: individual; level 2: household; and level 3: regency/municipality). Such analysis is intended to estimate the effects of predictors on the risk of child labor force participation in Indonesia. Goldstein (1995) points out that multilevel analysis is very suitable to be applied to hierarchical and grouped data, where sampling is performed in multiple stages. Therefore, the present study uses data from the 2020 National Socio-Economic Survey. One of the reasons is that the survey's sampling was selected using multistage stratified cluster sampling to produce hierarchically structured data.

In hierarchical data, a high-level group may affect the units studied at the lower level (Hox, 2010). Units in the same group tend to have similar characteristics. Hence, the units of observation in the same group are generally not completely independent. In fact, ignoring hierarchical data structures can cause serious problems (Guo & Zhao, 2000; Hox, 2010). These problems are bias in parameter estimation and bias in the standard errors. Then, a multilevel analysis should be used to examine the effect of independent variables on dependent variables at more than one level. Binary logistic multilevel analysis is one example because the dependent variable in this study is discrete data with two categories: working children and non-working children. Hox (2010) states that multilevel analysis can be used on various dependent variables with any data scale. Multilevel data processing is carried out using the GLLAMM (Generalized Linear Latent and Mixed Models) module, a special data processing program for multilevel analysis within the STATA software.

The model based on multilevel logistic regression analysis is as follows:

First Level:

$$Y_{tij} = ln\frac{\pi_{tij}}{1-\pi_{tij}} = \beta_{0ij} + \sum_{p=1}^{P} \beta_{pij} X_{ptij} + \varepsilon_{tij} + u_{0ij} + w_{00j} \quad (1)$$

Y_{tij} = dependent variable for the t-th unit at level 1 in the i-unit at level 2 and the j-th unit at level 3

β_{0ij} = intercept for the i-th unit at level 2 and the j-th unit at level 3

β_{pij} = fixed effect of the p-th independent variable for the I-th unit at level 2 in the j-th unit at level 3

X_{pij} = the p-th independent variable at level 1 for the t-th unit at level 1 in the i-th unit at level 2 and the j-th unit at level 3

ε_{tij} = residuals for the t-th unit at level 1 in the i-th unit at level 2 and the j-th unit at level 3, are assumed to be distributed N (0, σ_{ε}^2)

u_{0ij} = residual for the i-th at level 2 and the j-th unit at level 3 (residual level 2), assumed to be distributed N (0, σ_{ε}^2)(0, σ_{ε}^2)

w_{00j} = residual for the j-th unit at level 3 (residual level 3), it is assumed distributed N (0, σ_{ε}^2)

Second Level:

$$Y_{tij} = ln\frac{\pi_{tij}}{1-\pi_{tij}} = \gamma_{000} + \sum_{p=1}^{P} \gamma_{p00} X_{ptij} + \sum_{q=1}^{Q} \gamma_{0q0} V_{qij} + \varepsilon_{tij} + u_{0ij} + w_{00j} \quad (2)$$

Y_{tij} = summation of fixed parameters and random parameters

γ_{000} = fixed intercept

V_{qij} = the q-th independent variable at level 2 and the j-th unit at level 3

γ_{p00} and γ_{0q0} = fixed effect of the variables in the model to be estimated.

Third Level:

$$Y_{tij} = ln\frac{\pi_{tij}}{1-\pi_{tij}} = Z_{000} + \sum_{p=1}^{P} Z_{p00}\, X_{ptij} + \sum_{q=1}^{Q} Z_{0q0}\, V_{qij} + \sum_{k=1}^{K} Z_{00k}\, S_{qj} + \varepsilon_{tij} + u_{0ij} + w_{00j} \quad (3)$$

Y_{tij} = the sum of fixed and random parameters.

Z_{000} = fixed intercept

S_{qj} = the k-th independent variable at level 3 and the j-th unit at level 3

Z_{p00}, Z_{0q0}, and Z_{00k} = fixed effect of the variables in the model to be estimated.

