



Measuring Child Poverty in Jakarta Metropolitan Area Using a Multidimensional Perspective

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Abstract. This study aims to quantitatively uncover multidimensional child poverty in Jakarta Metropolitan Area, where Indonesia’s capital and its surrounding regions are located. It comprises 15 indicators in six dimensions of child wellbeing: housing, education, facility, food and nutrition, child protection, and health. It is a very alarming condition in the region that nearly one-fourth of children are deprived in at least three dimensions. These children experience, on average, 0.57 of all possible deprivations, or 3.4 deprivations, which indicates a massive high deprivation intensity. The overall deprived children are also almost two times larger than the poor children that suggest the lower monetary child poverty rate doesn’t guarantee to lower the multidimensional child poverty.

1. Introduction

Poverty is one of the main development issues in developing countries is closely linked to economic, social, and cultural factors that may undermine social stability, mental and physical health in the overall population [1]. The post-2015 Sustainable Development Goals (SDGs) aim to eradicate poverty, reduce inequalities and extend the benefits of sustainable economic development to all, especially the most vulnerable populations, including children. Therefore, examining poverty especially among the most vulnerable age group such as children is critical.

Understanding child poverty is key to develop policies that ensure children’s proper wellbeing and their basic needs are fulfilled. Most analyses often focus on the monetary approach, utilizing income (or consumption) per capita to determine the poverty status of members of a given household while assuming their needs are similar and that income is distributed evenly among them. But such an approach that offers only a limited perspective does not fully reflect on child poverty [2].

Household income level may not directly interpret into improvements of its members’ wellbeing, particularly children because they have different needs from adults. In most cases, not only because they are not the decision-makers in their households, but also because their needs are specific and not automatically fulfilled by higher household incomes. To measure children’s welfare, we need to assess child poverty using a multidimensional perspective through a broader measure that goes beyond monetary measurement. Multidimensional child poverty emphasizes the various deprivations experienced by children in their daily lives [3].

Children are also adults of the future, their opportunities, and development as children will impact their functioning in the near future [4]. The consequences of poverty are very significant for children. Falling into poverty with limited access to basic needs in childhood can last a lifetime [5].



To solve this issue, United Nations Children's Fund (UNICEF) developing a method to complement monetary-based poverty with multidimensional deprivation analysis and to produce quantitative evidence on child poverty called Multiple Overlapping Deprivation Analysis (MODA). MODA adopts a comprehensive definition of child wellbeing while concentrating on the access of children to various basic needs which are crucial for their development [6]. It recognizes that a child's experience of deprivations is multi-faceted and interrelated and that such multiple overlapping deprivations are more likely to occur in socio-economically disadvantaged groups, and with greater adverse effects [7].

There are nearly 84 million children age 0-17 with more than 255 million population of all age groups [8]. Children population contributes to more than 32.9 percent of the country's population. It's safe to state that one-third of Indonesia's population are children.

In 2016, the poverty rate in Indonesia was 10.86 percent [9]. Poverty among children age group (0-17) is the highest among other age groups, with 13.31 percent. This figure is relatively high in comparison to poverty in the productive age group (15-64), with 9.38 percent. While there were only three out of 10 children, the poor children contributed to around 40 percent of the overall population.

Like any other major city, Indonesia's capital is one of the regions with the lowest monetary child poverty rate. While monetary constraints are one of the most important determinants of child deprivation, not all deprived children monetary poor nor monetary poor children are deprived [10]. Megacities in developing countries face strong disaster risks such as flooding, a lack of drinking water, or issues around water pollution [11]. Rapid urban growth in the metropolitan area also correlated with increased water insecurity on health due to informal housing and slums and widespread poverty [12].

Given these striking conditions, there is a limited number of studies conducted in the field of children's poverty and deprivation in this country, especially in the metropolitan area where the majority of its population lives in urban areas. With urbanization currently expediting, it is becoming increasingly important to understanding deprivation in urban areas [13]. Poor urban populations tend to be underestimated and are often the indicators used to measure basic deprivations are not providing decision-makers with the information needed to implement policy to tackle urban deprivations [14].

This study constructs multidimensional child poverty with the application of the MODA framework to a metropolitan area. It analyses child deprivation in Jakarta Metropolitan Area, using data from the National Socio-Economic Survey 2016 that contains child-specific indicators of deprivation and monetary poverty. The study examines the single deprivation, multiple overlapping deprivations, and intra-region analysis between child deprivation and monetary child poverty.

