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Child Poverty in Sumatra in 2017 and 2019: The Multidimensional Overlapping Deprivation Analysis (MODA) Approach

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Abstract.

Introduction. Poverty is more multidimensional, but monetary-based method measures *are merely one-dimensional*. The multidimensional approach is more reliable for describing and analyzing children's poverty. This study only focused on ten provinces in Sumatra out of 34 provinces in Indonesia. There are five major dimensions of indicators which are housing, facilities, food and nutrition, education, child protection, and health.

Purposes. This study uses Multidimensional Overlapping Deprivation Analysis (MODA) Approach on Alkire-Foster Method as a measuring tool for analyzing children's poverty in Sumatra in 2017 and 2019.

Results The number of 0-4 year-old-deprived children was decreasing for most dimensions in 2019, compared to 2017, except child protection dimension and the number of 5-17 years-old-deprived children was decreasing for most dimensions, except health dimension. 2) The condition of the Child Multidimensional Poverty Index (MPI) become better in 2019. 3) Education was the most contributed dimension to child multidimensional poverty in Sumatra for 2017, while health dimension for 2019. 4) North Sumatra was the first highest score of Child MPI, headcount ratio, and intensity of poverty. 5) Bengkulu and Lampung were the provinces in 2017 and 2019 experiencing both monetary poverty and child multidimensional poverty above Indonesia's poverty rate and Child MPI in Sumatra.

Keyword: Multidimensional Poverty, Deprivation, Child Poverty

JEL Classification: J13, I32

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Formulation of problems. Poverty is a crucial problem in developed and developing countries around the world. Since 2015, The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States as a universal action call to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. Eradicating poverty in all its forms remains one of the greatest challenges facing humanity. Even the number of people living in extreme poverty dropped by more than half between 1990 and

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2015, too many are still struggling for the most basic human needs. United Nation stated that 700 million people live in a poverty trap and struggle for food, health, education, good sanitation, and housing. Poverty is linked with the quality of life of everyone in every age group. Eight percent of workers and their families live in a poverty trap. Poverty is affected 41 percent of pregnant women do not get labor help and one of five children lives in extreme poverty.

Poverty is a complex concept with various definitions. Statistics Indonesia defines poverty as a state or condition in which a person or community lacks the financial resources for a minimum standard of living (food and non-food needs) measured by expenditure. This monetary-based method is the common method to measure poverty. It is increasingly noted that monetary measures of income or expenditure provide partial insights into standards of living.

Poverty is more multidimensional, but monetary-based method measures are merely one-dimensional. Policy responses also vary depending on the type of poverty measure applied (Sen, 1983)[1]. Sen (1999) [2] developed the argument by emphasizing that poverty can be sensitively identified in terms of capability deprivation, which refers to the deprivation of opportunities, choice, and entitlements. Townsend (1979) [3] examined relative deprivation covering a wide range of aspects of living standards, both material and social. Several non-monetary indicators have been widely considered as proxies that enable identifying various aspects of poverty such as material deprivation and social exclusion. Children's needs are quite different from adult's needs. The lacking condition of children is different from adult's condition. CHIP (2004) [4][and UNDP (2004) [5] defined child poverty as the poverty experienced during childhood by children and young people. It differs from adult poverty in that it has different causes and effects, and the impact of poverty during childhood has permanent effects on children. Children are vulnerable to deprivation; even short periods of deprivation can impact long-term growth. "Children experience poverty as an environment that is damaging to their mental, physical, emotional, and spiritual development. Therefore, expanding the definition of child poverty beyond traditional conceptualizations, such as low household income or low levels of consumption, is particularly important. And yet, child poverty is rarely differentiated from poverty in general and its special dimensions are rarely recognized (UNICEF, 2005) [6].

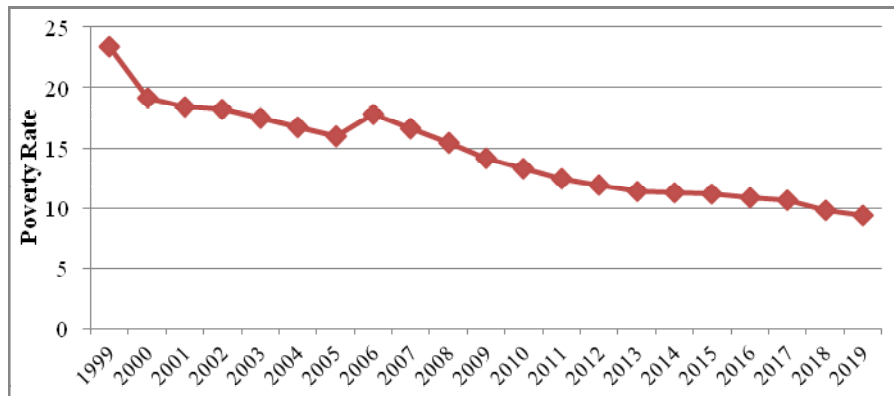


Figure 1. Poverty Rate of Indonesia in 1999 until 2019
Source : built by authors based on Central Bureau of Statistics data series

The poverty rate of Indonesia has been reducing by more than a half in the past 20 years. Indonesia has achieved a one-digit poverty rate in 2019, but this accomplishment is not achieved by every province in Indonesia. Sumatra is the second most populated island in Indonesia. There are ten provinces in this island which are Aceh, North Sumatra, West Sumatra, Riau, Jambi, Bengkulu, South Sumatra, Lampung, Bangka Belitung and Riau Islands. North Sumatra is the tenth child-most populated province in Indonesia based on data from Statistics Indonesia. Some socio-economic conditions in Sumatra are whether better or worse than Indonesia's condition. The better ones happen on housing and education. The worse ones happen on food and nutrition and health. Four provinces which are Aceh, South Sumatra, Bengkulu, and Lampung, have a higher monetary-poverty rate than Indonesia's poverty rate. Six other provinces have a lower poverty rate.