Based on the explanation and elaboration of the equation models above, the final model used in this study is as follows:

$$\begin{aligned} Y_{tij} = {} & Z_{000} + Z_{100}umur\_anak + Z_{200}jk\_anak + Z_{300}didik\_anak \\ & + Z_{010}didik\_krt + Z_{020}jk\_krt + Z_{030}lapus\_krt \\ & + Z_{040}bantuan\_ruta + Z_{050}jmlhart\_ruta + Z_{060}daerah\_ruta \\ & + Z_{001}miskin\_area + Z_{002}upah\_area + Z_{003}rls\_area \\ & + Z_{004}tani\_area + \varepsilon_{tij} + u_{0ij} + w_{00j} \end{aligned} \quad (4)$$

Where :

Z_{000} = intercept

umur_anak = age of child

jk_anak = gender of child

didik_anak = The educational level of the child

didik_krt = The educational level of the household head

jk_krt = gender of household head

lapus_krt = The main occupation of the household head

bantuan_ruta = Household access to social protection programs

jmlhart_ruta = Number of the household member

daerh_ruta = The residential area of the household

rls_area = mean years of schooling

miskin_area = poverty rate

upah_area = Regency/Municipality Minimum Wage

tani_area = Agriculture's share of gross domestic regional product (GDRP)

Hox (2010) states that in the multilevel model, the variation of the dependent variable can be explained by the differences in characteristics between groups of independent variables. Variations in the dependent variable can be determined by using the intraclass correlation coefficient (ICC). The ICC value ranges from 0 to 1, where the closer the value is to one, it can be said that multilevel analysis is suitable to be applied to the data because the variation in the dependent variable due to individual variations between groups of independent variables is very large and the effect of grouping the data is clearly visible.

The formula for calculating the intraclass correlation coefficient for level 2 according to Hox (2010) is as follows:

$$\rho = \frac{\sigma^2_{u_{oij}}}{\sigma^2_{\varepsilon_{tij}} + \sigma^2_{u_{oij}} + \sigma^2_{w_{ooj}}} \quad (5)$$

The calculation formula for level 3 is:

$$\rho = \frac{\sigma^2_{w_{ooj}}}{\sigma^2_{\varepsilon_{tij}} + \sigma^2_{u_{oij}} + \sigma^2_{w_{ooj}}} \quad (6)$$

The variances are defined as:

$\sigma^2_{u_{oij}}$ = residual variance at the level of household socioeconomic factors

$\sigma^2_{w_{ooj}}$ = residual variance at the regional contextual factor level

$\sigma^2_{\varepsilon_{tij}}$ = residual variance at the individual factor level.

In the present study, the parameter interpretation of the binary logistic

multilevel analysis is carried out by looking at the odds ratio. Based on the value of the odds ratio ($\psi = \exp(\beta j)$), the risk of the tendency to experience certain events from one category to another in the variable can be seen. In other words, the occurrence of a successful event (observation x = 1) that is several times that of an unsuccessful event (observation x = 0) can be identified. Following that, the data were analyzed using STATA version 15.0 statistical software. The results of the multivariate analysis were reported as adjusted odds ratios with p-values and 95% confidence intervals.

4. Empirical Results and Interpretation

This paper consists of six numeric independent variables, which are age of child, number of household members, mean years of schooling, poverty rate, agriculture share of GDRP, and regency/municipality minimum wage. The other variables are categorical variables. From the summary statistics presented in Table 2, the mean age is about 13.43 years old; the mean number of household members is 4.86; the mean poverty rate is 10%; and the mean of mean years of schooling is 8.45 years, which is consistent with grade two in junior high school. The median of agriculture share to GDRP is 20.37% and the median Regency/Municipality Minimum Wage is 2,758,909 Indonesian rupiah (IDR).

Table 2. Summary Statistics

Variables	Mean	Median	Std. Dev	Min	Max
Child Labor	0.04	0	0.193	0	1
Age of child	13.43	13	2.306	10	17
Gender of the child	1.51	2	0.5	1	2
Educational level of the child	1.67	2	0.471	1	2
Educational level of the household head	1.61	2	0.487	1	2
Gender of the household head	1.89	2	0.311	1	2
Main occupation of the household head	1.44	1	0.627	1	3
Number of the household members	4.86	5	1.592	1	26
The residential area of the household	1.46	1	0.498	1	2
Household access to social protection	1.39	1	0.487	1	2
Poverty rate	10	9.26	5.39	2.02	41.76
Mean years of schooling	8.45	8.19	1.6	1.13	12.65
Agriculture's share to GDRP	19.88	20.37	14.64	0.01	74.4
Regency/Municipality Minimum Wage (IDR)	2,866,923	2,758,909	787,840	1,705,000	4,594,325
Observations	194,267				

Notes: For variable definitions and measurements, see Table A.1 in the appendix.
Source: Authors' calculations from Statistics Indonesia's 2020 Socio-Economic Survey.