The study is organized as follows. The next section describes the methodology. The third section illustrates the results of the study. The fourth section concludes the study. The last section shows the limitations of the study.

2. Methodology

This paper relies on Indonesia National Socio-Economic Survey (Susenas) data, collected by Statistics Indonesia. This longitudinal dataset consists of two sets of questionnaires: consumption module (VSEN16.KP) to calculate monetary poverty and core module (VSEN16.K) to collect welfare characteristics of selected households. The dataset filtered children that reside in Jakarta Metropolitan Area (JMA), consists of five out of six regions in DKI Jakarta Province (Central, East, North, West and North Jakarta), five out of 26 regions in West Java Province (Bogor, Bogor Regency, Bekasi, Bekasi Regency, and Depok) and three out of eight regions in Banten Province (Tangerang, Tangerang Regency and South Tangerang).

The procedures of measuring child deprivation using the Multiple Overlapping Deprivation Analysis (MODA) [15] framework as follows:

a. Select the unit of analysis:

The most commonly used unit analysis is individual or household. In this study, children ages 0-17 are selected as the subject.

b. Define deprivation and specify its dimensions and indicators:

Defining it helps in setting the objectives of the analysis and choosing the most suitable dimensions. Choosing indicators mainly relies on the availability of the data.

c. Define deprivation cut-offs for each indicator and dimension:



Children's well-being differs in every stage of their lives. Adopting N-MODA, look at Table (1).

d. Select weights for each indicator and dimension:

Union approach is selected to calculate the number of children deprived on the chosen indicators.

e. Select poverty cut-off:

There are three methods to aggregate the indicators into dimensions:

1. Union approach ($0 < k \leq 1$)
2. Intersection approach ($k = d$)
3. Intermediate cut-off approach ($0 < k < d$)

where k is a cut-off point and d is a number of dimensions. To avoid making an arbitrary decision, MODA shows the outcomes for all possible cut-off points.

f. For single deprivation analysis, calculate the headcount ratio for each indicator and dimension.

g. Calculate the multidimensional poverty headcount (H):

$$H = \frac{q_k}{n} \quad (1)$$

where H is multidimensional child deprivation headcount ratio according to cut-off point k ; q_k is number of children affected by at least k deprivations; and n is the total number of children.

h. Calculate the average intensity of deprivation (A):

$$A = \frac{\sum_1^{q_k} c_k}{q_k * d} \quad (2)$$

where A is the average intensity of multidimensional deprivation according to the cut-off point k ; d is the total number of dimensions considered per child; and c_k is the number of children deprived multidimensionally.

i. Calculate the adjusted multidimensional poverty headcount (M_0):

$$M_0 = H * A \quad (3)$$

where M_0 is adjusted multidimensional child deprivation headcount ratio among children affected by at least k deprivations. This measure satisfies various of the basic properties of poverty measures, which means that this poverty measure is sensitive to the breadth of poverty that is experienced by each child.

**Table 1.** Selected dimensions, indicators, and definitions of MODA method

| No | Dimension | Indicator | Definition |
|-----|--------------------|-----------------------|--|
| (1) | (2) | (3) | (4) |
| 1 | Housing | Floor area | Age 0-17 that lives in the household with floor area per capita less than 7.2 m ² |
| | | Floor material | Age 0-17 that lives in the household with the floor made out of non-permanent materials |
| 2 | Education | School attendance | Age 3-4 that is not attending pre-school Age 5-6 that is not attending pre-school and/or primary school Age 7-17 that is not attending primary or secondary school |
| | | Lateness in schooling | Age 7-17 that did not complete the grade required for his/her age |
| 3 | Facility | Drinking water source | Age 0-17 that lives in a household with access to an unimproved source of drinking water |
| | | Sanitation | Age 0-17 that lives in a household that does not have access to an improved toilet type/sanitation |
| | | Cooking fuel | Age 0-17 that lives in a household that uses natural source fuel for cooking (e.g. wood, coal, etc.) |
| 4 | Food and nutrition | Calorie consumption | Age 0-17 with total calorie consumption per capita per day less than normal daily calorie consumption intake |
| | | Fat proportion | Age 5-17 that have fat B consumption more than 35 percent to its total fat B consumption |
| | | Breastfeeding | Age 0-11 months that did not have exclusive breastfeeding and/or extra foods or fluids |
| 5 | Child protection | Birth certificate | Age 0-17 that did not have a birth certificate |
| | | Early marriage | Age 10-17 that is married, divorced, or widowed |
| | | Child worker | Age 10-17 that is working a minimum of one hour continuously during the reference week |
| 6 | Health | Insurance | Age 0-17 that does not have health insurance |
| | | Immunization | Age 12-59 months that did not have full immunization |