Child poverty is a more multidimensional problem rather than a monetary problem. The multidimensional approach is more reliable in describing and analyzing children's poverty. UNICEF in 2012 introduced Multidimensional Overlapping Deprivation Analysis (MODA) which is constructed Multidimensional Poverty Index (MPI) based on Alkire-Foster Method. Based on the problems previously described, it is necessary to conduct research on some major indicators as a measuring tool for analyzing children's poverty in Sumatra and make a comparison between two years which are 2017 and 2019. The formulation of Child MPI consists six major dimensions which are housing, facilities, food and nutrition, education, child protection, and health. Thus, poverty can be eradicated more precisely on target, especially on children poverty in Sumatra, and reduced its potential in the future.



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Literature review.

Robles Aguilar & Sumner (2020)[7] was comparing the original Alkire–Foster measure of multidimensional poverty with other multidimensional indices for poverty headcount estimation. The multi-dimensionally poor population is largely young people, living in rural areas, but unnecessarily working in agriculture. Ogwumike & Ozughalu (2018)[8] studied about there was child deprivation in education, health, nutrition, child protection, water, and sanitation. Both child poverty and child deprivation were more pronounced in the rural sector than in the urban sector and in Northern Nigeria than in Southern Nigeria. The multidimensional child poverty was negatively related to children's academic achievement. Social relationships played a significant role in mediating the effects of multidimensional child poverty on children's academic achievement Ge & Wang (2019)[9].

Children faced high risks of deprivation and exclusion. The three highest levels of deprivation and exclusion have happened in environment, recreation, and education dimensions; the lowest two levels of deprivation and exclusion have happened in the dimensions of medical care and housing. The dimensions with higher levels of deprivation and exclusion give more relative contributions to facilitate poverty reduction of children (Leu, Chen, & Chen, 2016)[10]. Schooling, ability to read and write, thinness, and nutrition have significant contributors to children's total deprivation. Child deprivation in chronically poor households across all the indicators is higher than to the least poor. Rural children are significantly more deprived than urban children, but there is no significant difference between boys and girls (Singh & Sarkar, 2015)[11].

The monetary poverty approach cannot serve as a proxy for multidimensional poverty and vice versa. The most contributed indicators of child deprivation are water and sanitation and also leisure time. There is a significant difference between the deprived children in the rural and urban areas and different ethnicities, but there is no difference in gender basis (Roelen, Gassmann, & Neubourg, 2011)[12]. Fotso et al.,(2012)[13] examined patterns of child growth and how these were affected by four different dimensions of poverty which are expenditures poverty, assets poverty, food poverty, and subjective poverty. The prevalence of overall stunting was reaching nearly 60 percent in the age group 15–17 months and remaining almost constant thereafter. There is a strong link between food poverty and stunting among children aged 6–11 months, while assets poverty and subjective poverty have stronger relationships with malnutrition at an older age (24 months or older for assets poverty, and 12 months or older for subjective poverty). Poverty in childhood affects poverty in their adulthood. Children from poor families tend to have lower education, face higher poverty risks, and assess themselves as being less happy and poorer health (Oshio, Sano, & Kobayashi, 2010)[14].



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Brazil's North and Northeast remain with deeper deprivations than the Southern and Southeastern regions with the lowest case of multidimensional poverty. Dropout Rate of Grades 3–4 of High School, HDI-M Education, HDI-M Longevity, Logarithm of the Population, Gross Value Added per capita of Industry, Service Concentration Index, and Entrepreneur Rate contribute positively to the reduction of municipal vulnerability to poverty (Costa, Machado, & Amaral, 2018)[15]. Five dimensions included in the study are income, living standard, education, health, and social security. Rapid economic growth has resulted both in a reduction of prevalence and intensity of income poverty multidimensional poverty in the last decade. There are wide disparities across provinces and between urban and rural areas especially rising deprivation in education (Jianto Yu, 2018)[16]. The study is deriving indicators of multiple deprivations by applying a particular multivariate statistical technique, the non-linear principal component analysis (NLPCA), which overcomes traditional limits for the first thing. Second, the study is analyzing deprivation both as a distinct phenomenon in different life domains and as a single multidimensional concept. Third, the study is estimating logit regressions and an ordered probit model on the determinant of poverty in Italy (Coromaldi & Zoli, 2012)[17].

Six dimensions are built from the Peruvian data for 2004 and 2008. Deprivations are similar across regions and are largely related to the lack of adequate water and sanitation services and there is an opportunity to focalize public investment effort (Castro, Baca, & Ocampo, 2012)[18]. Thiede & Brooks (2018)[19] was describing poverty rates among US children across five immigrant generation groups. There are differences in poverty rates between immigrant generations. First-generation non-citizens and second-generation children with two foreign-born parents have consistently higher poverty rates than other generations. Differences between the official poverty measure (OPM) and a supplemental poverty measure (SPM)-based estimates suggest public supports and costs of living have differential welfare effects across groups. The results found strong evidence of a relationship between poor housing conditions with children's health and children's performance at school. Children's safety is linked to the quality of their home environment. Growing up in poor housing has an intense long-term effect on children's life chances and that public policy should play closer attention to this relationship (Harker, 2020)[20].

Based on the identification of problems and recent researches on multidimensional poverty in children, this study forms the conceptual framework shown in the chart below.

