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Multidimensional Approach to Poverty Measurement in Indonesia

Dwi Rani Puspa Artha[1*], Teguh Dartanto[2]

Abstract
Poverty is multidimensional phenomenon. The poverty measurement that based on consumption level is insufficient in explaining the multiple deprivations faced by poor. Applying Alkire & Foster's multidimensional methodology framework by utilizing the National Socio Economic Survey Indonesia data (2011), this study confirmed that the monetary measure of poverty should be complemented with multidimensional poverty measure to capture comprehensive picture of deprivation in Indonesia. Around 62.3% of populations that monetary poverty measurement declares them as non-poor are multidimensional poor. Using the logit and ordered logit model, this study also confirmed that a higher educational attainment of household head leads to a higher probability of being non-poor both in monetary and multidimensional poverty. The paper identifies that health is the major source of multidimensional poverty. Universal health insurance program is needed. Human investment is very important in efforts to reduce poverty.

Keywords
Monetary Poverty — Multidimensional Poverty — Indonesia

[1,2] *Department of Economics and Magister of Economics, Universitas Indonesia*
*__Corresponding author__: dwiranipuspa@gmail.com

Contents

1. INTRODUCTION

The changing of poverty definition towards broader look has been causing a lot of criticism regarding the measurement of poverty which is based only on monetary attribute such as income or consumption. The critics argue that monetary poverty measures alone are not sufficient to explain poverty. Poverty measurement should involve basic human needs such as health and education [1]. Poverty is essentially a multidimensional phenomenon so that should be explained by multidimensional approach [2]. Many researchers proposed new methods of poverty measures by multidimensional approach. One of them is [3] who proposed multidimensional poverty measures which is used FGT's (Foster Greer Thorbecke) class of one-dimension poverty measures. It offers multidimensional poverty estimates at the aggregate, provincial and district level and identifies the major drivers of poverty [4].

Indonesian poverty measurement uses concept of ability to satisfy minimum basic needs of food and non-food that were measured from the consumption side (monetary attribute only). For the past 15-years period, Indonesia has been managing to reduce over 40% of the poor. So we explore non-monetary attributes condition over monetary poverty in Indonesia to see the monetary poverty is enough. Based on data 2011, we found that the non-poor of monetary poverty, such as health (childbirth process), education (illiterate), housing, drinking water, sanitation, cooking fuel, and assets ownership, still deprived in non-monetary indicators. Almost twenty percent monetary non-poor are deprived in health. It also shows that eight percent of monetary non-poor are still deprived in education. It is even worse for four others criterion. Over twenty percent of monetary non-poor can't afford to have clean drinking water while almost forty

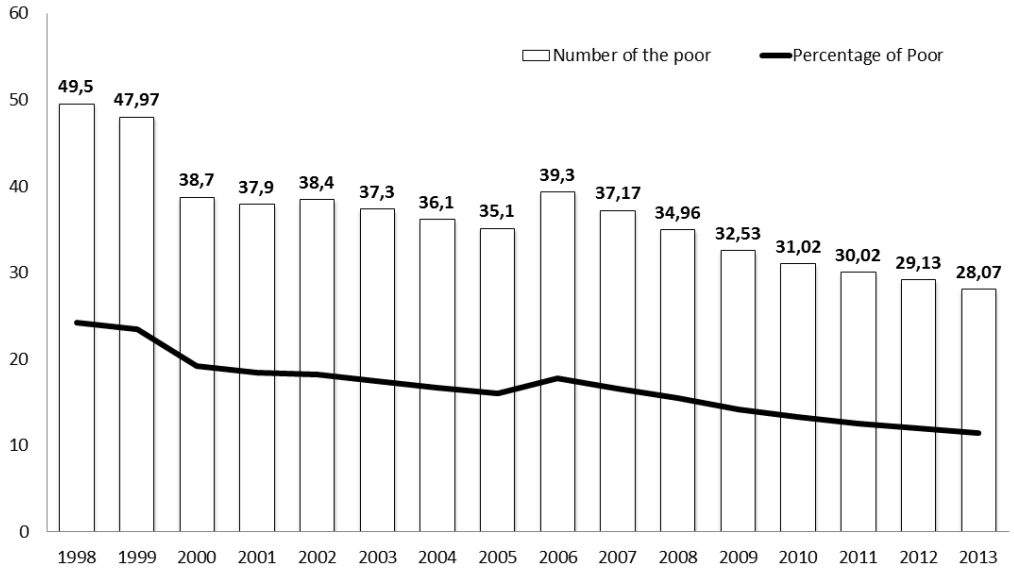

Figure 1. Poverty in Indonesia (1998–2013)
Source: Statistics Indonesia

percent is have no access to improved sanitation, proper cooking fuel and assets ownership. So even though the monetary measurement of poverty is continuously decreasing but monetary poverty cannot capture the achievement of human deprivation in term of non-monetary indicators of poverty; therefore, it is important to have the multidimensional indicators of poverty measurement to complement the monetary poverty measurement.

The previous researches about multidimensional poverty in Indonesia were conducted by [3], [5], and [6]. [3] illustrated multidimensional poverty measurement using Indonesian data. In 2010, Alkire and Santos measured multidimensional poverty index in 104 countries including Indonesia. They used three dimension i.e. health, education, and living standard. They found that 1.7 billion people are living in multidimensional poverty and most of them live in middle income countries. [6] compared multidimensional poverty to monetary poverty. This study revealed that the human assets (health and education) contribute more rather than physical assets (living standard).

All previous studies used Indonesian Family Life Survey (IFLS) data which undertaken only in four waves i.e. 1993, 1997, 2000, and 2007. Author proposes to use National Socio Economic Survey Indonesia (Susenas) that was conducted by Statistics Indonesia every year. Susenas data is more up to date rather than Indonesian Family Life Survey (IFLS) data, and the sample size is also much larger. The Susenas data represents actual Indonesia condition much more than the IFLS data. It covers all provinces in Indonesia while IFLS data only covers 13 of 33 provinces. We could break down the multidimensional poverty measures in to province level. So, this research gives an alternative approach to explore multidimensional poverty in Indonesia using the most available and most suitable data that represent actual Indonesia condition well. We also accommodate some new indicators of dimension that capture new dimensions of deprivation in Indonesia. This paper aims at addressing the following four research objectives: 1) measuring the multidimensional poverty in Indonesia; 2) comparing between the multidimensional poverty and the monetary poverty measurement; 3) exploring the determinants of multidimensional poverty; 4) analyzing why there is different between the monetary and multidimensional poverty and its implication to the policy guidance.

2. LITERATURE REVIEW

2.1 Defining poverty measurement

Poverty measurement has improved since hundred years ago. Mahbub UlHaq and Amartya Sen create Human Development Index (HDI) as an alternative assessment to determine whether a country is developed, developing, or underdeveloped besides economic growth. They compose HDI with three components: health, education, and standard of living. Health is measured by life expectancy at birth, education is measured by combination of adult literacy and gross enrollment, and standard of living is measured by GDP per capita. But HDI is not responsive to changing policy in short time. Then Human Poverty Index (HPI) is created to improve HDI. HPI used deprivation concept which is a situation where people are not able to fulfill the needs of life and basically the cause is poverty.

HPI measures deprivation in each dimension of human development while HDI measures the average achievements. But both measures are used at region/country level only. Then Multidimensional Poverty Index (MPI) is created to complement both of previous measurements. MPI analyzed poverty at household/individuals level. MPI is composite measure of health, education, and standard of living. Health is approached by nutrition and child mortality. Education is measured by years of schooling and children enrollment. Standard of living is approached by combination of cooking fuel, toilet, water, electricity, floor, and asset condition.

[3] propose a new approach method in identifying the poor. They use weighting system. Any person who deprived in a dimension will be given a certain weight. The rank of the total weight is 0–1. Each dimension has equal weight, if we use n dimensions then the weight for each dimension is

1/n. If one dimension consists of several indicators then indicator's weight in the same dimension has equal value. The second cutoff is simply the number of dimensions in which a person must be deprived to be considered poor [7]. The advantage of this method is that the identification approach is applicable on ordinal variables. All cardinalizations of the ordinal variable yield identical conclusions when applying both cutoffs. Also, these methods are sensitive to the joint distribution of deprivations [7].