3. Results

3.1 Single deprivation analysis: how many children are deprived and what are they deprived of?

The single deprivation analysis describes the results for each of the separate dimensions and indicators that have been selected for the MODA analysis. It portrays the number of children deprived in a given dimension as a percentage of specified children age group. It gives a preliminary indication of which sectors should receive specific attention for children's well-being development [16, 17].

Based on Figure 1 and Figure 2, the levels of deprivation for the food-nutrition and health dimensions are similar to children in JMA, with approximately one out of two of children deprived in those dimensions. The high deprivation level in the health dimension is driven by deprivation level in immunization and insurance indicators. This is caused by bad immunization coverage (half of the children do not receive full immunization such as BCG and all three DPT vaccinations by age 23 months) and bad coverage of health insurance with two out of five children deprived. While only 3 out of 100 children age 0-11 months do not have exclusive breastfeeding, almost one-third of children in JMA are deprived in calorie consumption per capita indicator.

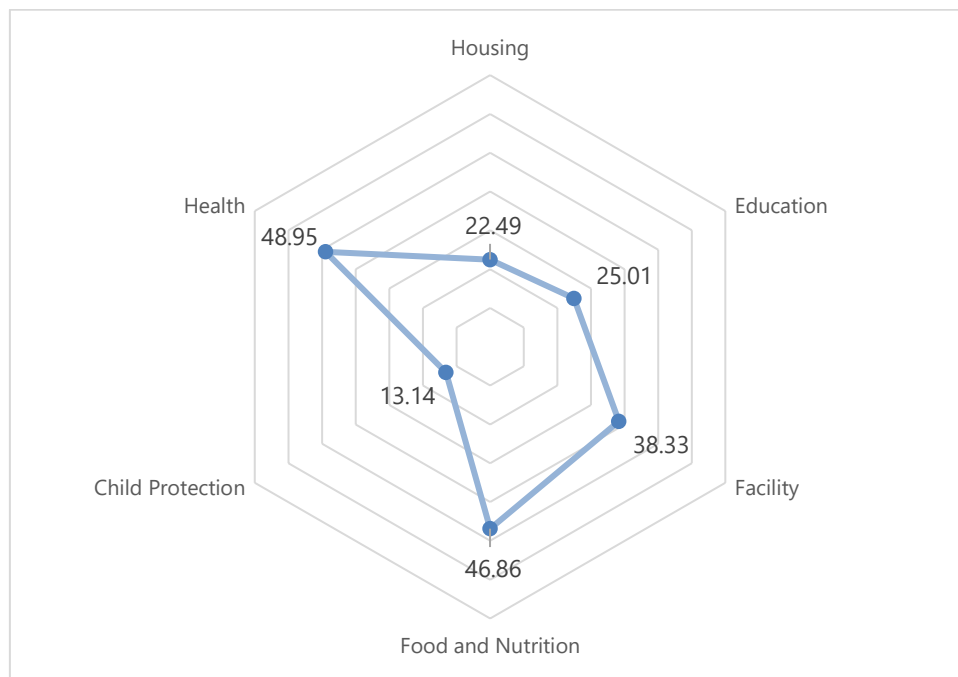


Figure 1. Number of children deprived in a given dimension as a percentage of total children in JMA

Source: Author's calculation, Indonesia Susenas 2016

The levels of deprivation for housing and education are similar, with around one-fourth of children deprived in the two dimensions. The level of deprivation in the housing dimension is mostly driven by floor area indicator, where more than one-fifth of children in JMA live in a household with a floor area less than 7.2 m² per capita with only 1.3 percent have lived in a house with unimproved floor materials. With regards to education, the deprivation levels for school attendance and lateness in schooling (children that did not start their education based on their appropriate age) are relatively mid-low (around 15 percent).