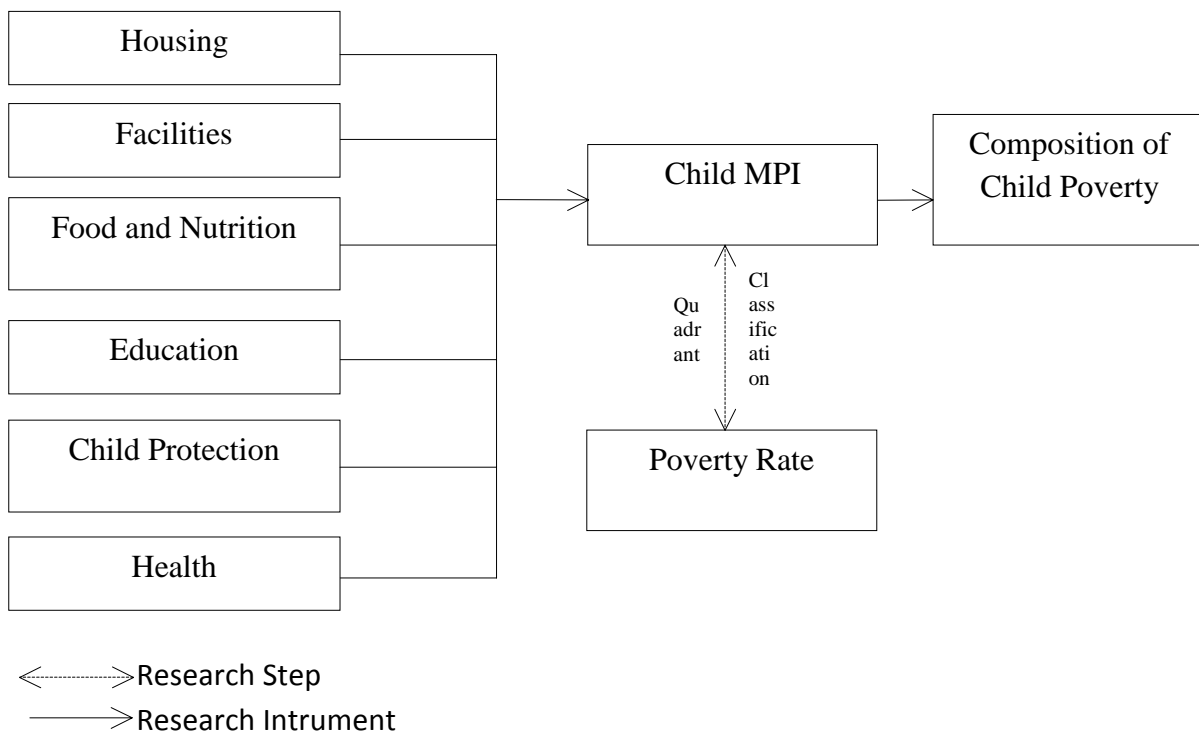


Figure 2. Conceptual Framework

Formulation of research goals.

The purposes of this study are: 1) analyzing the multidimensional childhood deprivation in Sumatra in 2017 and 2019. 2) Constructing Child Multidimensional Poverty for Sumatra and each province in 2017 and 2019. 3) Analyzing the composition of Sumatran child poverty and the comparison between Sumatran child poverty and monetary poverty rate.

Data and Methodology. The data for this study comes from the National Socio-Economics Survey of Indonesia (Survei Sosial Ekonomi Nasional) in 2017 and 2019 which is conducted by the Central Bureau of Statistics (*Badan Pusat Statistik Indonesia*-Statistics Indonesia). This study only focus on ten provinces in Sumatra out of 34 provinces in Indonesia which are Aceh, North Sumatra, West Sumatra, Riau, Jambi, Bengkulu, South Sumatra, Bangka Belitung and Riau Islands. Multidimensional Overlapping Deprivation Analysis and Alkire-Foster Method are used to construct the child deprivation score and Child Multidimensional Poverty Index (MPI). The Alkire-Foster method can be used to create global and national multidimensional poverty measures with context-specific dimensions and indicators.



The MPI dashboard's key statistics are **incidence of poverty** (the percentage of multi-dimensionally poor people), the **intensity of poverty** (the average proportion of deprivations poor people face at once), and **composition of poverty** (the percentage of people who are poor and deprived in each indicator). The Alkire-Foster method can be intuitively introduced in 12 steps consisted of 8 steps of identification and 4 steps of aggregation.

Step 1 : Choose Unit of Analysis. The unit of analysis in this study is an individual aged 0 to 17 years old. Those children are divided into two groups which are aged 0-4 years old group and aged 5-17 years old group.

Step 2 : Choose Dimensions. There are six dimensions which are housing, facilities, food and nutrition, education, child protection, and health.

Step 3 : Choose Indicators. There are 13 indicators in this study.

Step 4 : Set Deprivation Cut-Off.

Step 5 : Apply Poverty Lines. Children are identified as being deprived or non-deprived for each indicator.

Step 6 : Count the Number of Deprivations for Each Person by giving score 1 for the deprived children and score 0 for the non-deprived children. The formula of deprivation score is shown below.

$$c_i = w_1g_{i1} + w_2g_{i2} + \dots + w_{13}g_{i13} = \sum_{j=0}^{n-1} \sum_{j=1}^{13} w_j g_{ij} \quad (1)$$

Which:

c_i is deprivation score of the i-th individual

w_j is the j-th indicator weight

g_{ij} is the deprivation status (score 0 or 1)

Step 7 : Set the Second Cutoff. Assuming equal weights for simplicity, set a second identification cutoff, k, which gives the number of indicators in which a person must be deprived to be considered multi-dimensionally poor.

Step 8 : Apply Cut off (k-score) to Obtain the Set of Poor children and Censor All Non-poor Data. This study applies $\frac{1}{3}$ as the k-score. Now, the focus is the profile of the poor and the dimensions in which they are deprived.