This method has been applied in many countries around the world. [8] applied Alkire and Foster's Method (AFM) for measuring multidimensional poverty in Punjab Province, Pakistan. This study uses eight dimensions in measuring multidimensional poverty. The dimensions are housing, water, sanitation, electricity, assets, education, expenditure, and land. The result shows that land, expenditure, sanitation, housing, education are the major contributors among overall multidimensional poverty. Another research was done by [9] in Sub-Saharan Africa. This study defines four dimensions i.e. assets, health, schooling, and empowerment. This study leads to conclusion that AFM is appropriate for measuring poverty in developing countries such as Sub-Sahara Africa countries. And this result is similar to [10]. [10] applied AFM by using 20 non-monetary indicators that are grouped into four dimensions: basic deprivation, consumption, health, and neighborhood environment for 28-Europan countries. Later, [4] adopted AFM in Pakistan. This study calculates multidimensional poverty measures with four dimensions: education, health and nutrition, living standards, and wealth. The results shows multidimensional poverty incidence is significantly higher than monetary poverty incidence (which is consumption-based). This study also verifies that consumption alone does not sufficiently explain deprivations faced by the poor.

[3] already illustrated multidimensional poverty measurement using Indonesian data. In 2011, Alkire et al. measured multidimensional poverty incidence in Indonesia. They use three dimensions: education, health, and standard of living. [6] also estimated multidimensional poverty incidence in Indonesia than compared it to monetary poverty. He uses three dimension i.e. health, education, and living standard. This study reveals that the human assets (health and education) contribute more rather than physical assets (living standard).

2.2 Determinant of poverty

Many studies have found that key determinants of monetary poverty are human capital, demographic factors, geographical location, physical assets and occupational status. [11] found that regional unemployment has a positive relation with poverty, while remittance, house ownership, access to sewage and sanitation have negative effect in Eritrea. [12] found that public employment, informal sector, household size, age, and sex composition of head of the household are determinants of food calorie (consumption) poverty in Pakistan. [13] showed that age, level of education and occupation of household head, dependency ratio, exposures to idiosyncratic risk and access to credit are significant in explaining a household's vulnerability to poverty in South Africa. [14] confirmed that agriculture, education, family health and infrastructure are another important factor often associated with poverty in Indonesia. [15] also proved that the determinants of consumption poverty are educational attainment, size of household, physical assets, employment status, health shock, sectors in which they work, the availability of microcredit program and regional characteristics such as agricultural productivity, human development index and sanitation availability.

[16] compared consumption poverty and multidimensional poverty in rural Ethiopia. They found that the determinants of these two poverty measures are different. Household's size matters in consumption poverty but not in multidimensional poverty. This also applies to drought shock effect. The short-term shocks are more reflected in consumption poverty while simultaneous shocks are significant for multidimensional poverty. [17] compared income poverty to multidimensional poverty approach. They verified that increasing years of school can give more sustainable contribution to stay out from impoverished condition in long run. Level of education has strongest relation to both poverty measures. The age of household head and house owning have positive relation to multidimensional poverty.

3. METHODOLOGY

3.1 Counting multidimensional poverty

We are following the Alkire and Foster's methodology of multidimensional poverty (2007). Suppose a group of individuals. Let d ≥ 2 be the number of dimensions and $x = [x_{ij}]$ the nxd matrix of achievements, where x_{ij} is the achievement of individual i (i = 1, ..., n) in dimension j (j = 1, ..., d). x is of the following form:

$$x = \begin{pmatrix} x_{11} & . & x_{1j} & . & x_{1d} \\ . & . & . & . & . \\ x_{i1} & . & x_{ij} & . & x_{id} \\ . & . & . & . & . \\ x_{n1} & . & x_{nj} & . & x_{nd} \end{pmatrix}$$

Let z be a row vector of dimension-specific thresholds z_j, x_i the row vector of individual i's achievements in each dimension, and x_j a column vector of dimension j achievements across the set of individuals. Suppose matrix deprivation $x^0 = [x^0_{ij}]$ is derived from x as follows:

$$x^0_{ij} = \begin{cases} 1 & \text{if } x_{ij} < z_j \\ 0 & \text{otherwise} \end{cases}$$

x^0_{ij} = 1 means that individual i is deprived in dimension j and x^0_{ij} = 0 that individual i is not. Let k be the cut-off. By summing each row of x^0_{ij}, we obtain a column vector c of deprivation counts containing c_i the number of deprivations suffered by individual i. An individual i will be considered as poor if $c_i \geq k$

$$p_k = \begin{cases} 1 & \text{if } c_i \geq k \\ 0 & \text{if not} \end{cases}$$

The first measure is given by headcount ratio. Let qk be the number of poor identified according to the thresholds vector z and the cutoff k, the headcount ratio H. Let q_k be the number of poor identified according to the thresholds vector z and the cutoff k, the headcount ratio H is following:

$$H = \frac{q_k}{n} \quad ; \quad q_k = \sum_{i=1}^{n} p_k$$

The share of possible deprivations suffered by a poor individual i is given by:

$$\overline{c_i}(k) = \frac{1}{d}[c_i p_k]$$

and the average deprivation share across the poor by:

$$A = \frac{1}{q_k d} \sum_{i=1}^{n} c_i p_k$$

3.2 Data and selection of dimension, indicators, and cutoffs

3.2.1 Data

This paper uses National Socio Economic Survey Indonesia (Susenas) data collected in 2011 by Statistics Indonesia. The Survey covers all 33 provinces in Indonesia. The Susenas data contains rich information on education, health, employment, housing, and social information therefore suitable to answer the research question in this study. The Susenas data utilized a two-type question design. The first question type asks household's information and the second type asks individual's information. The first covers about 285,307 households while the second covers 1,118,239 individuals. After complying two samples, we got data about 1,079,277 of individuals.

This paper also combines the 2011 Susenas data set with the 2011 Village Potential Statistics (Podes) data set. The 2011 Podes data provides information about village characteristics for all Indonesia, with a sample of 77,961. It is surveyed in the context of the periodic censuses (Agriculture, Economy, and Population). After merging Susenas and Podes data, we got data about 253,280 households that representing 56,848,691 households in Indonesia.

3.2.2 Selection of dimensions, indicators, and cutoffs

The selection of dimensions, indicators and cutoff for each indicator is complex, and incorporates methodological decisions and political considerations [17]. Most past studies did not explain how they choose dimension explicitly. [7] concluded five ways of selection that most used implicitly: 1) use on-going participatory public deliberation; 2) use list that has achieved a degree of legitimacy through public consensus; 3) implicit or explicit assumptions about what people do value or should value; 4) convenience or a convention that is taken to be authoritative or used because these are the only data available that have the required characteristics; 5) empirical evidence regarding people's values, data on consumer preferences and behaviors, or studies of what values are most conducive to people's mental health or social benefit.

Based on the literature and available data, the dimensions considered in this study are: health, education, and standard of living. We will explain it later. After identifying the dimensions, a list of indicators is selected and a cut-off point for each indicator is identified (Table 1). The advantage of AFM method is that it allows for categorical/ordinal data or even qualitative data as long as we can clearly identify who is deprived in particular dimension. Next step is assigning weight to various dimensions/indicators on the basis of specific criterion. The AFM method provides the opportunity to assign the same or different weights to various dimensions, depending upon their relative importance. For example, if policy makers want to emphasis more upon the education dimension, they can allocate deprivation in this dimension higher weight than others. We assign equal weights to all three dimensions. The dimension weight is then equally divided into its nested indicators. The indicators in the same dimension have same weight. The details of weights are provided below on Table 1.