3.2 Multiple overlapping deprivation analysis: to what extent do children face deprivation?

To answer the question, the MODA methodology provides us with a tool to identify deprived children and their degree of vulnerability [16]. Not only can we identify whether children are deprived or not, but also if they experience simultaneously multiple deprivations.

Figure 3 displays the distribution of the number of simultaneous deprivations faced by children in the Jakarta Metropolitan Area (JMA) by area of residence. Approximately 17.3 percent of the children in the JMA are not deprived in any of the measured dimensions. Most of the deprived children have two or three deprivations at the same time (28.6 percent and 27.6 percent, respectively). Then, around three out of four children age 0-17 years old suffer from one to three simultaneous deprivations, reflecting the depth of multidimensional deprivations among children in the JMA.

Figure 4 shows the specified dimensions contribution percentage of deprivations faced by children in the Jakarta Metropolitan Area (JMA). In every case, the contribution of every dimension for the highest dimension is equal.

Nearly two-thirds of the children are deprived in health and food-nutrition dimensions if they are deprived in one dimension. Approximately one out of two children are deprived in health and food-nutrition dimensions if they are deprived in two dimensions. Then, one-third of the children will be deprived in these two dimensions if they are deprived in all six dimensions.

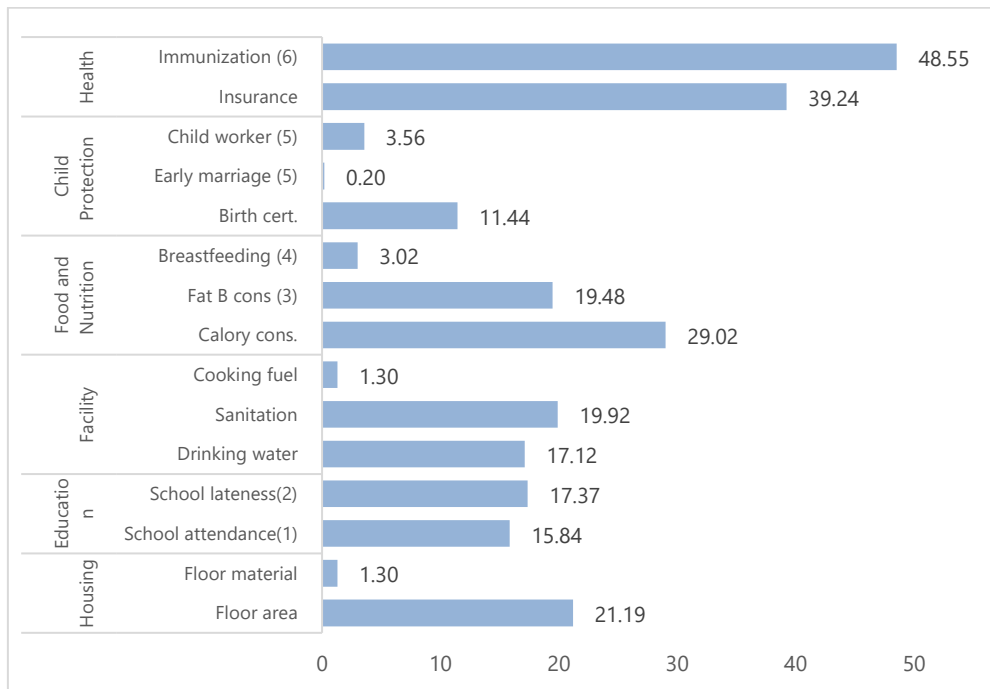


Figure 2. Number of children deprived in a given indicator as a percentage of total children in JMA

Source: Author’s calculation, Indonesia Susenas 2016

where: (1) Age 3-17 year; (2) Age 7-17 year; (3) Age 5-17 year;
 (4) Age 0-11 month; (5) Age 10-17 year; (6) Age 12-59 month.