Table 1. Deprivation Cut-Off for Each Dimension of Child Poverty

Dimension	Indicator	Deprivation Cut-Off	
		0-4 y.o.	5-17 y.o
(1)	(2)	(3)	(4)
Housing	House Ratio	Children live in the house with the house ratio is < 7,2 m ² per capita.	
	House Flooring	Children live in earth floored house	
Facilities	Drinking Water	Children do not have access to clean drinking water.	
	Sanitation Services	Children do not have access to adequate sanitation services	
	Cooking Fuel	Children live in the house where wood or charcoal is used as cooking fuel.	
Food and Nutrition	Calorie Consumption	Calorie consumption in a day is below the <i>Minimum Dietary Energy Requirement</i> (MDER).	
	Breast-milk Consumption	Children aged 0 to 23 months old do not consume breast milk.	-
Education	School Enrollment	-	Children aged 7 to 17 years old do not attend level of education based on their age.
Child protection	Birth Certificate	Children do not have a birth certificate	
	Child Marriage	-	Children aged 10 to 17 years old is married or widowed.
	Child Labor	-	Children aged 10 to 17 years old have a job in the last seven days.
Health	Health Insurance	Children do not have health insurance.	
	Vaccination	Children aged 12 to 59 months old do not have the complete basic vaccination.	-

Source: generated and supplemented by authors based on Central Bureau of Statistics publication



Step 9 : Calculate the Headcount, H. Divide the number of poor people by the total number of people.

Step 10 : Calculate the Average Poverty Gap, A. A is the average number of deprivations a poor person suffers. It is calculated by adding up the proportion of total deprivations each person suffers and dividing by the total number of poor persons.

Step 11 : Calculate the Adjusted Headcount, M_0 which is calculated as H times A. Headcount poverty is multiplied by the 'average' number of dimensions in which all poor people are deprived to reflect the breadth of deprivations.

Step 12 : Set Weights. This study used equal-weight for each dimension because it is the best way to provide the comparing study of multidimensional poverty in two different years.

The formula of H, A, and Child MPI are;

$$\text{Child MPI} = H \times A \quad (2)$$

$$H = \frac{q}{n} \quad (3)$$

$$A = \frac{\sum_{i=1}^q c_i(k)}{q} \quad (4)$$

Which:

Child MPI is Child Multidimensional Poverty Index; H is Headcount Ratio; A is average poverty gap or poverty intensity; q is the number of multi-dimensionally poor children; $c_i(k)$ adalah deprivation score

The formula of composition of child multidimensional poverty is;

$$\phi_i(k) = w_i \frac{h_i(k)}{\sum_{i=1}^q w_i h_i(k)} \quad (5)$$

Which:

$\phi_i(k)$ is the percentage of indicator's contribution at the cut-off position; w_i is indicator's weight; $h_i(k)$ is censored headcount ratio of indicator

Outline of the main research materials.

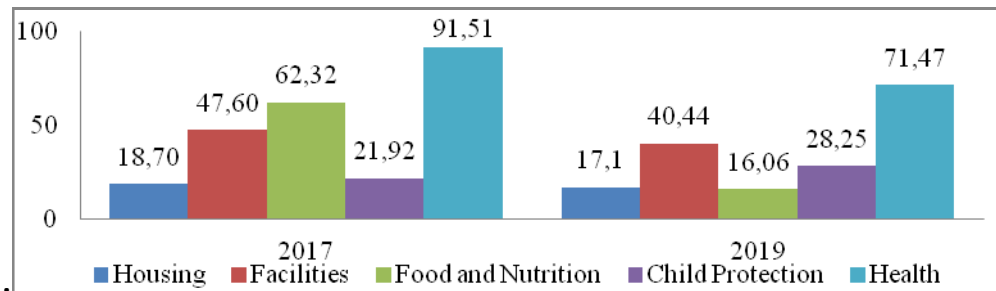


Figure 3. The Percentage of 0-4 Years Old-Deprived Children in Sumatra in 2017 and 2019

Source: built by authors based on Central Bureau of Statistics data series

Children as the object of this study were divided into two major age groups for analytical reason which are age 0 until 4 years old (0-4 y.o.) and age 5 until 17 years old (5-17 y.o.). Figure. 3 shows the number of deprived children of 2017 and 2019 in each dimension for 0-4 y.o age group. There were five dimensions in this 0-4 y.o.-child deprivation section which were housing, facilities, food and nutrition, child protection, and health. The deprived child was a child who lived in the deprived condition or below the minimum standard of and indicator's criteria (see Table 1). The number of 0-4 y.o-deprived children was decreasing for most dimensions and the most decreased number was found in the food and nutrition dimension. The number of deprived children was increasing only for the dimension of child protection. The fewest number of deprived children in 2017 was found in the health dimension and the lowest one was in the housing dimension. The dimension order in 2017 of fewest to the least number of deprived children was health, food and nutrition, facilities, child protection, and housing.

The fewest number of deprived children in 2019 was still found in the health dimension and the lowest one was in the food and nutrition dimension. The dimension order in 2019 of fewest to the least number of deprived children is health, facilities, child protection, housing, and food and nutrition.

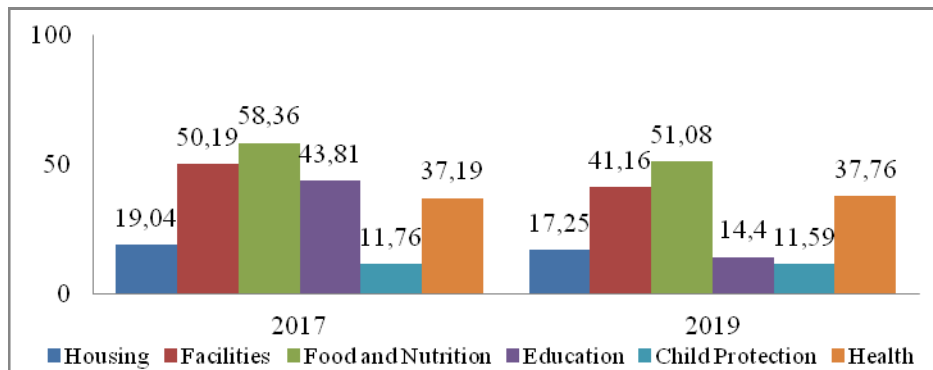


Figure 4. The Percentage of 5-17 Years Old-Deprived Children in Sumatra in 2017 and 2019

Source : built by authors based on Central Bureau of Statistics data series

Figure 4 shows the number of deprived children of 2017 and 2019 in each dimension for the 5-17 y.o age group. There were six dimensions in this 5-17 y.o.-child deprivation section which were housing, facilities, food and nutrition, education, child protection, and health. The deprived condition of 5-17 y.o children was different from 0-4 y.o children. The number of 5-17 y.o. deprived children were decreasing for most dimensions the most decreased number is found in education. The number of deprived children was increasing only for the dimension of health. The fewest number of deprived children in 2017 was found in the food and nutrition dimension and the lowest one was in the child protection dimension. The dimension order in 2017 of fewest to the least number of deprived children was food and nutrition, facilities, education, health, housing, and child protection.