Education is an important capability to increase individuals' wellbeing. More educated people in most countries, including low income developing countries, enjoy higher earnings than less educated ones [18]. At least, there is private benefit from education. It also gives individuals chance to participate actively in social, economic and political activities of their lives [4]. The two indicators selected under this dimension are described below;

(a) Adult illiteracy: Literacy rate of 15–24 year olds is one of indicators to archive Goal 2 of the MDGs. This indicator is used to look at the quality of education in the whole household.
(b) Years of schooling: Access to universal primary education is Goal 2 of the MDGs. However since May 1994Indonesia already has its own program called the "9-years Compulsory Education" that encouraged children to complete secondary school. Further stated that an important stage in the development of education is to improve compulsory education 6 years to 9 years. Implementation of the 9-years compulsory education has been arranged wider in Law Number 20 of 2003.

Like education, health also has an important role in determining the individuals' wellbeing. Health condition will impact directly on daily activities. The two indicators selected under this dimension are described below;

(a) Unhealthy: This indicator reflects the condition of members health, being healthy or not. Unhealthy workers will decrease their productivity. Unhealthy students will be more difficult to learn and concentrate.
(b) Health insurance: In many developing countries, notably in Asia, people on higher incomes spend a higher share of their income on health than the poor [18]. Insufficient expenditure of health cost is a reflection of poverty. The poorest countries in the world are characterized by extremely low expenditure on health cost compared with high-income countries. We approached the expenditure of health cost by health insurance. [**?**] also categorized health insurance as a strategy to protect the poor from high cost of health care.

The standard of living dimension has several indicators to portray the condition under which households live. A total of six indicators are selected under this dimension that described below;

(a) House floor: This indicator describes the quality of housing by identifying whether the household live in mud house or not.
(b) Sanitation: having private toilet is an important dimension of households' wellbeing. The consequences

Table 1. Preliminary Indicators Extracted

Dimension	Indicator (question code)	Deprived if	Weight
Health	Unhealthy (b5r2)	Any household member has experienced illness in the previous one month prior to the survey	0.167
	Health insurance (b7r6a-g)	Household is not covered by health insurance	0.167
Education	Adult illiteracy (b5r19a)	At least one household member can not read or write (age¿=15)	0.167
	Years of schooling (b5r17)	At least one adult member in household didn't complete secondary school (junior high school; age¿=18)	0.167
Standard of living	House floor (b6r7)	House majority floor is sand	0.056
	Sanitation (b6r13a-b)	House has no toilet with septic tank/shares public toilet	0.056
	Drinking water (b6r9a)	Household does not use proper drinking water, i.e. bottled water/mineral water, tap water, pump/well, protected spring water	0.056
	Electricity (b6r14a)	House is not installed electricity	0.056
	Cooking fuel (b6r15)	Household's cooking fuel is firewood/charcoal/briquettes	0.056
	Asset ownership (b7r4a-j)	Household doesnot own a vericle (car, boat, bike, motorbike) and doesnot own more than one of these: tv, air conditioner, heater, or refrigerator	0.056

of poor sanitary facilities could be disastrous for human health [19]. Having improved sanitation is also part of MDG's Goal 7.

(c) Drinking water: Clean drinking water is also an important dimension of households' wellbeing. Water contamination is the major source of many diseases, such as typhoid, cholera, hepatitis, worm infestation, diarrhea, skin infection, eye infection, stomach problems and allergies [20]. Increased access to safe drinking water is also part of the MDG's Goal 7.

(d) Electricity: This indicator is also an important dimension of households' wellbeing. It gives household access to several activities.

(e) Cooking fuel: The type of fuel used for cooking could be consequential for the health of a household, particularly for women who are almost exclusively involved in cooking in Pakistan [4]. Moreover, cooking fuel also has effect to the environment and indirectly corresponds to MDG's Goal 7.

(f) Asset ownership: Household assets reflect the long term material wellbeing status of the household. It shows the stock of wealth.

3.3 Model for determinants of poverty

The dependent variable in the model is limited variable so we used limited dependent variable model. We use logit model to examine the determinants of poverty measurements of each poverty categories. That is, why households are categorized as poor/not in monetary poverty and in multidimensional poverty (Eq. 1). We also use ordered logit model to examine the relative effects of different household characteristics on their poverty outcomes [15]. That is, why individuals only experience one poverty measurement while others experience poverty in two measurements (Eq. 2).

The logit and ordered logit models areas follows:

$$Pr(y_i^{LM}=1)=\frac{e^{\alpha_1 CH_i+\alpha_2 RC_i+e_i}}{1+e^{\alpha_1 CH_i+\alpha_2 RC_i+e_i}} \quad (1)$$

$$Pr(y_i^{OLM}=0)=\frac{e^{\alpha_1 CH_i+\alpha_2 RC_i+e_i}}{1+e^{\alpha_1 CH_i+\alpha_2 RC_i+e_i}} \quad (2)$$

where,

- y_i^{LM} is apoverty category for each of two poverty measurement: 1 = poor, 0 = non-poor;
- y_i^{OLM} is a poverty experience: 0 = non-poor in two poverty measurements; 1 = poor in only monetary measurements; 2 = poor in all two poverty measurements;
- e_i is an error term;
- i is the household identifier (i = 1,. . . , 253,280);
- CH_i is a vector of household characteristics including marital status of household head, educational attainment of household head, number of household member, locational dummy, size of house, and access to governance credit program;
- RC_i is a vector of village characteristics including village location, directly adjacent to the sea, ratio male population, ratio agriculture family and ratio male migrant worker in the village, heterogeneity of ethnic in the village, ratio medical expertise that live in the village, road condition in the village, and availability of commercial bank in the village.

Eq. 1 is a logit model with binary response outcomes $y=\{0,1\}$. The logit model solves these problems:

$$\ln\frac{p}{1-p}=\alpha_1 CH_i+\alpha_2 RC_i \;\;;\;\; p=Pr(y=1)$$

The estimated probability is:

$$p=\frac{1}{(1+e^{-(\alpha_1 CH_i+\alpha_2 RC_i)})}$$

Eq. 2 is an ordered response model with three outcomes $y=\{0,1,2\}$. Ordered logit is often conceptualized as a latent variable model. Assume latent variable y^* is determined by,

$$y^*=x\beta+e, e|x\sim \text{Normal}(0,1)$$

where β is a kx1 coefficient vector, and for reasons to be seen, vector x does not contain a constant.

We find the estimated parameters by maximum likelihood estimation. The estimated coefficients cannot be interpreted directly but the signs have exactly the same meaning as those that estimated by ordinary-least-square (OLS). A negative sign implies that the choice probabilities shift to lower categories when the explanatory variable increases.

Table 2. Explanatory variables used in logit and ordered logit model

Variables	Measurements and units	Expected effect
Household Characteristics		
Marital status of household head	1=marriage; 0=other	+/-
Educational attainment of household head	Completed schooling of household head (0=no schooling, 1=elementary, 2=junior high, 3=senior high, 4=one to three years of vocational training, 5=undergraduate, and 6=post graduate level education)	-
Number of household member	The number of household member	+
Location dummy	1=urban; 0=other	-
Size of house	Log size of house (square meter)	-
Access to poverty credit program	1=having; 0=other	-
Village Characteristics		
Village location	1=flatland; 0=other	-
Adjacent to the sea	1=yes; 0=no	-
Ratio agriculture family in the village		+
Ratio male migrant worker in the village		+
Ethnic group in the village	1=having more than one ethnic group; 0=other	-
Ratio medical expertise that live in the village		-
Main road condition in the village	1=asphalt; 0=other	-
Availability of commercial bank in the village	1=having commercial bank; 0= not having	-

4. POVERTY ANALYSIS – RESULT

4.1 Poverty estimation at provincial level

Table 3 presents headcount ratio index for all provinces in Indonesia. The national poverty index of both poverty measurements in 2011 are 12.14% (for monetary poverty) and 73.4% (for multidimensional poverty). There were over 60 percentage-point differences in poverty outcome between monetary and multidimensional poverty. The highest level of monetary poverty is found in Papua (33.27%) and multidimensional poverty is found in East Nusa Tenggara (84.93%) while the lowest level of monetary poverty is found in Jakarta (3.45%) and multidimensional poverty is found in Riau Islands (50.79%). The top 3 provinces that have the biggest percentage-point differences in poverty outcome between monetary and multidimensional poverty are West Kalimantan (75.1%), Central Kalimantan (73.14%), and West Sulawesi (70.78%). These three provinces have more than 70 percentage-point differences in poverty outcome between monetary and multidimensional poverty. And also, their monetary poverty index is much lower than national monetary poverty index while their multidimensional poverty index is higher than national multidimensional poverty index. It indicates that the income is spent in a small portion to fulfill the needs of health, education, living standard.