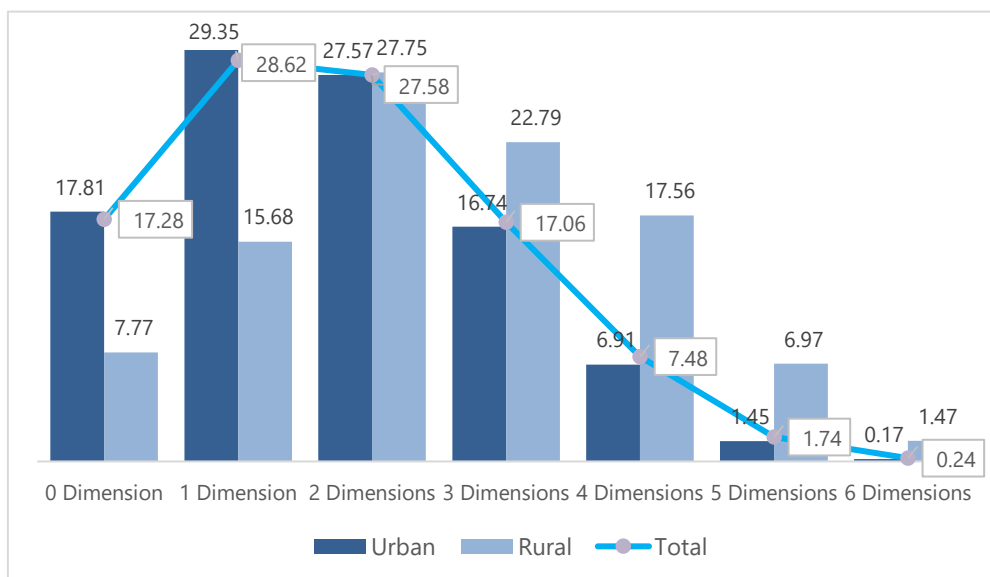


Figure 3. Share of children deprived in number of dimensions in JMA by type of area residence

Source: Author’s calculation, Indonesia Susenas 2016

Figure 4 shows that in JMA, the proportion of children that are deprived in health and food-nutrition dimensions will decrease as the number of dimension increase. On the contrary, the proportion of children that are deprived in child protection, education, and housing dimensions will increase overall



as the number of dimensions goes up. Facility dimension is the only dimension that doesn't follow the two trends before, whereas the largest proportion of children that deprived in this dimension if children in JMA deprived in four out of six dimensions.

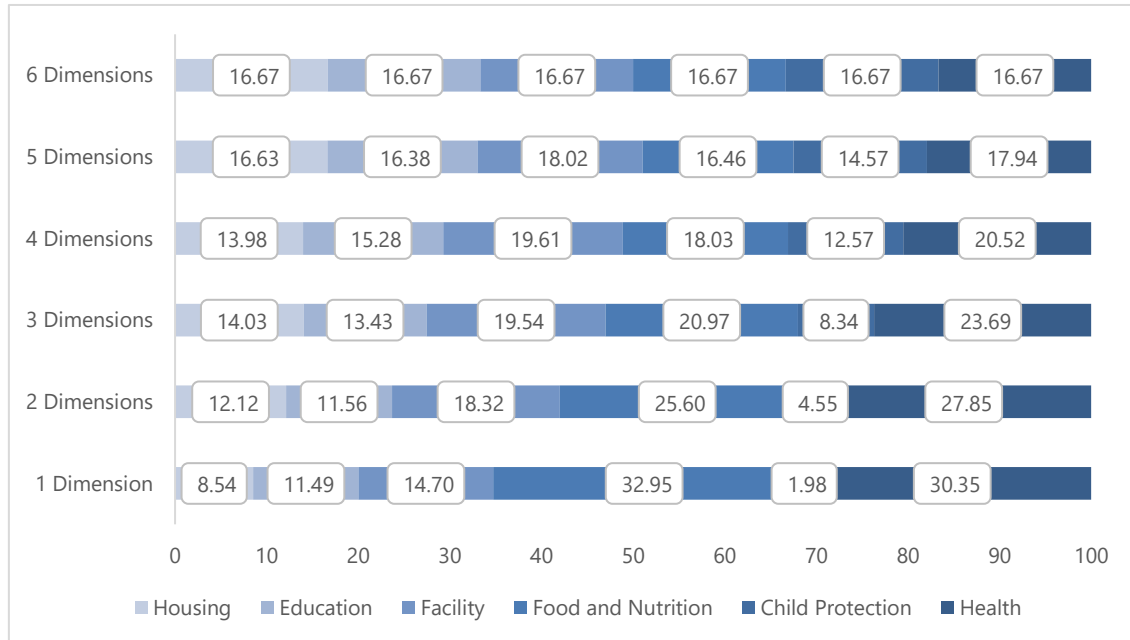


Figure 4. Percentage of the deprived children in JMA by number of dimensions

Source: Author's calculation, Indonesia Susenas 2016

Table 2 shows the estimates of deprivation headcount rate (H), average intensity among the deprived (A), and the adjusted multidimensional deprivation headcount rate for deprivation intensity (M_0), at all possible thresholds (k). The vast majority of children are deprived in at least one dimension with 82.72 percent, while 54.10 percent are deprived in two or more dimensions.