The test results in Table 3 indicate that the model at each level are well-fit and suitable for explaining the data. The random effects in the first, second, and third-level models produce an L value that is greater than the value $\chi_{((0,05;2))}^2$. The next stage determines the best fit model among the

three models that have been obtained. Determination of the best fit model was performed by comparing the L value in each model. Hox (2010) states that the likelihood function can be used to calculate the deviance value to determine whether a model is preferred to explain the data. A model with smaller deviance is a better fit model to explain data than a model with a larger deviance. Table 2 illustrates that the third level model has the lowest L value compared to the first and second level models. Therefore, it can be assumed that the third level model is the preferred model to explain the data compared to the first level model and the second level model. For this reason, the parameter values in the third level model will be interpreted in the subsequent discussion.

Table 3. Estimation Results of Binary Logistic Multilevel Analysis Parameters

Variable	Model 1	Model 2	Model 3	
	Coeff.	Coeff.	Coeff.	Odds Ratio
Constant	-26.4449***	-26.2334***	-26.3366***	3.54e-12
	(0.604)	(0.5664)	(0.8447)	
Age of child	1.1333***	1,0994***	1.0998***	3.0034
	(0.0248)	(0.0232)	(0.0232)	
Educational level of the child (low)	2.7934***	2.5943***	2.5884***	13.3087
	(0.0807)	(0.0761)	(0.0761)	
Gender of the child (boy)	1.2176***	1.2066***	1.2071***	3.3437
	(0.0509)	(0.0500)	(0.0500)	
Educational level of household head (low)		0.9354***	0.9286***	2.5309
		(0.0610)	(0,0612)	
Gender of the household head (boy)		-0.9291***	-0.9277***	0.3954
		(0.0766)	(0.0767)	
Main occupation household head (agriculture)		0.4820***	0.4523***	1.5719
		(0.0586)	(0.0587)	
Main occupation household head (unemployed)		-0.2945***	-0.2949***	0.7446
		(0.1068)	(0.1069)	
Social protection programs (has access)		0.2494***	0.2495***	1.2833
		(0.0534)	(0.0535)	

Numbers of the household members	0.0399*** (0.0149)	0.0379** (0.0149)	1.0387
Residential Area of the household (rural)	0.4855*** (0.0672)	0.3947*** (0.0683)	1.4839
Mean years of schooling		-0.1167** (0.0521)	0.8899
Poverty rate		0.0235** (0.0107)	1.0238
Regencies/Municipalities minimum wage		1.96e-07* (1.18e-07)	1.0000
Agriculture's share to GDRP		0.0146*** (0.0051)	1.0147

-2 Log likelihood			
Without random effect model	-33,721.612	-32,669.945	-32,380.97
With random effect model	-28,964.513	-28,552.559	-28,528.48
L/deviance	9,514.198	8,235.57	7,704.98
$X^2(0.05;2)$	5.991	5.991	5.991
Result	Fit Model	Fit Model	Fit Model
Total obs in 1st level	194267	194267	194267
Total obs in 2nd level	142975	142975	142975
Total obs in 3rd level	514	514	514

Notes: *, ** and *** denote statistical significance at < 0.1, < 0.05, and < 0.01 levels; robust standard errors in parentheses; reference categories in parentheses next to the relevant variables.
Source: Authors' calculations from Statistics Indonesia's 2020 Socio-Economic Survey.

The regression results in Table 3 show that all independent variables are statistically significant at a 5% significance level, except the regency/municipality minimum wage variable, which is significant at the 10% level. In this study, the parameter interpretation in the binary logistic multilevel analysis is carried out by looking at the odds ratio calculated from the coefficient value of each independent variable. Based on the odds ratio, a child's tendency to work compared to not working can be seen.

This study reports that the age of the child has a positive effect on child labor. This finding shows that the tendency of children to work in Indonesia increases as the age of the child increases. The odds ratio value of 3 means that the tendency of children to work is 3 times higher as age increases by one year, assuming other variables are constant. This result is congruent with the results of earlier scholarship (e.g., Blunch & Verner, 2000; Tang, Zhao, & Zhao, 2018). The studies suggest that households send older children into the labor market while younger children go to school. Older children are possibly considered more capable and more prepared to take on job responsibilities than younger children.