Figure 2 and 3 show the geographic monetary and multidimensional poverty map for each province in Indonesia. The figures clearly portray the shifting on level of the poor percentage in some provinces. Some provinces which are at low level among all provinces in monetary poverty measurement turn into at the high level in multidimensional poverty measurement. West Kalimantan and Central Kalimantan levels shift two levels from monetary poverty to multidimensional poverty.

4.2 Driver of multidimensional poverty and it's policy implication

Figure 4 presents the percentage of individual which is under the cut-off for each indicator of the three dimensions. For years of schooling, the cut-off is any adult member in household complete secondary school, over eighty percent of individual are deprived in years of schooling. This finding illustrates that level of education in Indonesia is still low. Almost sixty percent of individuals are deprived in health insurance and forty one percent in cooking fuel. It shows that society is not overly concerned about health insurance issues. Although since 2005, Indonesian government already issued a special program for the funding of social health insurance to protect the poor. For cooking fuel, since 2007 Indonesia also have program targeting 40 million poor households to use gas as their cooking fuel. It looks like these two programs have not provided satisfactory result. For standard of living, 34% of individuals didn't get improved sanitation. The house floor and drinking water condition is quite fair. The figure shows that only a few of individual is found to be deprived on electricity.

Figure 5 presents the percentage of individual facing deprivation on an exact number indicator. Very few of individual (6.36%) are found to have no deprivation at all. The result is quiet shocking that over 90% of individual deprived at least in one indicator. If we use the union approach and set the indicator as dimension then almost all of households categorized as poor. Most of individual are deprived on two to four indicators. The figure also reveals that over 50% of individual are deprived on three or more indicators. About 4.25% of individual are deprived on seven or more indicators and 0.02% of individual are deprived on all indicators.

The Figure 6 presents the contribution of each dimension in the overall deprivation experienced by those falling below the poverty line (second cut-off, k=1/3). It shows dimension-wise decomposition of multidimensional poverty at the aggregate level. Health makes the highest contribution in overall deprivation face by multidimensional poor. This reflects the poor state of health in the whole country. The next contributor of poverty is education. This reflects the poor condition of education level in Indonesia. In order to alleviate multidimensional poverty, government and other stake holders should prioritize health, particularly the awareness of health insurance due to the main drivers of multidimensional poverty.

Government policy in health insurance can be a pow-

Table 3. Headcount ratio of monetary and multidimensional poverty (%)

Province	Monetary poverty	Multidimensional poverty
Aceh	18.18	59.58
North Sumatra	9.59	73.04
West Sumatra	8.19	75.39
Riau	7.81	73.42
Jambi	7.73	78.25
South Sumatra	14.1	77.4
Bengkulu	16.63	75.58
Lampung	16.42	78.1
Bangka Belitung	4.39	65.26
Riau Islands	7.25	50.79
Jakarta	3.54	56.47
West Java	10.48	71.36
Central Java	15.43	77.15
Yogyakarta	15.56	61.51
East Java	13.92	78.09
Banten	6.7	68.5
Bali	4.74	63.11
West Nusa Tenggara	17.99	79.78
East Nusa Tenggara	23.82	84.93
West Kalimantan	7.65	82.75
Central Kalimantan	5.93	79.07
South Kalimantan	5.09	75.48
East Kalimantan	6.9	52.17
North Sulawesi	7.6	69.9
Central Sulawesi	14.18	79.48
South Sulawesi	11.67	71.41
Southeast Sulawesi	12.04	72.78
Gorontalo	18.09	78.1
West Sulawesi	12.53	83.31
Maluku	19.61	73.54
North Maluku	9.92	79.05
West Papua	26.83	70.52
Papua	33.27	83.26
National	12.14	73.4

Source: Author's calculation

erful way to reduce multidimensional poor. Since 1 January 2014 Indonesian government inaugurated a special institution, called *Badan Penyelenggara Jaminan Sosial Kesehatan* (BPJS), to manage universal health insurance for the entire population Indonesia. BPJS has the force of law which is regulated by Law No. 24 of 2011 on the Social Security Agency and Law No. 40 year 2004 on national social security system. Indonesian citizens and foreigners that have been in Indonesia for at least six months shall be a member BPJS. We simulated multidimensional poverty in Indonesia with assumption all Indonesian citizens have health insurance. Figure 7 illustrates the change in headcount ratio index of multidimensional poverty before and after BPJS implemented successfully. It shows a large impact on reducing multidimensional poor. At national level, multidimensional poverty index decreased by 23.5%, from 73.4% become 35.7%. This policy is most effective when applied in Jambi, South Sumatra, South Kalimantan, Riau, Jakarta, and North Sumatra, multidimensional poverty index decreased by around 30% in these provinces.

Table 4 presents the contribution of each dimension in the overall deprivation experienced by those multidimensional poor in provinces, East Nusa Tenggara (the highest multidimensional poor) and Riau Islands (lowest multidimensional poor). The highest contribution in deprivation face by multidimensional poverty in Riau Islands is health (48.58%) while the second contributor is education (41.35%). Another case to Riau Island, the contribution of each dimension in East Nusa Tenggara is quite equal. So, in order to move the multidimensional poor out of poverty trap, government should do the different approach to each province. Government should focus on health (particularly health insurance) in Riau Islands while they must do overall development in East Nusa Tenggara to improve health, education, and standard of living.

4.3 Changing in cut-offs selection

This sub-section is used to analyze the effect of the change in cut-offs on poverty measures. We lowered the cut-off for education dimension (Table 1). We set new cut-off for years of schooling indicator: household deprived if all adult member do not completed secondary school (junior high school) and cut-off for illiteracy: household deprived if all adult member in household can't read/write, while cut-offs for the other indicators are same. We call it "W-version of multidimensional poverty" to differentiate it with the version in previous section. We analyze whether the headcount ratio of poverty are affected by adopting on the two alternative definitions.

Table 5 shows that W-version of multidimensional poor is subgroup of multidimensional poor, because of the W-version multidimensional indicator cutoff is lower than multidimensional poverty cut-off. The W-version of multidimensional poor are obviously also the poor of multidimensional poor. And around 37% of W-version multidimensional non-poor become multidimensional poor after raising the cut-off of education dimension. It indicates that the

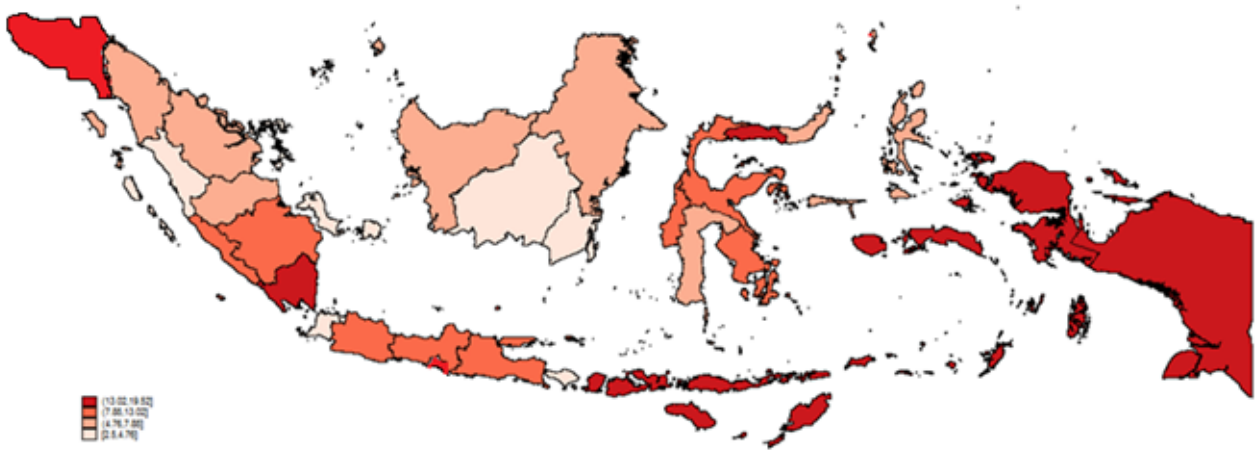

Figure 2. Geographic Monetary Poverty Map (Percentage of Poor in Each Province)