Table 2. Headcount, average intensity, and adjusted multidimensional child poverty by cut-off point of the number of dimensions in Jakarta Metropolitan Area

| Cut-off | Headcount (H) | Average intensity (A) | Adjusted headcount (M_0) |
|------------------------------|-------------------|---------------------------|------------------------------|
| (1) | (2) | (3) | (4) |
| $k \geq 1$ | 82.72 | 0.35 | 29.17 |
| $k \geq 2$ | 54.10 | 0.45 | 24.40 |
| $k \geq 3$ | 26.52 | 0.57 | 15.21 |
| $k \geq 4$ | 9.46 | 0.71 | 6.68 |
| $k \geq 5$ | 1.98 | 0.85 | 1.69 |
| $k = 6$ | 0.24 | 1.00 | 0.24 |

The results also display that, taking a cut-off level of at least 3 dimensions ($k \geq 3$), nearly one-fourth of children in JMA are deprived in at least three dimensions. These children experience, on average, 0.57 of all possible deprivations, or 3.4 deprivations, which indicates a massive high deprivation intensity. Then, the adjusted multidimensional deprivation headcount rate for deprivation intensity in JMA is 15.21 percent.

The adjusted multidimensional deprivation headcount (M_0) is the product of the headcount and the average intensity that allows us to compare the overall multidimensional poverty situation in terms of both headcount and average intensity comparison and decomposition [18].



3.3 Intra-region analysis of multidimensional and monetary child poverty

Monetary and multidimensional child poverty measures should be used together whenever possible to provide a holistic picture of child well-being [19]. In this study, we calculated the headcount of monetary child poverty using the specified poverty lines and we compare it to the adjusted headcount of multidimensional poverty with a cut-off point of at least three dimensions.

