JICA Research Institute

JICA-RI Working Paper

Analyses of Multifaceted Poverty and Poverty Dynamics in Indonesia

Measurements and Determinants of Multifaceted Poverty: Absolute, Relative, and Subjective Poverty in Indonesia

Teguh Dartanto and Shigeru Otsubo

No. 54

February 2013

JICA Research Institute

JICA Research Institute

JICA Research Institute
10-5 Ichigaya Honmura-cho
Shinjuku-ku
Tokyo 162-8433, JAPAN
TEL: +81-3-3269-3374
FAX: +81-3-3269-2054

Measurements and Determinants of Multifaceted Poverty:

Absolute, Relative, and Subjective Poverty in Indonesia

Teguh Dartanto[*] and Shigeru Otsubo[†]

Abstract

The notion of 'poverty' is diversified and dynamic. It varies across countries with different socio-economic norms. It may also change over time even in the same society, with different stages of social and economic development. A country may be struggling with absolute poverty at the early stages of development, while it may well be more concerned with relative and/or subjective poverty as its average per-capita income increases. This article intends to conduct an exploration of multiple poverty measures by looking into the absolute, relative and subjective poverty incidence in Indonesia. Using the 2005 National Socio-Economic Survey (Susenas), we observed that there was a roughly 28 percentage-point difference in the poverty headcount ratios computed by applying absolute (14.47%) and subjective (42.03%) poverty. There were virtually no correlations among the poverty rankings in the provinces of Indonesia obtained by five poverty metrics. Results of logit model and ordered logit model estimations of the possible determinants of poverty indicate that the main determinants of poverty are educational attainment, number of household members, physical assets (land and house ownership), existence of migrant workers (possible remittances), negative shocks of layoffs and/or health problems, development of public services, and the availability of road infrastructure. A higher educational attainment increases the probability of never being poor in any of the five poverty metrics by almost 11 percentage points. This study also confirmed that households having less than society's averages in terms of the physical asset of land and consumption of durable goods and fashion tended to subjectively asses themselves as poor. The study suggests that any poverty alleviation programs should consider relative impacts among beneficiaries and non-beneficiaries within each locality and across provinces.

Keywords: Absolute Poverty, Relative Poverty, Subjective Poverty, Subjective Well-Being, Multidimensional Poverty Analysis, Indonesia

[*] Research Associate, Japan International Cooperation Agency Research Institute (Teguh.Dartanto@jica.go.jp)
[†] Professor, Graduate School of International Development, Nagoya University, and Visiting Fellow, Japan International Cooperation Agency Research Institute

This research was conducted as a research project at the Japan International Cooperation Agency Research Institute. The study is also partly funded by the Japan Society for the Promotion of Science (JSPS) Research Funds (Kiban A-22252005 and Challenging Exploratory Research 23653066). The views expressed in this paper are those of the authors and do not necessarily represent the official positions of either the JICA Research Institute or JICA. Authors would also like to thank the two anonymous referees for their constructive and valuable comments and suggestions.

1. Introduction

Problems associated with the definitions and measurements of 'poverty' have been debated over decades. Poverty is a multifaceted phenomenon and different societies have different perceptions of 'poverty.' Although he did not directly refer to the notion of 'poverty,' Smith (1776) (Sen 1983) noted that the Greeks and Romans lived very comfortably though they had no linen; but in the present time, through the greater part of Europe, an average day laborer would be ashamed to appear in public without a linen shirt. This means that although a linen shirt had become the norm for European society in the 1770s, it was not the case in ancient Greek or Roman societies. The perception of the 'necessaries,' and therefore 'poverty,' is diversified and dynamic. It varies across countries with different socio-economic norms. It may also change over time even in the same society, with different states of development.

Most researchers agree that poverty can be conceptualized in the forms of deprivation suffered by the population. Various notions of poverty can then be classified as: 1) absolute poverty, 2) relative poverty, and 3) subjective poverty. Absolute poverty means that people have less than the objectively defined thresholds such as the minimum food-calorie intake and basic needs. Those with income (expenditure) below a certain money metric of basic needs are then classified as poor. Relative poverty refers to the definition that poverty is having less than others in the same society (Hagenaars and de Vos 1988). Subjective poverty means that individuals appraise their poverty status by themselves, subjectively. People would simply be categorized as poor when they consider themselves so (Niemietz 2011).

Applying different notions/metrics of poverty might produce different analytical results that, in turn, call for a different set of policy interventions. For example, while absolute poverty may be reduced by economic growth, relative poverty can only be mitigated when income inequality decreases (Hegenaars and Van Praag 1985). While absolute poverty may disappear as countries become richer, the relative deprivation and subjective poverty may

persist. Thus, while most developing countries are still concerned with absolute poverty, many developed countries, particularly OECD economies, have already shifted their focus to relative and subjective poverty.

In the past three decades, except for the periods of crises, socio-economic conditions in Indonesia have been improving rapidly. During this period, per-capita GDP in Indonesia increased three-fold. The World Bank reported that the per-capita GDP (PPP, 2005 US$) of Indonesia had jumped from $1,323 (1983) to $4,094 (2011).[1] This substantial increase in income has been accompanied by improvements in social indicators such as a massive decrease in absolute poverty incidence from 28.6% (1980) to 13.3% (2010) in headcount ratios, and a significant increase in the gross enrollment rate for tertiary education from 4% (1981) to 23% (2010).[2] These rapid changes in income and education attainments, coupled with ongoing technological innovations, have influenced society's perception of poverty. For example, in 1998, the Central Statistical Agency of Indonesia (henceforth BPS) changed the method of calculating the poverty line by adopting the adjustments for the quality of non-food items.[3]

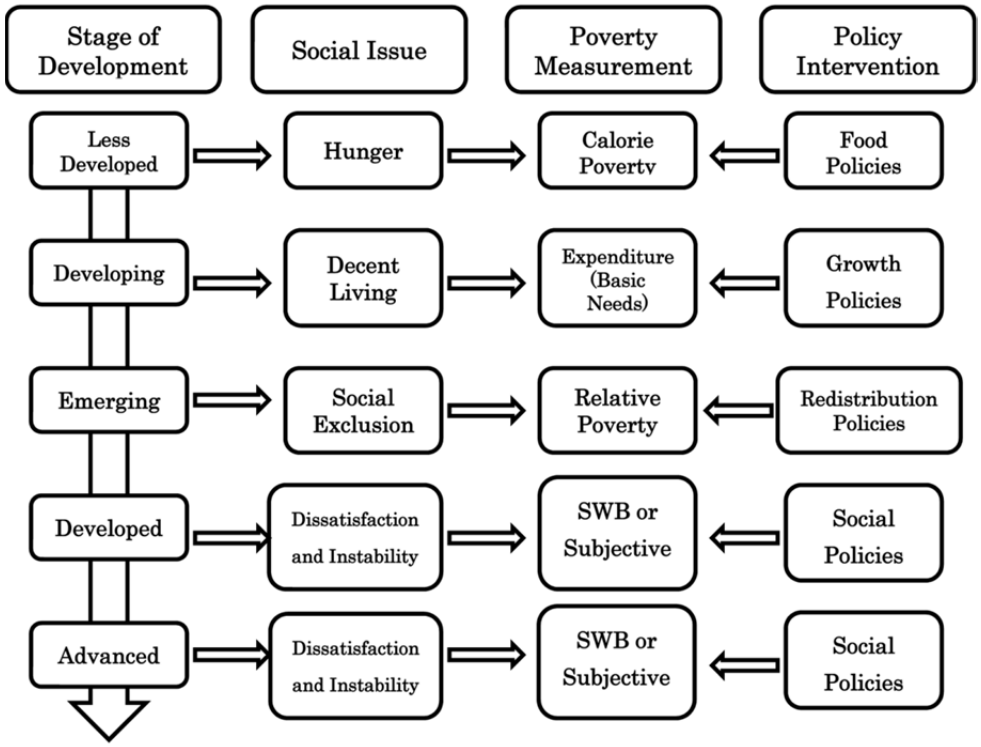
The absolute poverty measurements might be appropriate in the past and current context in Indonesia, but might not be suitable for the future. In the early stage of development, where there were high levels of hunger, society's and government's perception of poverty was dominated by absolutist concerns. However, when almost all members of society can easily afford basic needs, society's focus shifted from absolute deprivation to relative deprivation.[4]