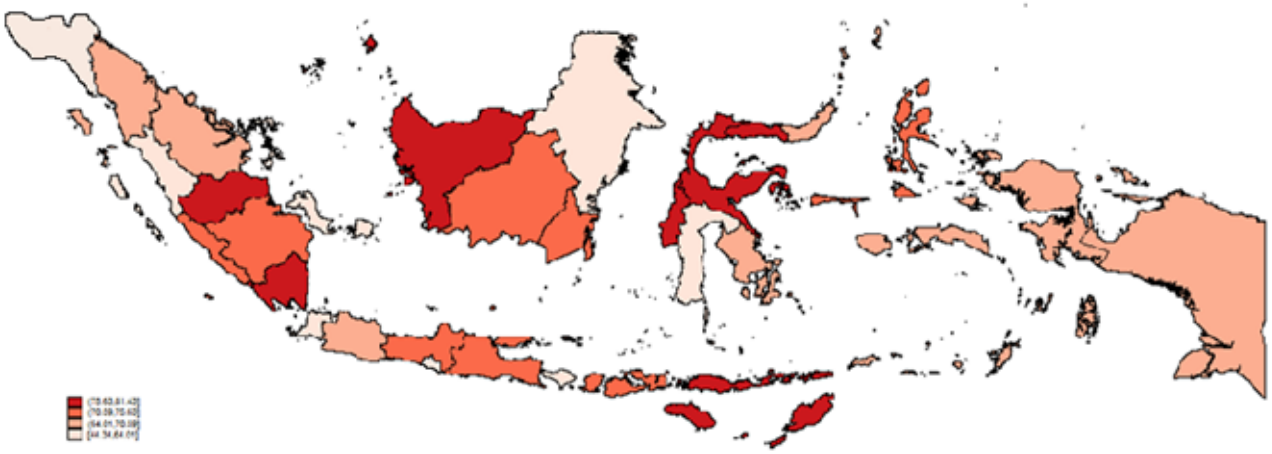

Figure 3. Geographic Multidimensional Poverty Map

measurement is quite sensitive to the cut-off of indicators.

4.4 Relationship between monetary and multidimensional poverty

Table 6 presents a cross tabulation of 1,079,277 Indonesia populations extracted from 2011 Susenas, being classified as poor or non-poor in each one of two poverty measurements. While 87.86% of populations are categorized as monetary non-poor, only 26.6% of populations are reported as multidimensional non-poor. The main difference between the two measures is that the monetary poverty measurement provides very conservative estimates of poverty. Multidimensional poverty estimates show 73.4% of populations fall below the poverty line at – six times higher than those using the monetary poverty measurement which finds only 12.14% of populations to be below the poverty line.

Table 6 contrasts the status of population using both measures of poverty. Around 62.3% of populations are non-poor in monetary poverty measurement but in higher poverty measurement are declared as poor. This provides strong evidence that monetary (consumption) alone does not satisfactorily explain deprivations faced by the poor. On the other hand, one percent of populations that declared as poor by monetary poverty measurement are multidimensional non-poor.

The relationship between the two methods of poverty estimation is explored by spearman rank correlation. The spearman's rank correlations among provincial rankings in both poverty indicators found that the ranking of monetary and multidimensional poverty measurements is significantly correlated among the provincial rankings. The correlation coefficient is 0.39 (p-value = 0.025). This finding is similar to [4], although the coefficient is statistically significant but it is low and does not provide the basis for accepting the one-dimension measure as the single, comprehensive criterion for the estimation of poverty. Besides, as shown in Appendix 3/Table 14, deprivation in monetary (consumption) has a low correlation with deprivation in other dimensions. The highest correlation of the consumption is 0.24 with the cooking fuel indicator.

5. ANALYSIS OF DETERMINANTS

We divide households into two groups, based on their poverty status in 2011 (Table 7): monetary poor (5,125,462 households) and multidimensional poor (39,407,050 households). Compared with monetary poor group, the multidimensional poor group was slightly better in educational attainment, and ownership of larger land area. Multidimensional poor group has fewer household members, lives in urban area,

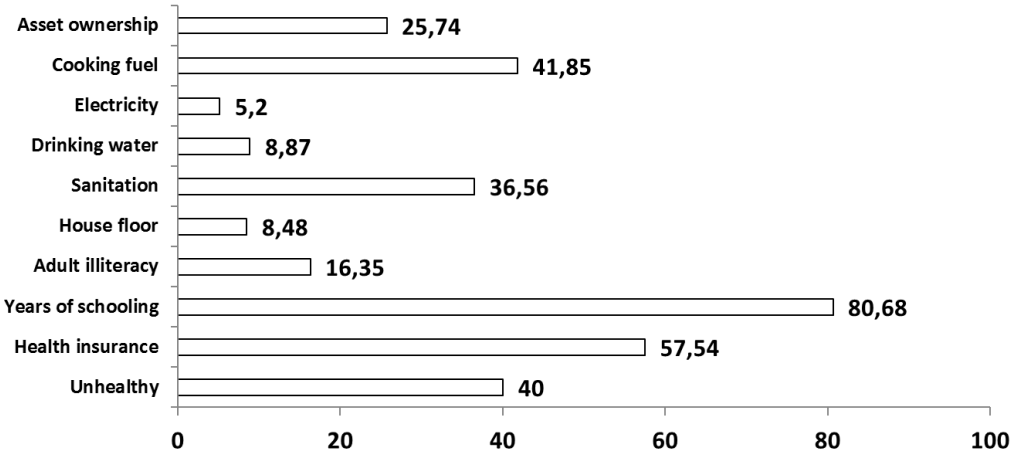

Figure 4. Percentage of deprivation on various indicators
Source: Author's calculation

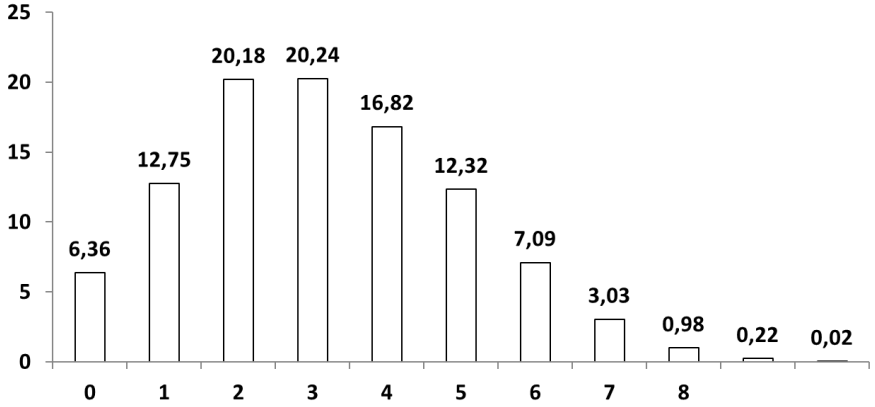

Figure 5. Percentage of individual facing various numbers of deprivations
Source: Author's calculation

has a low percentage of members working in agricultural sector and working as migrant worker. Their village condition was also better, better main road and availability of commercial bank.

5.1 Determinants of poverty

The logit and ordered logit models are estimated by the maximum likelihood estimation with robust standard errors. The estimation results of the logit model (Eq. 1) are shown in Tables 8 and 9. Table 8 shows the estimation results of poverty determinants for both monetary and multidimensional poverty measures. Table 9 summarizes the partial effects (dy/dx) of changes in the probability of households being poor or non-poor. Estimation results of the ordered logit model (Eq. 2) are reported in Table 10. The partial effects (dy/dx) of explanatory variables on the ordered poverty experiences are summarized in Table 11.