Education level of a child in this study was divided into two categories, namely higher education (has attended senior high school (SMA)/ equivalent and above) and low education (has attended junior high school and below). High education was used as a reference category. The results reveal that a child is less likely to participate in the labor market as their education increases. When children with low levels of education grow up, they become untrained adults. Consequently, they will receive low wages that may lead them to more poverty. Thapa, Chhetry, and Aryal (1996) also explain that the parents' view that education is not directly beneficial to parents, so they choose to send their children to work. Ikawati (2015) mentions that a family's economic limitations cause children to drop out of school. As a result, children are forced to work with a low level of education.

The gender of the child in this study was divided into two categories, namely boy and girl. The reference category was a girl. As provided in Table 2, the gender coefficient value is 1.21, so that the odds ratio is 3.34. When the odds ratio of the gender is 3.34, the tendency of boys to work is 3.34 times higher than girls, assuming other variables are constant. The result is consistent with the findings of Rad, Gholampoor, and Jaafaripooyan (2015), Iryani and Priyarsono (2013), and Utama and Handayani (2020). Putnick and Bornstein (2016) suggests that child labor participation by gender differs according to

the type of work. Girls are more involved in household chores than boys, such as cleaning houses, fetching water and wood, washing, and so forth. Nevertheless, domestic work is often not recorded as an economic activity in various surveys and even considered a hidden form of child labor because it is not paid and under-reported (Webbink, Smits, & de Jong, 2012). Purwanti (2014) adds that the patriarchal social system adopted by Indonesian society places the value of boys higher than girls, including in terms of responsibility. Hence, if children must work, boys will be responsible for market-oriented work while girls do domestic chores.

The educational level of the household head is proven to significantly affect child labor participation in Indonesia. The coefficient value for the educational level of the household head was 0.93, resulting in an odds ratio value of 2.53. It means that children in households where the household head has low educational attainment are 2.53 times more likely to work than children living with household heads with high educational attainment, assuming other variables are constant. Webbink et al. (2013) and Ayu and Bachtiar (2017) argue that the educational level of the household head is an important factor affecting child labor participation. A parent's education, i.e., the household head, will shape their view of working children. It affects their decision on whether to send children to school or to the labor market. Similarly, Iryani and Priyarsono (2013) explain that household heads with low educational attainment tend to have higher economic vulnerability, which becomes a strong impetus to involve their children in work. Meanwhile, highly educated household heads have a strong, positive influence on school participation rather than work (Canagarajah & Coulombe, 1997).

Based on Table 3, the negative coefficient value for the gender of the household head means that the chances of children to work whose household heads are male are smaller than for children whose households are headed by women. A possible explanation for this might be that female household heads are forced to use child labor because they are under economic pressure due

to the death or temporary or permanent absence of their husbands (Usman & Nachrowi, 2004). This finding is also confirmed in research by Priyambada, Suryahadi, and Sumarto (2005). They find that female-headed households are generally more vulnerable than male-headed households. Thus, the situation compels children to work in order to earn money for the family.

Another significant factor in this study is the main occupation of the household head. Occupation is divided into three categories, namely the non-agricultural sector, the agricultural sector, and the unemployed. Non-agricultural sector employment is used as a reference category. The results show that the tendency for children to work from households where the household head works in the agricultural sector is higher than for those in the non-agricultural sector, assuming other variables are constant. According to Canagarajah and Coulombe (1997), the nature of a parent's occupation can determine whether children participate in the labor market. The main occupation is also closely related to educational level. The level of education can increase a person's opportunities to diversify work and raise capital (Sukamdi, 2013). In addition, household heads with higher education are more likely to work in the non-agricultural sector (Utama & Handayani, 2020). This study corroborates with the findings of Priyambada et al. (2005) and Utama and Handayani (2020), suggesting that household heads who work in the agricultural sector will attract their children to work in the same sector, either as unpaid family workers or as wage earners.

Household access to social protection programs also deserves attention. This variable is proven to have a positive correlation with child labor force participation in Indonesia. The present study documents that children living in households that receive benefits through social protection programs are 1.28 times more likely to work than children whose households do not receive social protection program benefits, assuming other variables are constant. One possible reason is that households receiving government social protection program benefits are those targeted in poverty reduction efforts,

which means these households are more likely to be poor than household that do not receive benefits. In accordance with the survival mechanism stated by White (1991), poor households use the available labor in their household to help them earn money.