The fewest number of deprived children in 2019 is still found in the food and nutrition health dimension and the lowest one is in the child protection dimension. The dimension order in 2019 of fewest to the least number of deprived children is the same as in 2017. There was another comparison section between 0-4 y.o. children and 5-17 y.o children in each year. Children aged 0-4 years old were more deprived in the dimensions of food and nutrition, child protection, and health, while children aged 5-17 years old were more deprived in the dimensions of housing and facilities in 2017. However, children aged 0-4 years old were more deprived in the dimensions of child protection and health, while children aged 5-17 were more deprived in the dimensions of food and nutrition, housing, and facilities in 2019.



Figure 5 shows Child MPI of ten provinces in Sumatra in 2017 and 2019. Child MPI in 2019 was lower than child MPI of Sumatra in 2017 which scores are 0.0829 in 2017 and 0.0769 in 2019. North Sumatra was the first highest score of Child MPI out of 10 provinces in Sumatra in 2017 and 2019. However, South Sumatra in 2017 and Bangka Belitung in 2019 was the lowest score of Child MPI out of 10 provinces in Sumatra. The highest to the lowest score of Child MPI of 10 provinces in 2017 were North Sumatra, Jambi, Riau, Bengkulu, West Sumatra, Lampung, Aceh, Bangka Belitung, Riau Islands, and South Sumatra. However, there was a little bit different order of Child MPI score in 2019. The highest to the lowest score of Child MPI of 10 provinces in 2019 were North Sumatra, Bengkulu, Lampung, West Sumatra, Jambi, Riau, South Sumatra, Aceh, Riau Islands, and Bangka Belitung. The score of Child MPI was decreasing for most provinces. The increased score of Child MPI only happened in South Sumatra and Bengkulu.

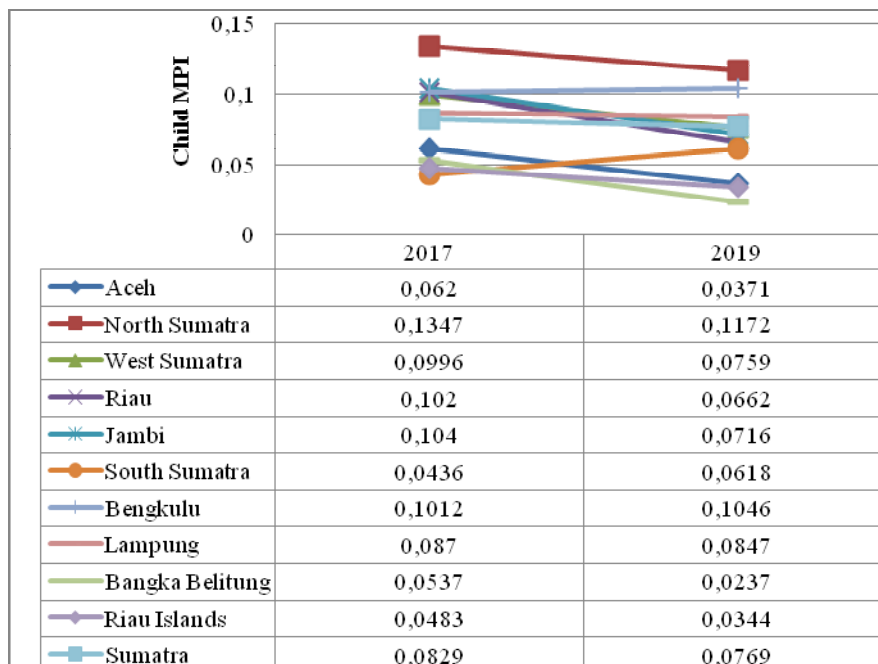


Figure 5. Child Multidimensional Poverty Index of Sumatra in 2017 and 2019
 Source: built by authors based on Central Bureau of Statistics data series