1. http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD.
2. http://www.bps.go.id/tab_sub/view.php?kat=1&tabel=1&daftar=1&id_subyek=23&notab=1
3. Since 1998, a change in the method of calculating the poverty line was adopted by improving the quality of non-food items, including: the cost of education (originally based on the cost of elementary education, the increase to cover the costs of junior high school education), the cost of health care (initially based on standard costs at a primary Health Center, then increased to include the costs of services of a general practitioner), and the transport costs (initially only costs of transport within a city were estimated, then transport costs were increased to also provide for inter-city transportation costs in accordance with the increased mobility of the population). As a result, the poverty line increased and the population below the poverty line also increased.
4. Corazzini, Esposito and Majorano (2011) observed undergraduate students from eight countries(Bolivia, Brazil, Italy, Kenya, Laos, Sweden, Switzerland and the UK) and concluded that students coming from richer countries tended to see poverty from a more relative perspective as compared to their colleagues from lower-income countries.

In a diverse society like Indonesia where a great deal of regional disparities exist, the perception of poverty among those living in Jakarta, the most developed province with per-capita income at around $4,500/year (2010), might be totally different from that of those living in East Nusa Tenggara (NTT), the poorest province with per-capita income of less than $300/year (2010).[5] A person in NTT might perceive poverty as the deprivation of basic needs while a person in Jakarta might perceive poverty as relative deprivation. Thus, the government of Indonesia should not only update the absolute measures but also compile relative or subjective measures of poverty. While an absolute measurement helps us to identify those people who are not able to attain a minimum standard of living, a relative measurement assists us in identifying those whose standard of living is low compared to the average level of the society in which they live. The subjective measurements of poverty help to evaluate the satisfaction/happiness/well-being of members of society, while promoting discussions about the goals of development. Figure 1 shows one proto-typical framework of the relationship between the stages of development, social issues, poverty measurements, and policy interventions.[6]

5. The per-capita income refers to GDP per-capita calculated based on the 2000 constant price. http://www.bps.go.id/tab_sub/view.php?kat=2&tabel=1&daftar=1&id_subyek=52&notab=2.
6. Social issues and policy interventions often continue into the later stages of development. For example, the issues associated with 'social exclusion' persist even among the most advanced countries.

Figure 1. Stages of development, social issues, poverty measurements, and policy interventions



Source: Authors

Absolute poverty analyses that compare the levels of income or expenditure with the given thresholds have dominated poverty literature in Indonesia (Islam and Khan 1986; Bidani and Ravallion 1993; Booth 2000; Balisacan, Pernia, and Asra 2002; Fields et al. 2003; Suryahadi, Suryadarma, and Sumarto 2009; Dartanto and Nurkholis forthcoming). Given the dynamism of society's perception of 'poverty' and rapid changes in the socio-economic situation in Indonesia, the current study of multiple poverty indicators should be a valuable addition to the existing stock of poverty literature. It is the first comprehensive study in Indonesia that looks into not only objective poverty (absolute and relative poverty), but also subjective poverty measurement. The subjective poverty measurements can be used to evaluate whether or not the current official absolute poverty line properly represents society's

perception of poverty. There may be significant differences between objectively and subjectively measured poverty in Indonesia.

Comparing the determinants of poverty across different poverty measures allows us a better understanding of the roles and robustness of various determinants of poverty. It also helps us to detect the key determinants that policy initiatives should focus on. It should also widen the perspective of Indonesian policy makers in proposing poverty alleviation policies. Existence of absolute and/or relative poverty would call for a different set of strategies to cope with. In a region where the problem of poverty is characterized by objective/absolute poorness, then the appropriate strategy would be promoting economic growth through providing basic physical and human capital infrastructure. If the existing problems in other regions are related to relative poverty, then the proper strategy may well include policies that promote asset redistribution. Alesina and Perotti (1996) mentioned that income inequality and life dissatisfaction (well-being) are closely related to political instability—an important agenda for development in Indonesia where national unity has been a priority issue.

This article, therefore, intends to conduct comparative studies of multiple poverty measures by looking into objective/absolute, relative and subjective poverty incidence in Indonesia. This paper aims at addressing the following three main questions: 1) How different are the poverty outcomes if five different metrics of poverty are used? 2) What are the key determinants of absolute, relative and subjective poverty? and 3) Are the socio-economic indicators of the reference group (neighbors) correlated with households' assessment of their subjective poverty?

The next section of this article presents a literature review on poverty definitions and past research on absolute, relative, and subjective poverty metrics. Section three describes the current research methodology. Section four introduces the national and regional poverty profile of Indonesia. The fifth and the main analytical section of the paper will introduce the results of logit and ordered logit model analyses of the determinants of absolute, relative, and subjective

poverty. The concluding section of the paper will summarize the main findings and discuss their policy implications.

2. Literature review

2.1 Defining poverty

Although the researchers in the field of poverty analyses have employed a wide variety of definitions, all poverty definitions can fit into one of the following categories: absolute poverty, relative poverty, and subjective poverty (Hagenaars and de Vos 1988). In the *absolute poverty* concept, poverty means that one is having less than the objectively-defined absolute minimum. The *Basic needs approach* defines this absolute minimum in terms of 'basic needs' such as food, clothing, and housing. Second, in the *relative poverty* concept, poverty means that one is having less than others have in the same society. Relative deprivation with respect to various commodities defines households as poor when they are lacking certain commodities that are common in the society they belong to (Townsend 1979). Third, in the *subjective poverty* concept, poverty means that one is feeling that (s)he does not have enough to get along. In the *subjective minimum income* definition, one is said to be poor if one's actual income level is less than the amount (s)he considers to be 'just sufficient' (Goedhart et al. 1977).

Perhaps, the earliest systematic studies on poverty were pioneered by Benjamin Seebohm Rowntree in the city of York, and by Charles Booth in London at the end of the 19th century. Rowntree defined poverty as families whose total income is insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency (1901, 86). Rowntree called poverty falling under this category as 'primary' poverty. Rowntree's definition of poverty was apparently an absolute/objective poverty concept. Townsend (1954) criticized Rowntree's framework, stating that it ignored social needs, asserting that Rowntree's

framework should be extended to include not only physical efficiency but also social participation costs.