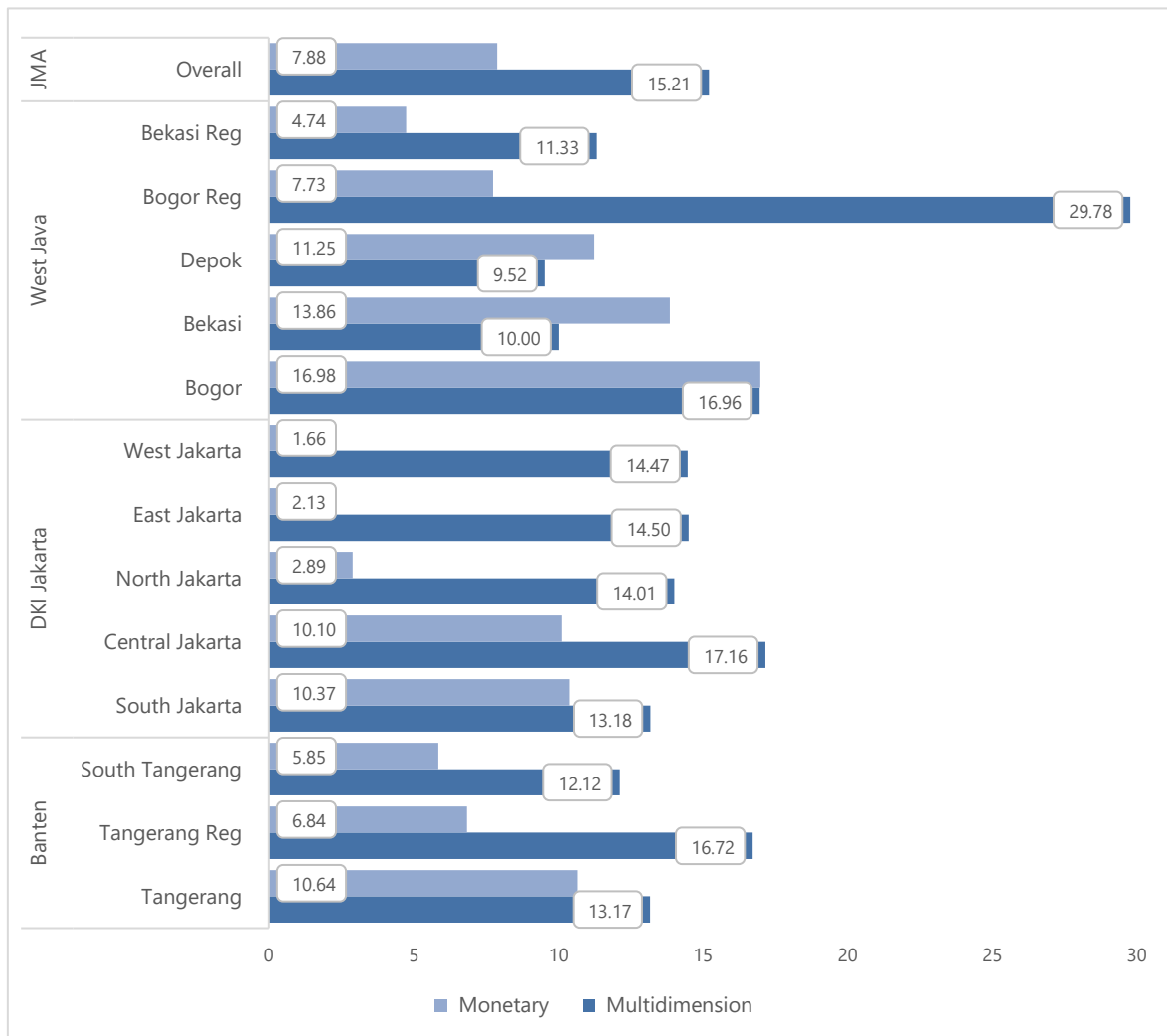


Figure 5. Headcount of the monetary and adjusted headcount of multidimensional child poverty by municipality/region in JMA (Source: Author's calculation, Indonesia Susenas 2016)

Based on Figure 5, the number of deprived children is nearly two times larger than deprived children in the Jakarta Metropolitan Area (JMA). Almost all regions in JMA have larger deprived children than poor children, except for Depok, Bekasi, and Bogor in West Java Province. Depok is the only region in JMA that has deprived children of less than 10 percent. Bekasi has the largest surplus of deprived children with the gap of only 1.73 percent to its poor children, while Bogor is the only region that has a similar rate between deprived and poor children in JMA.

Which regions are doing worse? With almost 30 percent of children in Bogor Regency deprived multidimensionally, this figure is four times larger than the poor children in this region, with more than 20 percent gap between deprived and poor children.

Other regions that did worse than Bogor Regency are West, East, and North Jakarta in DKI Jakarta Province. While the poor children insignificantly only account for less than three percent of their child



population, the deprived children account for more than 14 percent of its child population. The deprived children are 8.7, 6.8, and 4.9 times larger than the poor children, respectively.