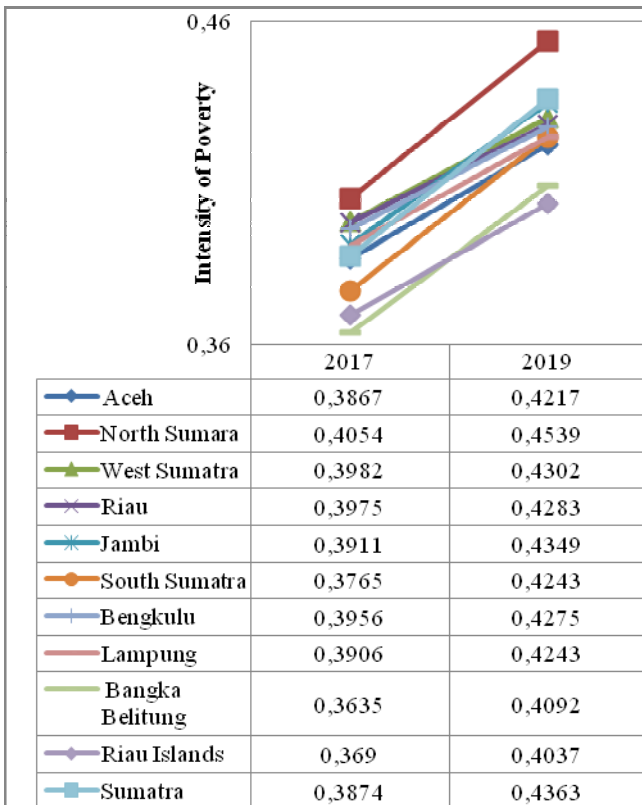


Figure 6. Headcount Ratio of Child Poverty Sumatra in 2017 and 2019

Source : built by authors based on Central Bureau of Statistics data series

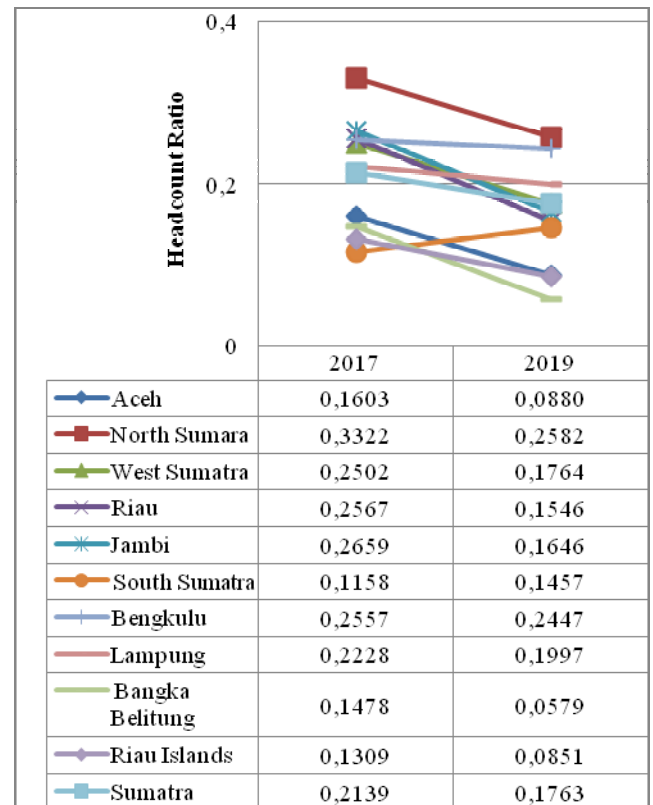


Figure 7. Intensity of Child Poverty Sumatra in 2017 and 2019

Source : built by authors based on Central Bureau of Statistics data series

Figure 6 shows the headcount ratio of child poverty and Figure 7 shows the intensity of child poverty or average deprivation. The headcount ratio of the multi-dimensionally poor child was decreasing in 2019, compared to 2017, for Sumatra and most provinces, except South Sumatra. However, the intensity of multidimensional poverty was increasing in 2019 for Sumatra and all provinces. The range of headcount ratio of 10 provinces in Sumatra was 11.58 percent (South Sumatra) to 33.22 percent (North Sumatra) for 2017 and 8.51 percent (Riau Islands) to 25.82 percent (North Sumatra) for 2019. The range of poverty intensity of 10 provinces in Sumatra was 36.35 percent (Bangka Belitung) to 40.54 percent (North Sumatra) for 2017 and 40.37 percent (Riau Islands) to 45.39 (North Sumatra) percent for 2019.



Child Multidimensional Poverty Index (MPI) of Sumatra in 2017 was 0.0829 which meant that the average deprivation of children in Sumatra 8.29 percent from 13 multi-dimensional forming indicators. The headcount ratio of Sumatran poor children in 2017 was 0.2139 which meant 21.39 percent of children in Sumatra were multi-dimensionally poor. The intensity of child poverty or average deprivation or average poverty gap was 0.3874 which meant the average deprivation experienced by multi-dimensional poor children was 38.74 percent of 13 multi-dimensional forming indicators. The condition of Child MPI becomes better in 2019 which score was 0.0769. The average deprivation of children in Sumatra was 7.69 percent from 13 multi-dimensional forming indicators. The result shows that 17.63 percent of children in Indonesia were multi-dimensionally poor and the average deprivation was 43.63 percent of the 13 indicators.

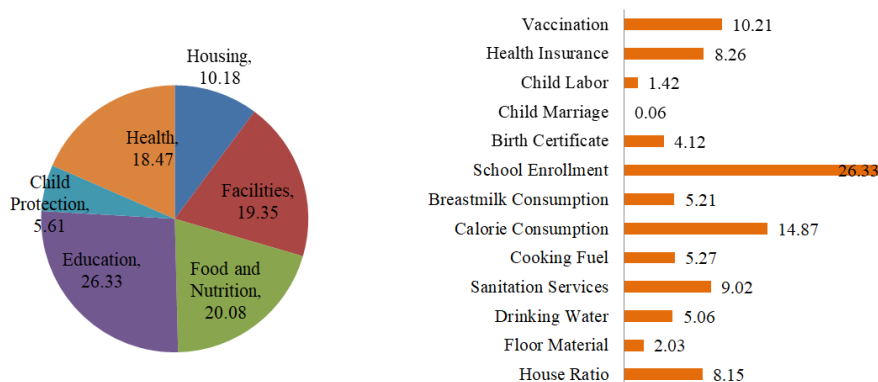


Figure 8. Composition of Child Multidimensional Poverty in Sumatra in 2017
 Source : built by authors based on Central Bureau of Statistics data series

Figure 8 shows the composition of Sumatran child poverty in 2017. The most contributed indicator can come from the most contributed dimension or come from the least contributed dimension. More than a quarter (26.33 %) of the composition was dominated by the dimension of education. The least contributed dimension was child protection about 5.61 percent. The order from the most to the least contributed dimensions was education (26.33%), food and nutrition (20.08%), facilities (19.35%), health (18.47%), housing (10.18%), and child protection (5.61%). The three-most contributed indicators were school enrollment (26.33%), calorie consumption (14.87%), and vaccination (10.21%) coming from the health dimension. The three-least contributed indicators were child marriage (0.06%) and child labor (1.42%) coming from the child protection dimension, and floor material (2.03%) coming from the housing dimension.