Townsend (1962) argued that there were no purely physical needs. Needs are almost completely a social concept, and society itself is continuously changing. While defending the 'absolute core' in the idea of poverty, Sen (1979) stated that the notion of 'minimum needs' must be relative rather than absolute. Poverty has to be judged in comparison with the experience of others in society. Sen (1983) asserted that the relativist approach sees deprivation in terms of a person or a household being able to achieve less than what others in that society do, and this relativity is not to be confused with variation over time. Most OECD countries use a relative poverty line and set it at typically 40-60% of mean or median income (e.g., Fouarge and Layte 2005; Eurostat 2005; OECD 2008). The argument of using a constant proportion of the mean relates to the costs of 'social inclusion', the cost assuring a person can maintain personal dignity and participate in customary social activities.[7] In the case of developing countries, Ravallion and Chen (2011) found that, in 2005, one half of the population of the developing world lived in relative poverty, half of whom were absolutely poor. The total number of relatively poor rose during the period 1981–2005, despite falling numbers of absolutely poor.

In contrast to the absolute and relative poverty measures, which are mostly constructed from the objective data of expenditure and/or income, subjective poverty is based on psychological perceptions of individuals. Niemietz (2011) summarized the two definitions of subjective poverty: the first one consists of an individual assessment of their poverty status. People are simply classified as poor when they consider themselves so. In this version of the subjective poverty concept, there is no setting of the 'poverty line'. The second one involves a majoritarian or democratic approach to setting the poverty line. People can be asked directly what they consider to be the necessary minimum income to maintain a minimum decent

7. Personal dignity is also often advocated in the area of absolute poverty.

standard of living in their society. The average responses obtained from surveys utilizing the minimum income question (MIQ), the income evaluation question (IEQ), the consumption adequacy question (CAQ), and the economic ladder question (ELQ) then become the foundation of the poverty line. Contributions to the majoritarian poverty line analyses include Goedhart et al. (1977), Danziger et al. (1984), Kapteyn, Kooreman and Willemse (1988), and Pradhan and Ravallion (2000). However, Deaton and Zaidi (2002) indicated that MIQ methodology might not be applicable to most developing countries where income is not a well-defined concept, particularly in rural areas.

Two prominent examples of subjective well-being research are the *General Social Surveys* (Davis, Smith and Marsden 2001) and the *World Values Survey* (Inglehart et al. 2000). The *General Social Surveys* has a single-item question on a three-point scale. This survey asks the question: "Taken all together, how would you say things are these days - would you say that you are very happy, pretty happy, or not too happy?" The *World Value Survey* assesses life satisfaction on a scale from one (dissatisfied) to ten (satisfied). This survey asks the question: "All things considered, how satisfied are you with your life as a whole these days?" Frey and Stutzer (2002) summarized that people evaluate their level of subjective well-being with regard to circumstances and in comparison to other persons, past experience and expectations of the future.

The *General Social Survey* and the *World Values Survey* ask directly on *subjective well-being/life satisfaction* in one question. However, life satisfaction can also be evaluated by a two-layer model (Van Praag and Ferrer-i-Carbonell 2008). In this case, the first layer asks households the question: "How satisfied are you today with the following areas of your life?" with answers, on a scale from one to ten, for areas such as income satisfaction, health satisfaction, job satisfaction, environment satisfaction and so on. The second layer then combines all components of the evaluation of households as overall life satisfaction.

2.2 Determinants of absolute, relative and subjective poverty

Many past studies have found that the key determinants of absolute poverty[8] are human capital, demographic factors, geographical location, physical assets and occupational status. Hassan and Babu (1991) found that productive assets other than land, smaller-sized families, and higher non-farming-related earnings are the determinants of food (calorie) poverty in rural Sudan. Studies by Rodriguez and Smith (1994) in Costa Rica, Adam and Jane (1995) in Pakistan, Grootaert (1997) in Cote d'lvoire, Anyanwu (2005) in rural Nigeria, Mukherjee and Benson (2003) in Malawi, de Silva (2008) in Sri Lanka, Dartanto and Nurkholis (forthcoming) in Indonesia have clearly shown that an increase in human capital indicated by educational attainment decreases the probability of being poor and improves the ability of a household to respond to transitory shocks. With regard to the changes in demographic factors, a positive link between an increased household size and poverty has been confirmed by Mukherjee and Benson (2003) in Malawi, Anyanwu (2005) in Nigeria, Mok, Gan and Sanyal (2007) in Malaysia, and de Silva (2008) in Sri Lanka.

de Silva (2008) confirmed in Sri Lanka that poverty is commonly found in rural areas. A lack of physical assets is another important factor often associated with poverty (Adam and Jane 1995; Grootaert 1997; de Janvry and Sadoulet 2000; Mukherjee and Benson 2003). Lastly, occupation status is frequently found as one of the important factors determining the household poverty status. Rodriguez and Smith (1994), Fields et al. (2003), and de Silva (2008) found that households with the head working as a waged employee can escape poverty. In the case of Indonesia, Fields et al. (2003) and Dartanto and Nurkholis (forthcoming) confirmed that the important factors of poverty dynamics are educational attainment, number of household

8. Some researchers called absolute poverty as objective poverty since this poverty is calculated based on the objectively defined threshold of minimum consumption. In this current analysis, the five poverty metrics for calorie, expenditure, relative, SWB, and subjective poverty definitions can be divided into objective measures (calorie, expenditure, and relative poverty measurements) and subjective measures (SWB and subjective poverty measurements).

members, physical assets, employment status, health shocks, access to electricity, and changes in the household size, sectors in which they work, and the availability of microcredit programs.

Compared to the abundant research on absolute poverty, there has been little analysis on the determinants of either relative or subjective poverty, particularly in developing countries. Kenworthy (1999), assessing 15 affluent industrialized nations over the period of 1960–91, strongly supported the conventional view that social-welfare programs reduce both absolute and relative poverty. Moller et al. (2003), using the panel data of 14 OECD countries between 1970 and 1997, found that relative poverty is mainly a function of industrial employment, unemployment, wage coordination and welfare policies. Herrera, Razafindrakoto and Roubaud (2006) modeled the determinants of subjective well-being in Peru and Madagascar by including several explanatory variables such as household demographic characteristics, socio-economic characteristics, social and political participation, shock and vulnerability, and social comparisons. They found that in Madagascar and Peru income inequality had a negative effect on the individual subjective evaluation of poverty.

Luttmer (2005) estimated the determinants of well-being as a function of own income and control variables such as religion, age and other socio-economic indicators and found that higher earnings of neighbors were associated with lower levels of self-reported happiness. Kingdon and Knight (2006), investigating subjective well-being (SWB) poverty in South Africa, found that the determinants of SWB poverty were age, household unemployment rate, health problems, house ownership, ethnicity, and availability of community roads. Ladiyanto et al. (2010) found that happiness in Indonesia depends on age, education, health, assets, marriage, and expenditure. Frey and Stutzer (2002) reported that subjective well-being is a valid and empirically adequate measure for human well-being, and asserted that it can be modeled in a microeconometric happiness function that can be estimated by ordered probit or logit models.