5.1.1 Characteristic of household

The result of the logit analysis shows all family characteristics variables of marital status, educational attainment, number of household member, locational dummy (1=urban or 0=rural), size of house, and having poverty credit program are significant. Educational attainment describes the complete schooling level of household head (0=no schooling, 1=elementary, 2=junior high, 3=senior high, 4=one to three years of vocational training, 5=undergraduate, and 6=post graduate level education). The negative coefficient of educational attainment variable means a higher educational attainment of household head leads to a higher probability of being non-poor. The probability of being monetary and multidimensional poor will decrease by 0.02% and 0.14%, respectively, when the completed schooling of household head increases from one step to the other, like no schooling to elementary school (Table 9). The effect of educational attainment is higher in multidimensional poverty than monetary poverty. These findings confirmed the conclusions of the previous studies such as [13], [14], [17], and [15].

On the other hand, a bigger number of household member increases the probability of being poor in both monetary and multidimensional poverty measurement. The probability of being monetary and multidimensional poor will increase by 0.02% and 0.015%, when households have one more child. Married households tend to be poorer. The access to governance credit program affects poverty status differently depending on the poverty measurements. Households that having governance credit program tend to be monetary non-poor. The probability of being monetary poor will decrease by 0.02%, when households have experience to governance credit program. Nevertheless, changing the poverty measurement from monetary indicator to multidimensional indicator resulted in different outcomes. The access to governance credit program has no effect to poverty

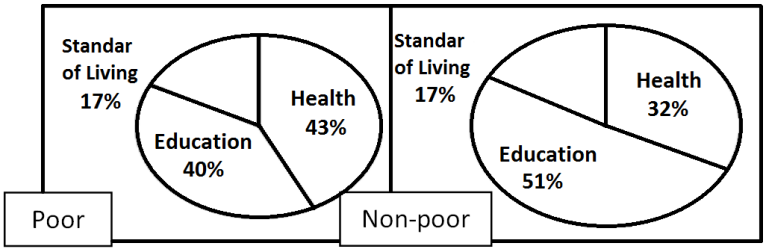

Figure 6. Poverty drivers of multidimensional poor and non-poor (%)
Source: Author's calculation

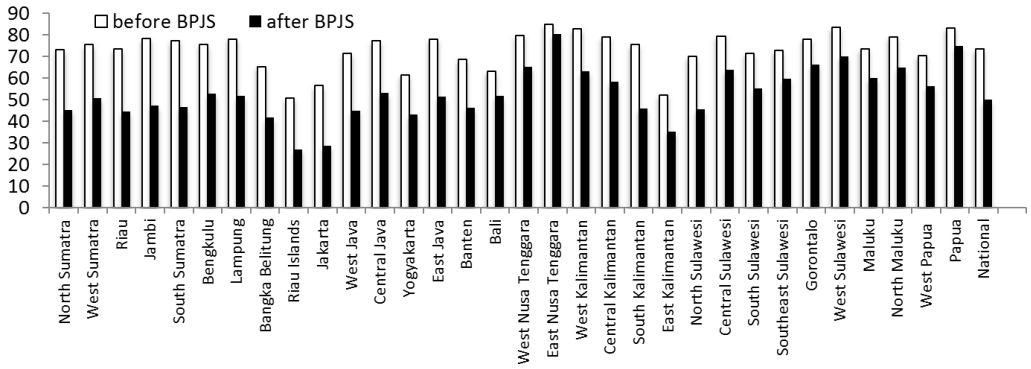

Figure 7. Headcount ratio of multidimensional poverty before and after BPJS
Source: Author's calculation

status on multidimensional poverty measurement. Size of house as indicator of physical asset ownership affects the monetary and multidimensional poverty negatively and significantly. Dummy variable also has negative coefficient, means households that live in rural area lead to be less poor. This result is predictable because urban area is more developed than rural area, there are more jobs and facilities in urban than in rural area. Headcount index for urban area always is higher than headcount ratio for urban area in all provinces in Indonesia (Appendix 2/Table 13).

5.1.2 Village Characteristics

All village characteristics including village location, directly adjacent to the sea, ratio male population, ratio agriculture family, ratio male migrant worker, ethnic group in neighborhood, ratio medical expertise, main road condition, and availability of commercial bank are significant. The availability of asphalt roads has a significant role in reducing poverty both in the monetary and multidimensional measurements. The availability of asphalt roads significantly reduces the probability of being poor in monetary (0.003%) and multidimensional (0.039%) poverty measurements. The existence of medical expertise has the biggest impact in reducing poverty. The probability of being monetary and multidimensional poor will decrease by 1.25% and 4.7%, when there are increasing medical expertise in the neighborhood. Surprisingly, ethnic group has negative coefficient in both measurements, means that having more than one ethnic group in neighborhood lead to be less poor. Having more than one ethnic group in neighborhood significantly reduces the probability of being poor in monetary (0.02%) and multidimensional (0.005%) poverty measurements. The availability of commercial bank has negative on monetary poverty but it has no effect to poverty status on multidimensional poverty measurement.

5.2 Determinants of ordered poverty experiences

In this sub-chapter, we will discuss about determinants for multi-layered poverty. Why peoples experience poverty in only monetary poverty measurement while others experience poverty in both monetary and multidimensional poverty measurements. This analysis of ordered poverty experience uses to check the consistency and robustness of the estimation result of the logit model (Eq. 1). The order of poverty experience is as follows: 0= no experience in any of poverty measurements; 1= experience of monetary poverty; 2= experience in monetary and multidimensional poverty.

5.2.1 Household Characteristics

Household with marriage status and having higher educational attainments tend to never be poor in any of the poverty categories. The probability of never being poor in any one of both poverty categories increases by 0.02% with a stepwise increase in educational attainment (Table 11). Households having many family members tend to be poor in more than one category of poverty. The probability of never being poor in two poverty categories decreases by 0.021% with an increase in number of household member. The estimation results confirmed that households who are experiencing positive shock such as access to governance credit program tend to be never poor in all poverty categories. Having access to governance credit program increases the probability of being never poor by 0.02%. And as expected, owning a larger house reduces of being poor in multilayer of poverty.

5.2.2 Village characteristics

The village characteristics of village location (in flat land/not and adjacent to the sea/not), the heterogeneity of ethnic groups, ratio medical expertise, main road condition (asphalt /not), and availability of bank significantly increase the probability of being never being poor in all poverty cat-

Table 4. Contribution of each dimension (%) in Riau Islands and East Nusa Tenggara

Dimension	Riau Islands	East Nusa Tenggara
Health	48.58	29.04
Education	41.35	36.15
Standard of living	10.07	34.80

Source: Author's calculation

Table 5. Cross tabulation between two definition of multidimensional poverty

		Multidimensional poverty measures "W-version"	
		Non-poor	Poor
Multidimensional poverty measures	Non-poor	61,954,368	0
		26.6	0
	Poor	87,777,616	83,207,062
		37.68	35.72

Source: Author's calculation

egories. The probability of never being poor in two poverty categories increase by 1.29% with an increase in number of ratio medical expertise that live in the same village. This study also confirmed that infrastructure development is one of the effective policies for poverty alleviation. Having asphalt road and bank in the area will increase the probability of being never poor by 0.004% and 0.014%. On the other hand, the ratio of agriculture family and the ratio male migrant worker decrease the probability of being never being poor in all poverty categories. Having male migrant workers in the area decreases the probability of being never poor by 0.21%.

6. CONCLUDING REMARKS

6.1 Conclusion

This paper adopted Alkire and Foster multidimensional framework to estimate poverty and identify the poor in Indonesia. It has analyzed data on 10 indicators pertaining to three valuable dimensions of wellbeing; education, health, and standard of living. This study finds that over seventy percent of populations are multidimensional poor. Health is found to be main major drivers of multidimensional poverty in Indonesia.

In this paper, we explored the relationship between monetary and multidimensional poverty. This study found that there was a 60 percentage-point difference in the poverty headcount ratio computed by applying the monetary and multidimensional poverty metrics. This study confirmed that the monetary (consumption) alone does not satisfactorily explain deprivations faced by the poor. Around 62.3% of populations are non-poor in monetary poverty measurement but in higher poverty measurement are declared as poor. Thus consumption based one-dimension measurement of poverty is an insufficient measure of poverty.