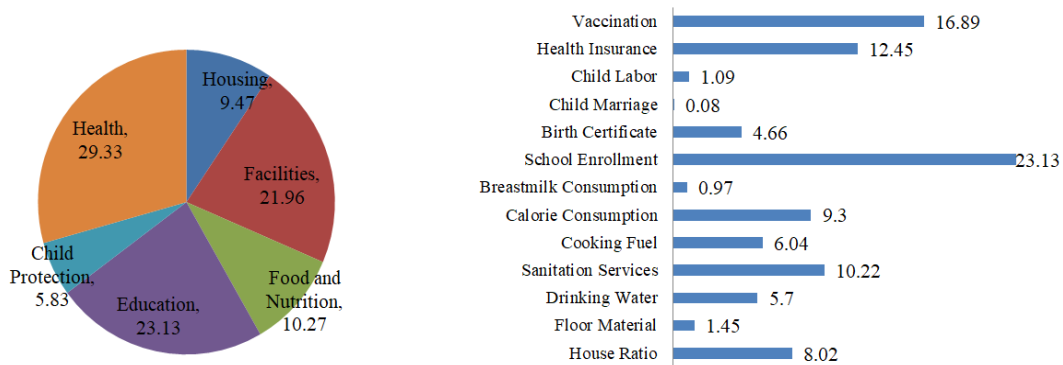


Figure 9. Composition of Child Multidimensional Poverty in Sumatra in 2019

Source: built by authors based on Central Bureau of Statistics data series

The composition of Sumatran child poverty in 2019 was different from the condition in 2017. The most contributed dimension was health about 29.33 percent. The least contributed dimension was still child protection about 5.83 percent. The order from the most to the least contributed dimensions had changed and they were health (29.33%), education (23.13%), facilities (21.96%), food and nutrition (10.27%), housing (9.47%), and child protection (5.83%). The three most contributed indicators were school enrollment (23.13%), vaccination (16.89%), and health insurance (12.45%) coming from the health dimension.

The three least contributed indicators were child marriage (0.08%), breast milk consumption (0.97%), and child labor (1.09%). Two of the three-least indicators come from the least contributed dimension (child protection dimension). Even there were many laws preventing child employment and child marriage, those things were still happening. Child employment and child marriage was started on the age of 10 years old and the age of 14 years old in 2017. Child employment and child marriage were started at the age of 10 years old and the age of 13 years old in 2019. Most of the child employments happened on boys and most of the child marriages happen on girls.



Quadrant Classification. This study used quadrant classification to classify 10 provinces in Sumatra based on the overlapping of the monetary poverty rate and child MPI. The scatter plot shows that there was a positive correlation between the monetary poverty rate and child MPI. There were four quadrants named Quadrant I, Quadrant II, Quadrant III, and Quadrant IV. Figure 7 and Figure 8 show the movement and the shifting of each province from 2017 to 2019. There were some movements of three provinces in 2019, which are Jambi, Riau, and West Sumatra, from Quadrant IV to Quadrant III. Bangka Belitung and Riau Island was in Quadrant III in 2017 and 2019. North Sumatra is consistency in Quadrant IV for both years. Quadrant I in 2017 was consisted of Bengkulu and Lampung and it did not change in 2019. Quadrant II in 2017 and 2019 were consisted of Aceh and South Sumatra.