3. Research methodology

3.1 Operationalizing poverty definitions

This article classifies poverty experienced by Indonesian households using five poverty indicators: i) calorie intake poverty, ii) expenditure poverty, iii) relative poverty, iv) subjective well-being (SWB) poverty and v) subjective poverty. While i) and ii) reflect an 'absolute' notion of poverty, iii) reflects a 'relative' notion of poverty. Metrics i), ii), and iii) can be grouped as 'objective' measurements of poverty against the 'subjective' measurements of iv) and v).[9] This study uses the 2005 National Socio-Economic Survey (Susenas) collected by the Central Statistical Agency of Indonesia to quantify poverty in all five measures, and to analyze determinants of these multifaceted poverty metrics. The Susenas survey covering all provinces in Indonesia except Aceh consists of two main datasets: Core and Module. The Susenas 2005 Core recorded the detailed characteristics of 278,352 households representing the 59,321,125 households in Indonesia and covering various geographic regions of the country. The 2005 Susenas Module collected additional pieces of information on a subset of the Core households (68,288 households). The Susenas Module recorded detailed sets of information for food and non-food consumption as well as income of the sample households. After merging the Susenas Core and Module and omitting the missing and outlier data, 62,625 households are included in the current analyses.

A person suffers from absolute deprivation if (s)he cannot enjoy society's minimum standard of living. If one accepts a definition of a minimum standard of living as consumption at a certain level known as the poverty line, then the poverty measurement is straightforward: those with consumption expenditures below this line are considered 'poor' and the rest are 'non-poor'.

9. Relative poverty measurements can also be defined as subjective indicators.

If we use the ***calorie poverty*** line, then those with daily food consumption worth less than 2,100 Calories (≅ kilocalories) are classified as poor (Ravallion 1994). The 2005 Susenas Module recorded 229 food commodities consumed by households. Using the calorie contents of each food, BPS calculated the calorie intake for each household. If we use the ***expenditure poverty*** line, then those with monthly expenditure for both foods and non-foods less than the 2005 BPS poverty line are classified as poor.[10] The BPS poverty line varies across provinces and between rural and urban areas.[11] This is due to the differences in food and non-food prices and in consumption patterns. The calculation of poverty using the expenditure approach is the official measurement of poverty in Indonesia.

When the ***relative poverty*** concept is applied, those with monthly income less than 50 percent of the average provincial income are categorized as poor.[12] Sen (1979) said that the income of a person can be seen to be not simply a rough aid to predicting a person's actual consumption, but also as capturing a person's ability to meet his minimum needs. The income in the 2005 Susenas survey covered four components: 1) monthly wages (salaries) and non-wage (salary) reward, 2) yearly net-income from agriculture and non-agriculture business, 3) yearly incomes from rent, shares and interest, and 4) yearly transfers. Like the BPS poverty line, this relative poverty line also differs across provinces and between rural and urban areas.

10. The Central Statistical Agency of Indonesia's use of 2,100 Calories/capita/day resulted from 52 commodities designed for calculating the food poverty line. To calculate the expenditure poverty line, non-food expenditures such as on health, education, transportation, etc., should be added.
11. In 2005, the average monthly money metric of the national poverty line was IDR 117,259 ($11.7) in rural areas and IDR 150,799 ($15) in urban areas.
12. This study used income instead of expenditures for the calculation of the relative poverty line in order for us to obtain a consistent set of poverty indicators. Atkinson and Bourguignon (2001) postulated two key capabilities in the poverty measurements: physical survival and social inclusion. Therefore, the relative poverty line should not be set lower than the absolute poverty line (a physical survival need). However, if we set the poverty line at the level half (50%) of the mean (median) expenditures, this will make the relative poverty line at a level lower than the absolute poverty line. Therefore, the relative poverty incidence particularly in rural areas will be lower than the absolute poverty incidence. For example, using the 50% mean of expenditure as the relative poverty line will result in a poverty incidence of 19.64% (Urban) and 9.52% (rural), while using the 50% median of expenditure as the relative poverty line will result in a poverty incidence of 14.33% (urban) and 10.17% (rural). Both results are lower than the absolute poverty incidence.

For ***subjective well-being poverty***, this study adopts the weakly defined SWB poverty concept in accordance with the ways the relevant questions were raised in the survey for the 2005 Susenas.[13] Most of the survey questions related to the SWB poverty are similar to those of *World Values Survey* and *General Social Survey*. However, the 2005 Susenas evaluated the subjective perception of household consumption by the following questions:[14]

1) (Food Consumption) Compared to that of last year, what is the current level of food consumption? 1) significantly decreased; 2) slightly decreased; 3) same; 4) slightly increased; 5) significantly increased
2) (Non-food Consumption) Compared to that of last year, what is the current level of food consumption? 1) significantly decreased; 2) slightly decreased; 3) same; 4) slightly increased; 5) significantly increased

We then assigned numerical scores from 1 to 5 to each question. Adding up the scores for the two sub-questions, the total score ranges from 1 to 10. Poor is defined as those with a total score of 5 or less.[15]

The ***subjective poverty*** definition used in this study follows that of Niemietz's category of an individual assessment instead of a majoritarian (democratic) poverty line. Those who reported themselves as poor are categorized as poor. In the 2005 Susenas, respondents are asked the following question: "In your opinion, do you think you are poor?" 1) Yes; 2) No. If respondents reported yes, then they are categorized as (subjectively) poor in this subjective poverty concept.

13. Households' evaluation on consumption of both foods and non-food items in Susenas is only one part of life satisfaction. Thus, the SWB measurement obtained from this Susenas may be called 'weakly defined' SWB or 'pseudo' SWB. The current study then followed the two-layer approach of Van Praag and Ferrer-i-Carbonell (2008) by combining the scores of households' evaluation on both foods and non-food items.
14. Addressing questions in changes over a certain periods, not in levels, is also widely seen among surveys of subjective well-being. For example, in their study on Madagascar and Peru, Herrera, Razafindrakoto and Roubaud (2006) used the following question for the households' subjective assessment of the evolution of living standards. During the last year, living standards have: increased, stagnated, or fallen.
15. If a household experiences significant increase in either food or non-food consumption but at the same time experiences significant decrease in the other consumption category, then that household is still categorized as non-poor.

3.2 Two models for the determinants of poverty

The current study uses two econometric models—logit and ordered logit models—in order to examine the determinants of poverty outcomes under the aforementioned five poverty concepts. The logit model is applied to observe the determinants of each poverty category. That is, why some households are categorized as poor in a designated poverty category while others are categorized as non-poor (Eq.1). The ordered logit model is applied in order to examine the relative effects of different household characteristics on their poverty outcomes. That is, why some households only experience poverty in one poverty indicator while others experience poverty in two to all five poverty categories (Eq.2). The description and descriptive statistics of each of the explanatory variables included in these models are summarized in Appendix 1 and 2. Mean and standard deviation of each explanatory variable are also presented in Appendix 3 for the poor identified by each one of the aforementioned five poverty concepts. Cross correlations among five poverty indicators and explanatory variables are presented in Appendix 4. Independent variables are selected taking into account data availability in the 2005 Susenas and the results of the previous studies, such as Hassan and Babu (1991), Adam and Jane (1995), Grootaert (1997), Frey and Stutzer (2002), Mukherjee and Benson (2003), Fields et al. (2003), Bigsten et al. (2003), Kedir and McKay (2005), Anyanwu (2005), Luttmer (2005), Kingdon and Knight (2006), de Silva (2008), and Dartanto and Nurkholis (forthcoming).