Furthermore, the tendency of children to work in Indonesia increases when the number of household members in the child's household increases. Households with more members have more needs that must be met and vice versa. According to Grootaert (1998), a larger household size decreases per capita income. Conversely, it increases the dependency ratio. Both factors increase the likelihood that a child needs to generate income (in cash or in-kind) to maintain the household's standard of living. In addition, whether a household is located in an urban (reference category) or rural area matters for child labor. The coefficient on the rural indicator is 0.39, which translates to an odds ratio value of 1.48. With this value, children whose households are located in rural areas are 1.48 times more likely to work than those who stay in urban areas, with the assumption that other variables are constant. Previous studies also conclude that the area of residence strongly affects child labor decisions. The tendency of child labor in rural areas is always higher than in urban areas according to Priyambada et al. (2005) and Ali & Arabsheibani (2016). In addition, Grootaert (1998) argues that rural areas reinforce child labor because of a lack of educational infrastructure.

When looking at regional contextual factors, the mean years of schooling is worth discussing. It represents a long-term development output indicator that includes the population aged 15 years and over. If the mean years of schooling is high, it can be assumed that the quality of education in the area is increasing. In this context, the coefficient for mean years of schooling is -0.12 with an odds ratio of 0.89. The negative value indicates that the tendency of children to work in Indonesia declines as the mean years of schooling for the area increases. This finding is congruent with research conducted by Webbink et al. (2015). They claim that the tendency of children

in Asia to work is less if they live in highly educated areas. The greater the mean years of schooling that residents have in an area, the more it prevents residents from entering the labor market at an early age. This is in line with research conducted by Widodo & Masjkuri (2018), which finds that mean years of schooling has a negative effect on child labor participation.

Statistics Indonesia uses the concept of poverty as the economic inability to meet basic food and non-food needs measured in terms of expenditure. A low poverty rate in an area is an indicator of the prosperity of the region. In this study, the poverty rate coefficient is 0.02 with an odds ratio of 1.02. These results indicate that the tendency of children to work in Indonesia increases as the poverty rate increases. ILO (2007) also reveals that the level of child labor is positively correlated with the global poverty rate at the aggregate level. Similarly, Wasserman (2000) shows that the higher the level of poverty in a country, the greater the number of child workers. However, other scholars (e.g. Ahmed, 1999; Goswami & Jain 2006) believe that poverty is only one of many explanatory factors for child labor.

When a region has a high minimum wage, the cost of living is also likely to be high. This wage factor has been demonstrated to have a significant effect at the 10% significance level. The minimum wage coefficient is very small (1.97e-07) with an odds ratio of just slightly higher than 1. These results indicate that the tendency of children to work in Indonesia increases when the region has a higher regency/municipality minimum wage. Fatima (2017) reports similar results, finding a positive influence between the minimum wage for adult workers in Pakistan and child labor. One possible reason is that, regarding the increasing market wage for adult workers, it is an option for employers to replace these workers with cheap child labor. Employers or companies take this action to have workers who can be paid low wages. Thus, the profitability of the company or employer can be maximized (Ringdal, 2011).

The distribution of GRDP based on current prices shows the structure

of the economy or the role of each business field in a region. According to Statistics Indonesia, the agricultural sector is still the backbone of the Indonesian economy. It contributed 12.71% to total GDP and employed 29.33% of the population in 2019. The results show the tendency of children to work in Indonesia increases with the contribution of agriculture to GRDP. Fallon and Tzannatos (1998) suggest that the best explanatory variable for child labor appears to be related to the production structure, where a high contribution of agriculture to GDP might increase the rate of child labor. Ahmed (1999) finds that agriculture's contribution to GDP is large in low-income countries. Therefore, greater dependence on agriculture tends to result in child labor.

Based on the random effects significance test results in the previous discussion, there are variations in child labor participation due to differences in variation in individual factors, household socio-economic factors, and regional contextual factors. To find out how much diversity exists between groups and levels of child labor participation, the present study uses intraclass correlation (ICC). ICC for the regional contextual level is calculated as follows:

$$\rho = \frac{\sigma^2_{w_{00j}}}{\sigma^2_{\varepsilon_{tij}} + \sigma^2_{u_{0ij}} + \sigma^2_{w_{00j}}} = \frac{1.743714}{3.29 + 13.70252 + 1.743714} = 0.0931$$