Applying logit and ordered logit model estimations obtained that the main determinants of poverty are educational attainment of household head, number of household members, physical assets (house ownership), positive shock (having property credit program), house location, existence of migrant workers, existence of medical expertise, and the heterogeneity of ethnic in society. The effect of the variables is higher in multidimensional poverty than monetary poverty.

6.2 Policy implication

This study confirmed that higher educational attainment of household head leads to a higher probability of being non-poor. The probability of being monetary and multidimensional poor will decrease by 0.02% and 0.14%, respectively, when the completed schooling of household head increases from one step to the other. This study also confirmed that infrastructure development is one of the effective policies for poverty alleviation.

This paper simulated the change in headcount ratio index of multidimensional poverty before and after BPJS implemented successfully. It shows a large impact on reducing multidimensional poor. At national level, multidimensional poverty index decreased by 23.5%, from 73.4% become 35.7%. Government policy in health insurance (BPJS) has a powerful power to reduce multidimensional poor.

6.3 Limited study

Results as presented in this paper are still in preliminary stage. Further analysis is needed to explore the multidimensional poverty intensity. In this paper, three dimensions are equally and normatively weighted by 1, and each of them also equally divided into nested dimensions. Future extensions could consist in exploring the effects of change in the weighting on the poverty measures.

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Table 6. Cross tabulation between multidimensional poverty and monetary poverty

Poverty measures		Multidimensional poverty	
		Non-poor	Poor
Monetary poverty	Non-poor	59,511,584 25.55	145151670 62.31
	Poor	2,442,784 1.05	25,833,008 11.09

Source: Author's calculation

Note: For each cell, the first row contains the number of people in that category. The number in the second row show percentage share in total sample population.

Table 7. Descriptive data on poverty status

Variables	Monetary poor		Multidimensional poor	
	Mean	SD	Mean	SD
Household Characteristics				
Marital status of household head (1=marriage; 0=other)	0.896	0.305	0.859	0.348
Educational attainment of household head (Completed schooling)	0.927	0.892	1.254	1.070
Number of household member	4.827	1.770	3.946	1.646
Locational dummy (1=urban; 0=other)	0.248	0.432	0.427	0.495
Size of house (Log size of house (square meter))	3.862	0.560	3.982	0.617
Havingpoverty credit program (1=yes; 0=no)	0.072	0.258	0.106	0.307
Village Characteristics				
Village location (1=flatland; 0=other)	0.680	0.467	0.797	0.402
Directly adjacent to the sea (1=yes; 0=no)	0.112	0.316	0.109	0.311
Ratio agriculture family in the village	0.648	0.478	0.408	0.491
Ratio male migrant worker in the village	0.004	0.013	0.003	0.011
Ethnic group in the village (1=having more than one ethnic group; 0=other)	0.740	0.439	0.798	0.401
Ratio medical expertise that live in the village	0.001	0.002	0.001	0.002
Main road condition in the village (1=asphalt; 0=other)	0.712	0.453	0.789	0.408
Availability of commercial bank (1=having; 0= other)	0.108	0.311	0.211	0.408
Number of Observation	5125462		39407050	

Source: Author's calculation based on Susenas data

SD = standard deviation;

Completed schooling : 0=no schooling, 1=elementary, 2=junior high, 3=senior high, 4=one to three years of vocational training, 5=undergraduate, and 6=post graduate level education

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Table 8. Estimation results of logistic regression of poverty determinants

Variables	Monetary poverty		Multidimensional poverty	
	Coefficient	Robust S.E	Coefficient	Robust S.E
Household Characteristics				
Marital status of household head (1=marriage; 0=other)	0.081***	0.024	0.451***	0.015
Educational attainment of household head (Completed schooling)	-0.344***	0.007	-0.795***	0.004
Number of household member	0.433***	0.004	0.085***	0.003
Locational dummy (1=urban; 0=other)	-0.699***	0.022	-0.379***	0.013
Size of house (Log size of house (square meter))	-0.704***	0.014	-0.138***	0.008
Having poverty credit program (1=yes; 0=no)	-0.471***	0.027	0.016	0.017
Village Characteristics				
Village location (1=flatland; 0=other)	-0.356***	0.017	-0.217***	0.015
Directly adjacent to the sea (1=yes; 0=no)	-0.062***	0.018	-0.133***	0.013
Ratio agriculture family in the village	0.792***	0.017	0.785***	0.013
Ratio male migrant worker in the village	4.365***	0.558	3.064***	0.621
Ethnic group in the village (1=having more than one ethnic group; 0=other)	-0.369***	0.018	-0.025*	0.015
Ratio medical expertise that live in the village	-25.621***	3.275	-25.849***	1.781
Main road condition in the village (1=asphalt; 0=other)	-0.064***	0.016	-0.219***	0.015
Availability of commercial bank (1=having; 0= other)	-0.302***	0.028	-0.017	0.013
Constant	-0.480***	0.061	2.648***	0.041
Wald Chi-Square	32866.59		78095.78	
Log Pseudo likelihood	-64.149.628		-115392.89	
Pseudo R2	0.2039		0.2528	
Number of Observation	253280		253280	

Source: Author's calculation

Note: *, **, *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Table 9. Estimation results of partial effect (dy/dx) of poverty determinants (%)

Variables	Monetary poverty	Multidimensional poverty
Household Characteristics		
Marital status of household head (1=marriage; 0=other)	0.004	0.089
Educational attainment of household head (Completed schooling)	-0.017	-0.144
Number of household	0.021	0.015
Locational dummy (1=urban; 0=other)	-0.033	-0.070
Size of house (Log size of house (square meter))	-0.034	-0.025
Having poverty credit program (1=yes; 0=no)	-0.020	0.003
Village Characteristics		
Village location (1=flatland; 0=other)	-0.019	-0.038
Directly adjacent to the sea (1=yes; 0=no)	-0.003	-0.025
Ratio agriculture family in the village	0.043	0.135
Ratio male migrant worker in the village	0.212	0.557
Ethnic group in the village (1=having more than one ethnic group; 0=other)	-0.020	-0.005
Ratio medical expertise that live in the village	-1.247	-4.699
Main road condition in the village (1=asphalt; 0=other)	-0.003	-0.039
Availability of commercial bank (1=having; 0= other)	-0.014	-0.003
Probability ($y = j\|x$)	0.051	0.761

Source: Author's calculation

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Table 10. Estimation results of ordered logit model of poverty experience

Variables	Coefficient	Robust S.E
Household Characteristics		
Marital status of household head (1=marriage; 0=other)	0.085***	0.024
Educational attainment of household head (Completed schooling)	-0.348***	0.007
Number of household member	0.432***	0.004
Locational dummy (1=urban; 0=other)	-0.698***	0.022
Size of house (Log size of house (square meter))	-0.710***	0.014
Having poverty credit program (1=yes; 0=no)	-0.473***	0.027
Village Characteristics		
Village location (1=flatland; 0=other)	-0.371***	0.016
Directly adjacent to the sea (1=yes; 0=no)	-0.065***	0.018
Ratio agriculture family in the village	0.808***	0.017
Ratio male migrant worker in the village	4.368***	0.556
Ethnic group in the village (1=having more than one ethnic group; 0=other)	-0.367***	0.018
Ratio medical expertise that live in the village	-26.552***	3.281
Main road condition in the village (1=asphalt; 0=other)	-0.073***	0.016
Availability of commercial bank (1=having; 0= other)	-0.301***	0.028
/cut1	0.439	0.061
/cut2	0.582	0.061
Wald Chi-Square	33340.96	
Log Pseudo likelihood	-72094.106	
Pseudo R2	0.1878	
Number of Observation	253280	

Source: Author's calculation

Table 11. Estimation results of partial effect (dy/dx) on ordered poverty experience (%)