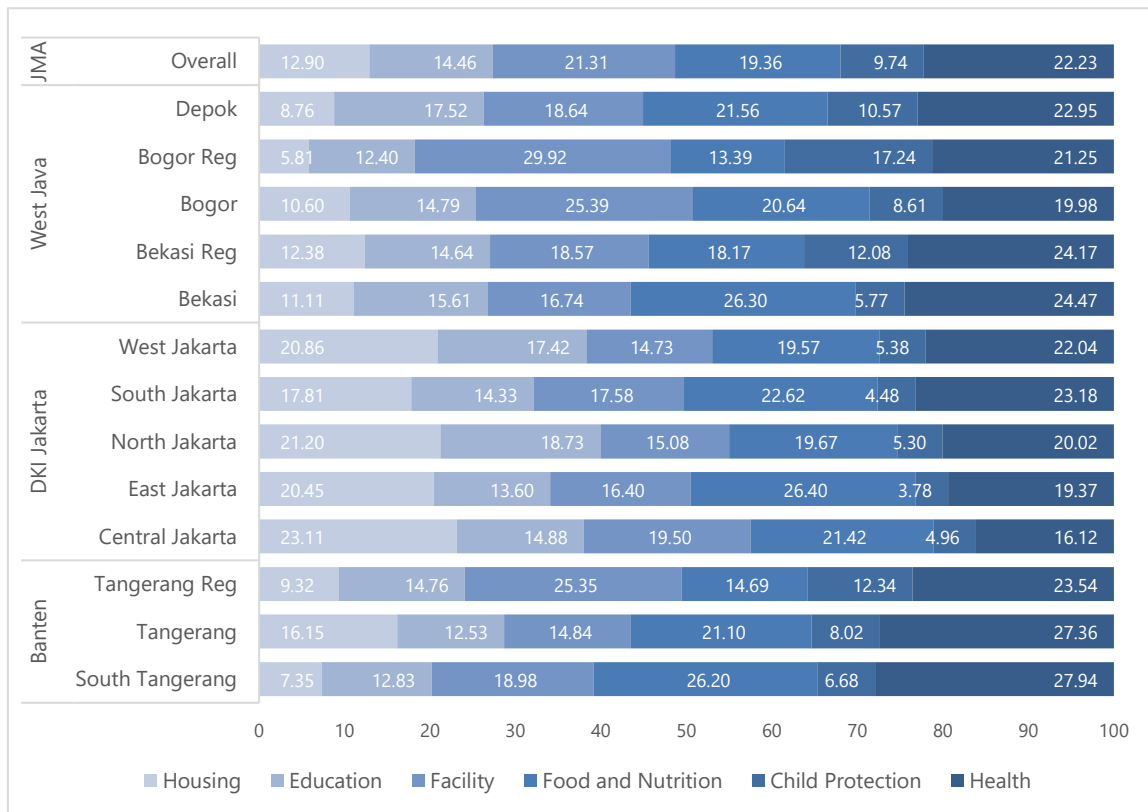


Figure 6. Decomposition of the adjusted child deprivation headcount with cut-off $k \geq 3$ in Jakarta Metropolitan Area (JMA) by municipality/regency (Source: Author’s calculation, Susenas 2016)

Figure 6 shows the decomposition of the multidimensional child poverty index, by various profiling variables, to show the relative contribution of deprivation in each dimension to the index. The dimensions of health, food, and nutrition, and facility have the highest relative contribution to overall multidimensional poverty across JMA.

The main contributor to the relative contribution of deprivation in regions in West Java Province is the health dimension, except for Bogor and Bogor Regency with facility dimension as their main contributor. This case also happens in regions in Banten Province of JMA, whereas the health dimension is the main contributor except for Tangerang Regency where their main contributor is the facility dimension. In five regions in DKI Jakarta Province of JMA, the highest contributor for West and South Jakarta is health dimension; housing in North and Central Jakarta; and food-nutrition dimension in East Jakarta.

4. Conclusions

Child poverty is a multidimensional concept which measures child wellbeing development. Four primary conclusions can be drawn from this study. First of all, in a single deprivation, health and food-nutrition have the highest figures. Almost one out of two children is deprived in these two dimensions. This is mostly driven by the vast majority of children who did not receive full immunization (such as BCG and all three DPT vaccinations by age 23 months), have bad coverage of health insurance, and unimproved calorie consumption per capita per day. On the other hand, only 3 percent of children did not have exclusive breastfeeding.



Secondly, in the extent of child deprivations children faced, the proportion of children that are deprived in the health and food-nutrition dimensions will decrease as the number of dimension increase. On the contrary, the proportion of children that are deprived in child protection, education and housing dimensions will increase overall as the number of dimensions goes up. The facility dimension is the only dimension that doesn't follow the previous two trends, whereas the largest proportion of children that are deprived in this dimension if children deprived in four out of six dimensions.

Thirdly, with taking a cut-off level of at least three dimensions ($k \geq 3$), nearly one-fourth of children are deprived in at least three dimensions. These children experience, on average, 0.57 of all possible deprivations, or 3.4 deprivations, which indicates a massive high deprivation intensity. Then, the adjusted multidimensional deprivation headcount rate for child deprivation intensity is 15.21 percent.

Finally, in terms of the region child poverty analysis, the deprived children are almost two times larger than the poor children, with only three regions that have the deprived children less than the poor children. Then, the dimensions of health, food nutrition, and facility have the highest relative contribution to overall multidimensional poverty in the region.

5. Limitations

This study is vulnerable to a number of limitations. Firstly, the analysis is based on 2016 data, there is a 5-year lag to the time of the study. However, further study can be conducted using 2020 data to compare how well current government administration reducing child deprivation in their first five-year term. Secondly, this study is limited to the sample of children covered by the Susenas, which by definition a household survey, excludes some of the most vulnerable children who are not living in regular households. Lastly, the MODA framework can be modified in various ways, hence the construction of indicators and dimensions is open to debate and improvement.

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