The logit and ordered logit models are as follows:

$$y_i^{LM} = HHC_i\beta + SECO_i\chi + ShockGov_i\phi + REGCHAR_i\varphi + REL_i\gamma + e_i \quad [1]$$

$$y_i^{OLM} = HHC_i\beta + SECO_i\chi + ShockGov_i\phi + REGCHAR_i\varphi + REL_i\gamma + e_i \quad [2]$$

where,

- y_i^{LM} is a household poverty category for each of five poverty indicators: 1 = poor, 0= non-poor;

- y_i^{OLM} is a household poverty experience: 0 = non-poor in all of the five poverty measurements; 1 = poor in only one poverty measurement; 2 = poor in two poverty measurements; 3 = poor in three poverty measurements; 4 = poor in four poverty measurements; 5 = poor in all of the five poverty measurements;
- HHC_i is a vector of family characteristics including marital status, age, education attainment, number of household members, number of children under 5 years of age, and a locational dummy (1=urban or 0=rural);
- $SECO_i$ is a vector of socio-economic characteristics including employment status, land ownership (in hectares), size of house (in square meters), a dummy for households with some members working as overseas migrant workers, and a ratio of self-food production over total food consumption;
- $ShockGov_i$ = a vector of shocks, coping strategies, and policy assistances received; Negative shocks include layoffs and health problems. Positive shocks are an improvement in public facilities in the surrounding area. This vector also includes interaction variables (cross-terms) between layoffs and public provision of cheap rice (RASKIN), between health shocks and public provision of health insurance targeted to the poor (ASKESKIN). This vector also includes availability of household savings to cope with the shocks.
- $REGCHAR_i$ is a vector of regional characteristics including agricultural productivity for food crops, human development index, proportion of paved roads, and proportion of sanitation availability in each region where household *i* resides;
- REL_i is a vector of household's conditions relative to the averages of that society; This vector includes relative size of land and housing ownership, relative development of public facilities, relative educational attainment, relative consumption of durable goods and fashion items, and relative access to telephone and Internet.

- e is an error term; and
- i is the household identifier (i=1,…, 62,625).

Eq. 1 is a binary response model with two outcomes y={0,1} while Eq. 2 is an ordered response model with six outcomes y={0,1,…,5}. An ordered probit model (probit model) for y (conditional on a vector of explanatory variables **x**) can be derived from a latent variable model. Assume that a latent variable y* is determined by,

$$y^* = x\beta + e, \quad e|x \sim \text{Normal}(0,1) \qquad [3]$$

where β is a k x 1 coefficient vector, and for reasons to be seen, vector **x** does not contain a constant (for the detailed explanation of the ordered response model, see Wooldridge (2010)).

The parameters of this model can be estimated by using the maximum likelihood estimation. The signs of estimated coefficients from the ordered probit/logit models have exactly the same meaning as those obtained from the ordinary-least-square (OLS) estimations. A negative sign implies that the choice probabilities shift to lower categories when the independent variable increases. The magnitudes of the estimated coefficients, however, cannot be interpreted directly as in the case of OLS estimations. In most cases, we are interested in the response probabilities or partial effects $P(y=j|x)$ of the ordered probit/logit models (for the detailed explanation of the response probabilities, see Wooldridge (2010).

4. Multiple poverty indicators and regional characteristics in Indonesia

Table 1 presents a cross tabulation of 62,625 Indonesia households extracted from this 2005 Susenas, being classified as poor or non-poor in each one of the five operationalized poverty definitions. While 85.53% of households are categorized as absolute (expenditure) non-poor (i.e., 14.47% as poor), only 57.97% of households are reported subjective non-poor (i.e., 42.03% as poor). While 37.15% (19,900/53,566) of households that are absolute (expenditure) non-poor reported themselves as subjectively poor, 29.12% (2,638/9,059) of the absolute

(expenditure) poor reported as non-poor in their subjective judgment category. This evidence indicates that some households that are non-poor in an objective measurement may still feel poor subjectively. In the same token, other households that are poor in an objective metric could still perceive themselves non-poor in a subjective metric.

Table 2 presents computed poverty indicators using the aforementioned five poverty definitions for provinces of Indonesia together with other key regional characteristics. In Indonesia, it is generally said that there are two types of regional segregation, Java and Bali versus outside Java and Bali, and Western Indonesia versus Eastern Indonesia. Western Indonesia comprises of Sumatra, Java, Bali and Kalimantan, while Eastern Indonesia consists of Sulawesi, Nusa Tenggara, Maluku and Papua. Highly populated Java and Bali areas are significantly more developed than other islands in terms of economic activities and infrastructure. While manufacturing activities and service sectors dominate the economy of Java and Bali, agriculture and mining activities dominate the economy outside Java and Bali. According to the BPS, in 2005 (survey year), the Java-Bali economy contributed 61.2% of Indonesian Gross Domestic Product. The population in these areas also amounts to 58.8% of Indonesia's total population. Table 2 confirms that Java-Bali provinces generally have better road infrastructure, higher agricultural productivity, and lower criminal risk as compared to other provinces.

This regional segregation between Java-Bali and outside Java-Bali provinces may well influence the regional patterns of poverty incidence. Table 2 shows that, in fact, the poverty incidence across provinces varies in all poverty measures. The national poverty incidences in 2005 were 3.57% (calorie), 17.44% (expenditure), 30.83% (relative), 33.73% (SWB) and 38.94% (subjective). There were 21.5 percentage-point differences in the poverty outcome between absolute and subjective poverty.[16]

16. Poverty outcomes at the national level reported in Table 2 differ from those reported in Table 1. In Table 2, national averages are obtained by weighting regional indicators with regional populations, whereas Table 1 reports the unweighted national statistics.

Table 1. Cross tabulation between each poverty indicator

Poverty Measures		Calorie Poverty		Expenditure Poverty		Relative Poverty		SWB Poverty		Subjective Poverty	
		Non-Poor	Poor	Non-Poor	Poor	Non-Poor	Poor	Non-Poor	Poor	Non-Poor	Poor
Calorie Poverty	Non-Poor	60,678									
		96.89									
	Poor		1,947								
			3.11								
Expenditure Poverty	Non-Poor	52,638	928	53,566							
		84.05	*1.48*	*85.53*							
	Poor	8,040	1,019		9,059						
		12.84	*1.63*		*14.47*						
Relative Poverty	Non-Poor	45,089	875	43,831	2,133	45,964					
		72.00	*1.40*	*69.99*	*3.41*	*73.40*					
	Poor	15,589	1,072	9,735	6,926		16,661				
		24.89	*1.71*	*15.54*	*11.06*		*26.60*				
SWB Poverty	Non-Poor	40,759	1,263	36,532	5,490	32,264	9,758	42,022			
		65.08	*2.02*	*58.33*	*8.77*	*51.52*	*15.58*	*67.10*			
	Poor	19,919	684	17,034	3,569	13,700	6,903		20,603		
		31.81	*1.09*	*27.20*	*5.70*	*21.88*	*11.02*		*32.90*		
Subjective Poverty	Non-Poor	35,369	935	33,666	2,638	29,492	6,812	26,439	9,865	36,304	
		56.48	*1.49*	*53.76*	*4.21*	*47.09*	*10.88*	*42.22*	*15.75*	*57.97*	
	Poor	25,309	1,012	19,900	6,421	16,472	9,849	15,583	10,738		26,321
		40.41	*1.62*	*31.78*	*10.25*	*26.30*	*15.73*	*24.88*	*17.15*		*42.03*

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

Source: Authors' calculation.