These results indicate that 9.31% of the variation in child labor force participation in Indonesia is influenced by differences in conditions and socio-economic characteristics of the district/city where the child lives. ICC for household level is calculated as follows:

$$\rho = \frac{\sigma^2_{u_{0ij}}}{\sigma^2_{\varepsilon_{tij}} + \sigma^2_{u_{0ij}} + \sigma^2_{w_{00j}}} = \frac{13.70252}{3.29 + 13.70252 + 1.743714} = 0.7313$$

This finding indicates that 73.13% of the variation in child labor participation in Indonesia is influenced by differences in household conditions and characteristics of where the children reside. Finally, the ICC for the

individual level is calculated as follow:

$$\rho = 1 - [(regional\ contectual\ ICC) + (household\ ICC)] = 0.1756$$

Therefore, 17.56% of the variation in child labor participation in Indonesia is mainly influenced by the individual's conditions and characteristics that might differ from one child to another. Based on the ICC calculations above, it can be seen that variation in Indonesian child labor participation is mainly affected by the differences in individual characteristics and household socio-economic status.

5. Conclusions and Policy Implications

This study has confirmed that three sets of factors affect child labor participation in Indonesia. The first set is individual factors that include age, gender, and the educational level of the children. The second set is the household's socio-economic factors that involve the head of household's educational level, gender, and main occupation. Child labor is also associated with the household's access to social protection programs, the number of household members, and the household residential area. The final set is regional contextual factors. They refer to the mean years of schooling, poverty rate, and contribution of agriculture to GRDP. One significant finding of this study is that 73.11% of the variation in child labor participation in Indonesia is influenced by differences in household socio-economic characteristics.

On the individual and household factors, children's and household head's educational level are significant contributors to the child labor decision, as seen from the coefficient values. Therefore, education is an essential factor that can reduce children's labor market participation. Improving children's educational attainment can be achieved by adding school buildings, expanding school access, reducing direct and indirect schooling costs, and improving education quality. Furthermore, poverty is a driving factor for child labor.

The present study indicates that child workers often come from households receiving social protection and from areas with high rates of poverty. Thus, it is necessary to find policies that can help reduce the economic vulnerability of these households. For example, providing assistance such as food, microcredit, skill development, and economic empowerment can raise family economic activities that would allow children to withdraw from the labor market.

This research shows that area-based policies are also important and that policy recommendations to reduce child labor are not targeted only at the household and individual levels. This is because regional characteristics also have an influence on child labor market participation. At a macro level, child labor force participation tends to be higher in areas with a low average schooling rates, high poverty rates, and high agricultural shares of GRDP. Large disparities between regencies/municipalities indicate that the socio-economic conditions are unequally distributed among regions. The central and regional governments are expected to carry out a comprehensive strategy to eliminate child labor.

Because of this study's reliance on the government survey data, the interpretation of results is limited to the available variables in the dataset. Not all desired independent variables could be accommodated in this study, such as birth order and number of siblings. In fact, previous studies show that these variables have a significant effect on child labor. In addition, the data used in this study covers only one year, preventing us from comparing the data across the years. Finally, the cross-sectional data used in this study prevents the authors from analyzing how long children work and the transition time from completing the education to the labor market. These are areas for potential future research.

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Appendix

Table A.1. Variables, Measurement Scale, and Categorization

Variables	Measurement Scale	Categories
Dependent Variable		
Child's working status	Nominal	0 = not working; 1 = working
Independent Variables		
Individual Factors		
Age of child	Ratio	
Gender of the child	Nominal	1 = female*; 2 = male
The educational level of the child	Ordinal	1 = high school and above*; 2 = below high school
Household's Socio-Economic Factors		
The educational level of the household head	Ordinal	1 = high school and above*; 2 = below high school
Gender of the household head	Nominal	1 = female*; 2 = male
The main occupation of the household head	Nominal	1= non-agriculture*; 2 = agriculture (rice and palawija crops, horticulture, plantation, fisheries, livestock, forestry and other agriculture); 3 = does not work
Household access to social protection programs	Nominal	1 = no access*; 2 = access (cash assistance, Prosperous Family Cards (KKS), Family Hope Program (PKH), Smart Indonesia Program (PIP), etc.)
Number of the household members	Ratio	
The residential area of the household	Nominal	1 = urban*; 2 = rural
Regional Contextual Factors		
Mean years of schooling	Ratio	
Poverty rate	Ratio	
Regency/Municipality Minimum Wage	Ratio	
Agriculture's share to GDRP	Ratio	

Notes: * = reference category