Variables	Y=0	Y=1	Y=2
Household Characteristics			
Marital status of household head (1=marriage; 0=other)	-0.004	0.000	0.004
Educational attainment of household head (Completed schooling)	0.017	-0.002	-0.015
Number of household member	-0.021	0.003	0.018
Locational dummy (1=urban; 0=other)	0.033	-0.004	-0.029
Size of house (Log size of house (square meter))	0.034	-0.004	-0.030
Having poverty credit program (1=yes; 0=no)	0.019	-0.002	-0.017
Village Characteristics			
Village location (1=flatland; 0=other)	0.020	-0.002	-0.018
Directly adjacent to the sea (1=yes; 0=no)	0.003	0.000	-0.003
Ratio agriculture family in the village	-0.044	0.005	0.039
Ratio male migrant worker in the village	-0.212	0.026	0.186
Ethnic group in the village (1=having more than one ethnic group; 0=other)	0.020	-0.002	-0.018
Ratio medical expertise that live in the village	1.287	-0.156	-1.131
Main road condition in the village (1=asphalt; 0=other)	0.004	0.000	-0.003
Availability of commercial bank (1=having; 0= other)	0.014	-0.002	-0.012
Probability ($y = j\|x$)	0.949	0.007	0.045

Source: Author's calculation

Table 12. Appendix 1. Poverty line for monetary poverty in 2011

Province	Poverty line (IDR)		
	Urban	Rural	Urban + Rural
Aceh	308306	266285	278389
North Sumatra	247547	201810	222898
West Sumatra	262173	214458	230823
Riau	276627	235267	256112
Jambi	262826	193834	216187
South Sumatra	258304	198572	221687
Bengkulu	255762	209616	225857
Lampung	236098	189954	202414
Bangka Belitung	289644	283302	286334
Riau Islands	321668	265258	295095
Jakarta	331169	-	331169
West Java	212210	185335	201138
Central Java	205606	179982	192435
Yogyakarta	240282	195406	224258
East Java	213383	185879	199327
Banten	220771	188741	208023
Bali	222868	188071	208152
West Nusa Tenggara	223784	176283	196185
East Nusa Tenggara	241807	160743	175308
West Kalimantan	207884	182293	189407
Central Kalimantan	220658	212790	215466
South Kalimantan	230712	196753	210850
East Kalimantan	307479	248583	285218
North Sulawesi	202469	188096	194334
Central Sulawesi	231225	195795	203237
South Sulawesi	186693	151879	163089
Southeast Sulawesi	177787	161451	165208
Gorontalo	180606	167162	171371
West Sulawesi	182206	165914	171356
Maluku	249895	217599	226030
North Maluku	238533	202185	212982
West Papua	319170	287512	294727
Papua	298285	247563	259128
National	232988	192354	211726

Table 13. Appendix 2. Monetary and Multidimensional poverty in urban and rural Indonesia

Province	Area	The Number of poor household		Headcount ratio	
		Monetary poverty	Multidimensional poverty	Monetary poverty	Multidimensional poverty
Aceh	Urban	106,983	548,967	8.69	44.62
	Rural	705,142	2,113,137	21.78	65.27
North Sumatra	Urban	305,779	3,855,883	4.92	62.02
	Rural	917,44	5,460,567	14.03	83.51
West Sumatra	Urban	61,656	1,093,586	3.4	60.30
	Rural	325,618	2,471,267	11.17	84.77
Riau	Urban	65,96	1,198,494	3.12	56.67
	Rural	364,17	2,846,087	10.73	83.87
Jambi	Urban	24,553	550,685	2.67	59.86
	Rural	211,792	1,843,345	9.9	86.16
South Sumatra	Urban	182,355	1,579,555	7.04	61.01
	Rural	856,608	4,123,456	17.92	86.28
Bengkulu	Urban	48,285	283,717	9.36	54.98
	Rural	232,58	992,96	19.83	84.65
Lampung	Urban	95,714	1,097,230	5.09	58.39
	Rural	1,132,317	4,742,691	20.23	84.72
Bangka Belitung	Urban	15,929	338,097	2.69	57.17
	Rural	37,497	456,226	5.99	72.91
Riau Islands	Urban	74,283	586,241	5.63	44.43
	Rural	43,564	239,484	14.23	78.23
Jakarta	Urban	321,466	5,129,273	3.54	56.47
West Java	Urban	1,981,085	17,885,027	7.08	63.91
	Rural	2,505,629	12,656,647	16.91	85.44
Central Java	Urban	1,525,784	9,859,117	10.57	68.27
	Rural	3,370,800	14,622,401	19.49	84.56
Yogyakarta	Urban	180,512	1,234,665	8.1	55.40
	Rural	345,837	845,543	29.99	73.32
East Java	Urban	1,069,668	11,571,965	6.18	66.90
	Rural	4,024,441	16,995,365	20.87	88.12
Banten	Urban	227,757	4,123,822	3.23	58.56
	Rural	481,005	3,125,527	13.59	88.27
Bali	Urban	50,693	1,254,164	2.24	55.45
	Rural	128,902	1,139,488	8.42	74.43
West Nusa Tenggara	Urban	230,564	1,317,727	12.55	71.70
	Rural	566,27	2,215,957	21.85	85.51
East Nusa Tenggara	Urban	20,44	465,639	2.48	56.43
	Rural	1,028,388	3,274,134	28.74	91.50
West Kalimantan	Urban	44,26	840,356	3.49	66.35
	Rural	282,696	2,697,196	9.4	89.66
Central Kalimantan	Urban	19,764	463,249	2.77	64.97
	Rural	109,115	1,254,138	7.48	85.95
South Kalimantan	Urban	28,138	954,799	1.88	63.89
	Rural	153,941	1,744,918	7.39	83.79
East Kalimantan	Urban	40,562	885,203	1.86	40.67
	Rural	202,317	951,698	15.05	70.78
North Sulawesi	Urban	57,658	545,189	5.84	55.19
	Rural	109,93	996,3	9.03	81.82
Central Sulawesi	Urban	23,325	345,86	3.9	57.78
	Rural	337,273	1,675,722	17.34	86.16
South Sulawesi	Urban	48,318	1,552,674	1.76	56.43
	Rural	845,982	3,921,790	17.21	79.80
Southeast Sulawesi	Urban	14,646	292,317	2.57	51.20
	Rural	243,89	1,270,672	15.47	80.60
Gorontalo	Urban	8,49	201,384	2.51	59.62
	Rural	173,658	584,994	25.95	87.43
West Sulawesi	Urban	22,536	164,246	9.08	66.17
	Rural	117,65	768,018	13.51	88.20
Maluku	Urban	29,713	304,849	5.63	57.73
	Rural	257,145	771,145	27.5	82.46
North Maluku	Urban	1,692	145,402	0.65	56.26
	Rural	96,881	639,82	13.18	87.06
West Papua	Urban	5,089	120,724	2.35	55.66
	Rural	190,602	393,558	37.2	76.81
Papua	Urban	22,776	350,007	3.25	49.99
	Rural	920,279	2,010,314	43.11	94.18

Table 14. Appendix 2. Monetary and Multidimensional poverty in urban and rural Indonesia

	Consumption	Unhealthy	Health insurance	Years of schooling	Adult illiteracy	House floor	Drinking water	Sanitation	Electricity	Cooking fuel	Asset ownership
Consumption	1										
Unhealthy	0.0388	1									
Health insurance	0.0032	-0.0391	1								
Years of schooling	0.1362	0.0942	0.1557	1							
Adult illiteracy	0.0763	0.0459	0.0017	0.1115	1						
House floor	0.1465	0.0261	-0.0184	0.1174	0.0585	1					
Drinking water	0.117	0.0186	0.0271	0.1137	0.0261	0.0347	1				
Sanitation	0.2242	0.0593	0.0477	0.2633	0.0956	0.2186	0.2538	1			
Electricity	0.1941	0.0361	0.0063	0.1193	0.0468	0.1604	0.2946	0.316	1		
Cooking fuel	0.2445	0.0779	0.0538	0.3217	0.1264	0.2147	0.2416	0.4304	0.3096	1	
Asset ownership	0.1946	0.0372	0.0161	0.1634	0.0801	0.1388	0.1365	0.2507	0.2526	0.3036	1