The highest level of absolute poverty both in calorie and expenditure measurements is found in Papua (16.89% and 43.95%, respectively) while the lowest calorie poverty incidence is found in Bali (1.39%). The lowest level of expenditure poverty was found in Jakarta (7.35%). Jakarta, the capital of Indonesia, has a unique poverty profile. Although Jakarta has the lowest poverty rate based on the expenditure measurement (7.35%) and the subjective measurement (20.50%), at the same time, it has the highest poverty rate based on the relative measure (44.36%). Jakarta is a well-developed but highly unequal region. In terms of subjective poverty measurements, East Nusa Tenggara has the highest poverty rate both in the SWB and subjective poverty metrics. More than a half (51.73%) of the households in East Nusa Tenggara reported that their food and non-food consumptions as indicators of SWB poverty

had decreased significantly from the previous year. Around 80% of households in this province also assessed themselves as poor subjectively.

Surprisingly, the calculation of Spearman's rank correlations among provincial rankings in various poverty indicators found that, except for the rankings of calorie and expenditure poverty measurements, and the rankings of expenditure and subjective poverty measurements, there were virtually and statistically zero correlations among the provincial rankings in various poverty measurements (Appendix 5). This finding is similar to that in Ravallion and Bidani (1994), where there was no correlation between the rankings of provincial poverty obtained by two different poverty measurements.

These findings point to the needs of tailor-made strategies for each province in order to cope with multifaceted poverty. For instance, Papua should promote economic growth for reducing expenditure poverty and improve food access for reducing calorie poverty. A part of the problems faced by Papua is infrastructure bottlenecks that, in turn, cause higher prices of food and non-food items that low-income households cannot afford. On the contrary, with 44% of households being categorized as relative poor, Jakarta should focus more on reducing income inequality in order to create a more inclusive society. Among the provinces in Indonesia, East Nusa Tenggara can be considered as a really poor province since there is massive poverty in both subjective poverty measurements in addition to absolute and relative poverty this region faces. Thus, alleviating poverty in this province would require a comprehensive approach.

Table 2. Multiple poverty Indicators and regional characteristics by provinces in 2005

Region	Multiple Poverty Indicators					Regional Characteristics						
	Absolute Poverty		Relative Poverty	Subjective Well-Being (SWB)	Subjective Poverty	Human Development Index	Agricultural Productivity (100 Kg/Ha)*	Paved Road Availability (%)	Sanitation Availability (%)	Criminality Rate**	Log GRDP Per-Capita	Population
	Calorie	Expenditure										
North Sumatera	3.17	15.90	28.98	34.33	39.57	72.03	60.90	61.49	72.64	220	7.59	12,291,892
West Sumatera	3.23	12.05	26.14	43.91	46.02	71.19	70.61	76.57	49.22	163	8.26	3,744,936
Riau	3.51	12.52	23.35	32.32	39.39	73.63	48.07	61.73	79.50	193	19.71	4,229,976
Jambi	2.43	12.15	31.46	26.44	39.28	70.95	57.39	73.53	61.44	84	5.09	2,623,468
South Sumatera	5.33	22.89	35.60	30.72	43.11	70.23	52.69	73.13	64.05	125	7.76	6,731,288
Bengkulu	2.21	25.42	29.76	32.35	55.08	71.09	55.99	69.27	59.24	69	4.23	1,561,514
Lampung	2.06	19.79	34.83	34.15	49.64	68.85	71.37	67.43	75.48	58	5.06	6,100,347
Bangka Belitung	3.45	9.11	28.82	23.71	21.04	70.68	51.77	75.16	58.91	114	10.69	846,776
Riau Island	8.04	8.21	29.54	38.57	26.00	72.23	45.75	75.01	78.71	159	29.13	1,113,744
DKI Jakarta	3.19	7.35	44.36	26.12	20.50	76.07	63.41	100.00	73.28	347	35.33	8,854,520
West Java	2.37	12.79	29.53	39.47	31.36	69.93	81.24	77.42	60.30	62	6.74	38,194,934
Central Java	3.28	21.72	26.68	32.41	40.74	69.78	77.65	67.01	59.73	37	4.62	32,583,058
DI Yogyakarta	3.62	21.95	35.55	28.63	35.01	73.50	71.11	72.03	67.27	108	5.38	3,258,255
East Java	4.00	20.84	29.65	30.55	35.55	68.42	74.06	81.82	56.36	86	7.41	36,587,860
Banten	2.44	10.53	29.30	36.25	33.48	68.80	68.32	60.69	56.46	45	6.59	9,306,222
Bali	1.39	7.41	27.16	42.21	34.86	69.78	70.69	89.84	57.32	188	6.47	3,430,494
West Nusa Tenggara	2.63	25.45	29.72	36.79	64.37	62.42	62.04	71.52	34.54	113	3.79	4,121,928
East Nusa Tenggara	4.92	32.08	38.75	51.73	80.10	63.59	45.81	44.95	63.00	136	2.56	4,051,428
West Kalimantan	4.17	15.60	30.97	35.92	44.70	66.20	54.55	40.20	56.67	136	6.07	4,078,268
Central Kalimantan	3.35	14.34	20.50	25.80	41.89	73.22	43.10	39.81	52.54	157	9.55	1,555,330
South Kalimantan	2.29	8.71	32.39	25.87	30.51	67.44	58.38	75.75	58.29	87	7.64	3,202,285
East Kalimantan	7.58	16.31	41.37	26.33	30.16	72.94	59.70	53.16	74.94	202	34.82	2,774,473
North Sulawesi	4.08	15.47	39.16	29.85	46.91	74.21	56.55	63.53	67.49	489	6.24	2,159,556
Central Sulawesi	5.07	25.16	26.94	28.80	58.03	68.47	59.78	58.79	47.98	226	5.63	2,250,822
South Sulawesi	4.75	16.42	36.68	29.79	43.28	68.06	71.65	66.18	57.57	159	5.24	8,056,648
South East Sulawesi	3.17	17.32	38.93	36.27	55.26	67.52	61.42	49.16	58.52	36	4.67	1,849,318
Gorontalo	5.62	30.67	32.75	19.75	60.80	67.46	60.45	56.61	29.18	304	2.63	828,479
Maluku	7.38	20.37	28.87	37.13	53.66	69.24	51.61	37.21	45.81	65	2.71	2,143,230
Papua	16.89	43.95	38.64	27.61	66.34	62.08	50.56	31.71	50.51	249	16.43	1,674,269
National	**3.57**	**17.44**	**30.83**	**33.73**	**38.94**	**69.57**	**69.25**	**64.51**	**59.55**	**121**	**8.04**	**210,205,318**

Note: * Agricultural productivity is a composite index of four commodities: cassava, sweet potato, maize and paddy. The weight of each commodity is 15%, 15%, 20% and 50%, respectively. ** The criminal risk is the criminal incidence per-100,000 people. National averages are obtained as weighted (by population) averages of provincial statistics.

Source: Authors' calculation based on Susenas 2005 and other BPS publications.