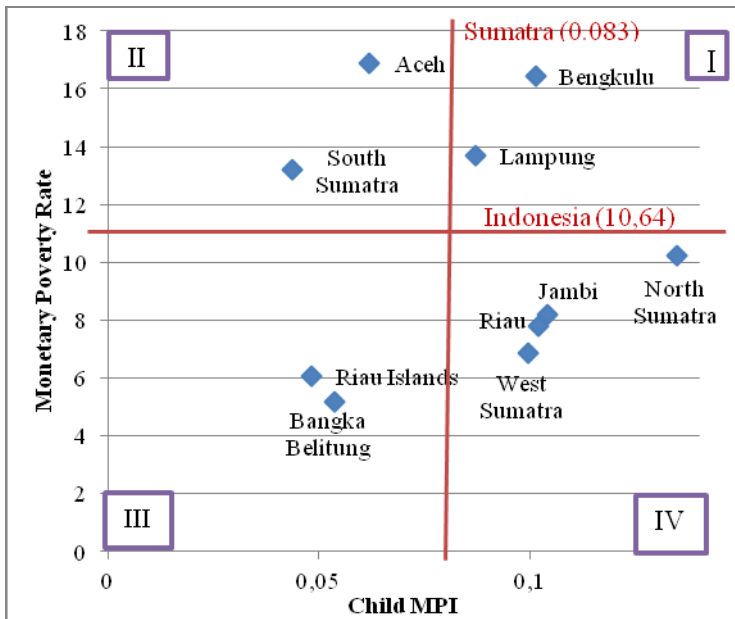


Figure 10. Child MPI and Monetary Poverty Rate in Sumatra in 2017

Source : built by authors based on Central Bureau of Statistics data series

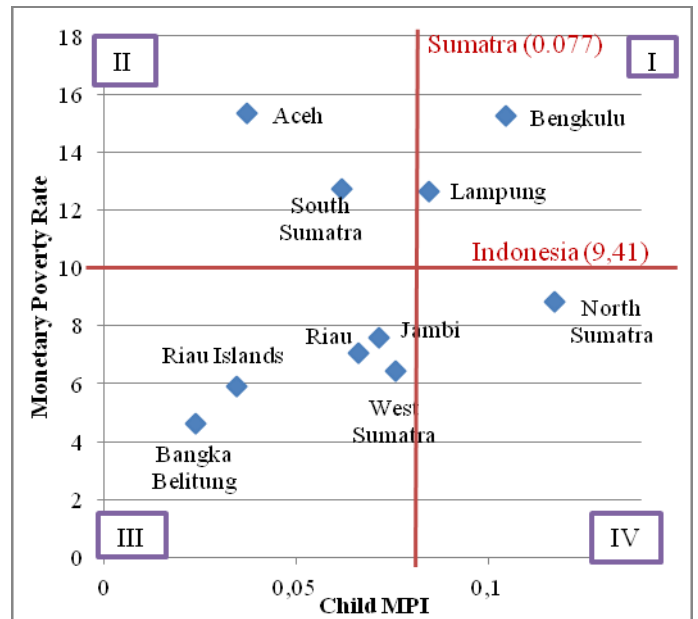


Figure 11. Child MPI and Monetary Poverty Rate in Sumatra in 2019

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Bengkulu and Lampung in Quadrant I should become a top priority of government policy about eradicating poverty. Provinces in Quadrant I was the provinces experiencing both monetary poverty and child multidimensional poverty above Indonesia's poverty rate and Child MPI in Sumatra. Poor children in both provinces lived in a not only monetarily poor household but also multi-dimensionally poor conditions. It is such a really big challenge to eradicate poverty and escape the poverty trap because the children were monetarily and non-monetarily poor. So, the government should focus on the greatest composition of child poverty which was an education in 2017 and health in 2019. Government should give more attention to school enrollment which children are attending level of education based on their age, basic vaccination, and health insurance provided by the government. The next step is the improvement of life facilities especially adequate sanitation services.

North Sumatra in Quadrant IV should be the next concern of government policy. North Sumatra's Child MPI was above Sumatran Child MPI which meant children in this province live in multi-dimensionally poor conditions. The children were non-monetarily poor, but they were not monetarily poor. Children did not live in a monetarily poor household, but they experienced some deprived conditions. The government should give more attention to child deprivation studies to determine the most effective solution for this problem. The most deprived condition also happened in education and health like Lampung and Bengkulu's condition. Government should not only give better access to education, but also build a better awareness of parents and young adults, living with children, about basic vaccination, adequate food and nutrition, and basic sanitation services for children. Roche (2013) [21] stated that policies to eradicate child poverty can be carried out through two approaches which are reducing the incidence of poverty or headcount ratio (H) approach and reducing poverty intensity (A) approach. The headcount ratio approach focuses on reducing the number of poverty incidents without paying attention to the intensity of poverty, so the poorest of the poor in this approach is not a priority. The poverty intensity approach focuses on prioritizing the most multidimensional deprived children which UNICEF terms as an equity-focused approach. Those two approaches have a better impact on one than the other in different areas.



Conclusions. The conclusions of this study are: **1)** The characteristics of deprived children in 2019 had changed compared to 2017. The number of 0-4 y.o-deprived children was decreasing for most dimensions, except the child protection dimension. The number of 5-17 y.o. deprived children were decreasing for most dimensions, except health dimension. Children aged 0-4 years old were more deprived in the dimensions of food and nutrition, child protection, and health, while children aged 5-17 years old were more deprived in the dimensions of housing and facilities in 2017. However, children aged 0-4 years old were more deprived in the dimensions of child protection and health, while children aged 5-17 are more deprived in the dimensions of food and nutrition, housing, and facilities in 2019. **2)** The condition of the Child Multidimensional Poverty Index (MPI) become better in 2019. The Child MPI in Sumatra was 0.0836 in 2017 and 0.0769 in 2019. Child MPI of Sumatra in 2017 was 0.0829 which meant that the average deprivation of children in Sumatra was 8.29 percent from 13 multi-dimensional forming indicators. Child MPI of Sumatra in 2019 was 0.0769 which meant that the average deprivation of children in Sumatra was 7.69 percent from 13 multi-dimensional forming indicators. **3)** Education was the most contributed dimension to child multi-dimensional poverty in Sumatra for 2017, while health dimension for 2019. The three-most contributed indicators in 2017 were school enrollment, calorie consumption, and vaccination while the three-most contributed indicators in 2019 were school enrollment, vaccination, and health insurance. However, the three-least contributed indicators in 2017 were child marriage, child labor, and floor material, while the three-least contributed indicators were child marriage, breast milk consumption, and child labor. **4)** North Sumatra was the first highest score of Child MPI, headcount ratio, and intensity of poverty out of 10 provinces in Sumatra in 2017 and 2019. However, South Sumatra in 2017 and Bangka Belitung in 2019 was the lowest score of Child MPI out of 10 provinces in Sumatra. The increased score of Child MPI only happen in South Sumatra and Bengkulu. The headcount ratio of the multi-dimensionally poor child was decreasing in 2019, compared to 2017, for Sumatra and most provinces, except South Sumatra. However, the intensity of multidimensional poverty was increasing in 2019 for Sumatra and all provinces. **5)** Bengkulu and Lampung were the provinces in 2017 and 2019 experiencing both monetary poverty and child multidimensional poverty above Indonesia's poverty rate and Child MPI in Sumatra. North Sumatra experienced child multidimensional poverty above Sumatran Child MPI, but its monetary poverty was below Indonesia's poverty rate. Aceh and South Sumatra experienced child multidimensional poverty under Sumatran Child MPI but its monetary poverty was above Indonesia's poverty rate. Bangka Belitung and Riau Islands experience both monetary poverty and child multidimensional poverty were below Indonesia's poverty rate and Child MPI in Sumatra. Jambi, Riau, and West Sumatra move from the same condition as North Sumatra to the same condition as Bangka Belitung and Riau Islands in 2019.



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Recommendation. Eradicating child multidimensional poverty should be started by eradicating the deprived condition in the most contributed dimension and indicator. The improvement of parents' or young adult awareness about children's needs is a must. Government should provide better access to an adequate standard of living for children. The research about child multidimensional poverty should be conducted every year and used every approach to determine the most effective and efficient approach in reducing child poverty. Future research can be conducted by inter-temporal comparisons of child poverty in a specific area which are before and after the condition of some policy implementation.

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