Table 3. Correlation between poverty indicators and regional characteristics

Correlation	Calorie Pov.	Expend. Pov.	Relative Pov.	SWB Pov.	Subjective Pov.	Human Dev. Ind.	Agri. Prod.	Road Av.	Sanitation Av.	Criminal Risk	Log GRDP
Calorie Pov.	1										
Expend. Pov.	0.595***	1									
	0.001										
Relative Pov.	0.307*	0.231	1								
	0.100	*0.220*									
SWB Pov.	-0.153	-0.031	-0.122	1							
	0.420	*0.872*	*0.520*								
Subjective Pov.	0.301	0.810***	0.098	0.304	1						
	0.106	*0.000*	*0.607*	*0.103*							
Human Dev. Ind.	-0.325*	-0.620***	-0.065	-0.272	-0.677***	1					
	0.080	*0.000*	*0.732*	*0.145*	*0.000*						
Agri. Prod.	-0.394**	-0.151	0.023	0.096	-0.249	0.023	1				
	0.031	*0.427*	*0.905*	*0.613*	*0.185*	*0.906*					
Road Av.	-0.533***	-0.542***	0.015	-0.034	-0.593*	0.413**	0.490***	1			
	0.002	*0.002*	*0.936*	*0.857*	*0.001*	*0.023*	*0.006*				
Sanitation Av.	-0.095	-0.422**	0.245	0.086	-0.499***	0.588***	-0.069	0.252	1		
	0.616	*0.020*	*0.193*	*0.652*	*0.005*	*0.001*	*0.718*	*0.180*			
Criminal Risk	0.273	0.057	0.341*	-0.290	0.035	0.294	-0.243	0.029	0.064	1	
	0.145	*0.765*	*0.066*	*0.120*	*0.856*	*0.115*	*0.195*	*0.878*	*0.738*		
Log GRDP	0.334*	-0.292	0.318*	-0.217	-0.500***	0.455**	-0.231	0.200	0.544***	0.357*	1
	0.071	*0.118*	*0.087*	*0.250*	*0.005*	*0.012*	*0.220*	*0.289*	*0.002*	*0.053*	

Note: *,**,*** are significant at 10%, 5% and 1% correspondingly. Figures in italics are p-values.
Source: Authors' calculation.

Table 3 shows cross correlations among the five poverty measures and key regional characteristics. Absolute poverty (calorie and expenditure) is negatively correlated with human capital, agricultural productivity, and road and sanitation infrastructure. These regional characteristics, however, are not significantly correlated with relative poverty measurement. The income per-capita (log pcGRDP) and criminal risk are significantly and positively related to the relative poverty. The simple regression confirmed that the criminal risk will increase along with an increase in relative poverty incidence.[17] Many studies such as Kelly (2000), Fajnzylber, Lederman and Loayza (2002), Sachsida et al. (2010) and Whitworth (2012) also confirmed that income inequality plays an important role in the determination of the crime

17. The study estimated the relationship between relative poverty (RelPov) and criminal risk (CrimRisk) by controlling some variables such as calorie poverty (Cal), land ownership (Land), agricultural productivity (AgriProd) and employment (Empl). The study combined the 2005 Susenas dataset with the regional characteristic dataset. The regression result is as follows:

*CrimRisk=406.99+9.75RelPov+0.0002*Cal-4.09*AgriProd-5.97*Land-2.60*Empl*
t-statistic 157.62 12.41 3.70 -144.13 -39.20 -2.70
N=62,625 F-stat=4421.26 R-Squared=0.222

rates. This finding that relative poverty increases the criminal risk points to the needs of research into relative poverty in Indonesia. On the other hand, it was found that subjective poverty was significantly and negatively correlated with human and physical capital, and income level. A higher per-capita regional income seems to lead to lower subjective poverty. Among five poverty indicators, SWB poverty appears not to have a significant relationship with regional characteristics. This is probably because the SWB indicators adopted here means changes (over the last year) rather than levels.

5. Determinants of multifaceted poverty: absolute, relative and subjective

The models (Eq. 1 and Eq. 2) are estimated using the maximum likelihood estimation with robust standard errors. The estimation results of the logit model (Eq. 1) are shown in Tables 4, 5 and 6. Table 4 shows the estimation results of poverty determinants for all poverty measures. Table 5 shows the results from regressions of three poverty measures where variables that show households' relative position in their societies are added to the standard set of explanatory variables used in the regressions reported in Table 4. This is motivated by the idea that households could consider their neighbors' condition when they evaluate their own happiness/well-being/satisfaction. Table 6 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 7. The partial effects (dy/dx) of explanatory variables on the ordered poverty experiences are summarized in Table 8.

5.1 Determinants of poverty: main findings

Demographic Variables

All demographic variables of marital status, educational attainment, number of household members, number of children under 5 years of age, and a locational dummy (1=urban or 0=rural) are significant except in the case of SWB poverty. Educational attainment and the number of children under 5 years of age are the two most significant factors that consistently influence the poverty status in all poverty measures. For educational attainment, we used the 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). The negative coefficient of education means that a higher educational attainment leads to a higher probability of being non-poor. The probability of being absolutely and subjectively poor will decrease by 4.63% and 12.14%, respectively, when the completed schooling increases from one step to the other, like elementary school to junior high school (Table 6). Higher educational attainment increases the probability of being never poor in any of the five poverty metrics by almost 11 percentage points (Table 8). A better education raises the probability of being non-poor because it creates wider opportunity for getting a better job and higher income. It also likely enhances life satisfaction through non-economic factors such as through self-enlightenment. These findings confirmed the conclusions of the earlier studies such as Rodriguez and Smith (1994), Adam and Jane (1995), Bigsten et al. (2003), Anyanwu (2005) and Dartanto and Nurkholis (forthcoming).

On the other hand, having one more child increases the probability of being poor. Similarly, a bigger number of household members also increases the probability of being poor in four poverty measurements but not in the subjective poverty measurement. Households having more family members tend to assess themselves subjectively as non-poor. Given a fixed income, an increase in the number of members forces the households to reduce their per capita consumption levels in order to support the additional member(s). Households having more

family members, however, may not become poorer if they have work/income contributions. Marital status affects poverty status differently depending on the poverty measurements. Married households tend to be subjective non-poor since they might be able to share the joys and sorrows of life. Nevertheless, changing the poverty measurement from subjective indicator to either absolute or relative indicator resulted in difference outcomes. There, married households tended to be poor(er).

Socio-Economic Variables

There are two socio economic variables—households having migrant workers and self-food production (ratio of self-food production over total food consumption)—significant across all the poverty measurements (Table 4). Households having family members working outside Indonesia have a higher probability of being non-poor because remittances can either support basic family needs or business start-ups. The probability of being poor decreases around 0.6% (absolute-calorie), 2.75% (absolute-expenditure), 4.25% (relative), 4.92% (SWB) and 2.80% (subjective) when a household has a family member working outside Indonesia (Table 6). This finding confirmed the results from previous studies of Hall (2007) and Dartanto and Nurkholis (forthcoming). Self-food production measured as a ratio to the total household consumption significantly increases the probability of being poor for all poverty measures. This variable can be associated with either a higher subsistence level or as exclusion. A high ratio of self-food production points to farmers, it could also signify isolation from the market system. Therefore, households with a high proportion of self-food production (mostly farmers) are objectively and subjectively categorized as poor.

House ownership as an indicator of physical asset possession negatively and significantly affects the poverty in expenditure, relative and subjective poverty categories. This study found that while land ownership reduces the probability of being poor in calorie poverty and the SWB (including changes in food consumption) poverty measurement, it represents higher poverty incidence in expenditure, relative and subjective poverty categories.

Households owning land are again often associated with those who are working in the agricultural sector. Quite unexpectedly, results show that employment status is less important in determining poverty status. Being employed (having work activities) is important for being non-poor in calorie poverty but it is likely to increase subjective poverty (Tables 4 and 6).[18]

Shocks, Government Assistance, and Coping Strategies

Low income groups in most developing countries usually face volatility in consumption due to external shocks. Households will respond differently to negative shocks depending on their consumption structure, asset ownership, availability of own savings and/or family assistance. As a provision of the social safety net, the government of Indonesia distributes subsidized rice (RASKIN) and provides health insurance targeted for the poor (ASKESKIN).

Results presented in Tables 4 and 6 show that households experiencing layoffs and/or health problems tend to become poor. Layoffs significantly increase the probability of being poor in terms of relative (6.28%), SWB (25.70%) and subjective (15.02%) poverty measurements, but not in terms of absolute measures. The government's fiscal (rice) subsidies and community safety networks (such as the traditional food sharing) may be functioning well. Households experiencing health problems will have a higher probability of being poor by 2.85% (relative), 22.85% (SWB) and 12.68% (subjective). Layoffs reduce family income while health problems reduce households' capacity to engage in/carry out jobs. Our estimated results clearly show that these shocks reduce household consumption levels significantly as shown by the highest impacts on the probability of being SWB poor. These shocks affect subjective measurements of poverty more compared to their impacts on poverty in the absolute measurements. Households tend to assess themselves subjectively as poor when they experience negative shocks.

18. In the next subsection, the current study shows that loss of employment (layoffs) significantly increases the probability of being poor in relative, SWB, and subjective poverty categories, but not in absolute poverty categories. The Susenas survey asks the following question: "Have you experienced layoffs over the last year? Yes or No." The layoffs have been most likely temporarily and, therefore, the impact is more mental/relative rather than objective (absolute).

Table 4. Estimation results of logistic regression of poverty determinants (1)

Variables	Calorie Poverty		Expenditure Poverty		Relative Poverty		SWB Poverty		Subjective Poverty	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Demographic Characteristics of Household Head										
Marital Status (1=marriage; 0=other)	-0.292	0.073***	0.091	0.042**	0.201	0.032***	-0.023	0.027	-0.232	0.028***
Educational Attaintment (completed schooling)	-0.056	0.019***	-0.495	0.012***	-0.487	0.009***	-0.146	0.007***	-0.504	0.008***
Number of Household Member	0.281	0.013***	0.369	0.008***	0.265	0.006***	0.028	0.006***	-0.081	0.006***
Number of Children under 5 years	0.205	0.036***	0.306	0.021***	0.386	0.017***	0.101	0.016***	0.328	0.017***
Location Dummy (1=urban; 0=other)	0.268	0.059***	0.305	0.032***	1.270	0.025***	0.034	0.022	-0.326	0.023***
Socio-Economic Characteristics of Households										
Log Size of Land Ownership (hectare)	-0.041	0.012***	0.065	0.006***	0.059	0.005***	-0.006	0.005	0.022	0.005***
Log Size of House (square meter)	-0.044	0.040	-0.110	0.021***	-0.159	0.016***	-0.011	0.014	-0.197	0.015***
Household with Migrant Worker (1=having TKI; 0=other)	-0.272	0.148*	-0.332	0.070***	-0.255	0.058***	-0.234	0.050***	-0.118	0.051**
Employment (1=having work activity; 0=unemployment)	-0.207	0.070***	0.018	0.040	0.007	0.031	-0.020	0.027	0.184	0.029***
Self food production (% of total consumption)	0.010	0.002***	0.014	0.001***	0.011	0.001***	0.001	0.001**	0.009	0.001***
Shocks and Coping Strategies										
Layoffs (1=experience; 0=other)	0.119	0.135	0.055	0.081	0.326	0.061***	1.065	0.055***	0.607	0.061***
Health Problems (1=experience; 0=other)	0.091	0.086	-0.088	0.048*	0.154	0.038***	0.955	0.033***	0.514	0.038***
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	-0.027	0.226	0.161	0.114	0.030	0.098	0.017	0.088	0.179	0.095*
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	0.065	0.067	0.684	0.032***	0.547	0.028***	0.236	0.025***	1.836	0.032***
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	0.163	0.191	-0.289	0.129**	-0.317	0.095***	0.057	0.079	0.045	0.088
Public Project (1=having public project in surrounding living area; 0=other)	-0.396	0.092***	-0.018	0.041	-0.134	0.034***	-0.061	0.030**	-0.104	0.032***
Regional Characteristics										
Agricultural Productivity of Food Crops (100kg/hectare)	-0.004	0.003*	0.010	0.001***	-0.004	0.001***	0.004	0.001***	-0.015	0.001***
Human Development Index	-0.002	0.011	-0.019	0.006***	0.009	0.005*	-0.034	0.004***	-0.027	0.005***
Paved Roads (% good condition of total paved roads)	-0.009	0.002***	-0.001	0.001	0.008	0.001***	-0.001	0.001	-0.007	0.001***
Sanitation Availability (% of Population)	-0.004	0.003	-0.005	0.002***	0.010	0.001***	0.009	0.001***	-0.003	0.001**
Constant	-2.984	0.664***	-2.148	0.371***	-3.547	0.304***	0.916	0.264***	4.646	0.286***
Wald Chi-Square	**1,084**		**6,530**		**7,106**		**10,951**		**2,246**	
Log Pseudolikelihood	**-8,205**		**-21,966**		**-31,657**		**-34,637**		**-38,455**	
Pseudo R2	**0.054**		**0.151**		**0.127**		**0.187**		**0.031**	
Number of Observation	**62,625**		**62,625**		**62,625**		**62,625**		**62,625**	

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

Source: Authors' calculation.

Table 5. Estimation results of logistic regression of poverty determinants (2)

Variables	Relative Poverty		SWB Poverty		Subjective Poverty	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Demographic Characteristics of Household Head						
Marital Status (1=marriage; 0=other)	0.202	0.032***	-0.033	0.027	-0.238	0.029***
Educational Attaintment (completed schooling)	-0.540	0.015***	-0.137	0.012***	-0.462	0.014***
Number of Household Member	0.267	0.006***	0.010	0.006*	-0.165	0.007***
Number of Children under 5 years	0.385	0.017***	0.071	0.016***	0.257	0.018***
Location Dummy (1=urban; 0=other)	1.308	0.026***	-0.058	0.023**	-0.540	0.025***
Socio-Economic Characteristics of Households						
Log Size of Land Ownership (hectare)	0.074	0.008***	-0.013	0.007*	0.026	0.007***
Log Size of House (square meter)	-0.125	0.022***	-0.067	0.019***	-0.196	0.021***
Household with Migrant Worker (1=having TKI; 0=other)	-0.258	0.058***	-0.218	0.050***	-0.068	0.052
Employment (1=having work activity; 0=unemployment)	0.011	0.031	-0.018	0.027	0.201	0.029***
Self food production (% of total consumption)	0.011	0.001***	0.000	0.001	0.007	0.001***
Shocks and Coping Strategies						
Layoffs (1=experience; 0=other)	0.336	0.061***	1.046	0.055***	0.590	0.062***
Health Problems (1=experience; 0=other)	0.157	0.038***	0.948	0.033***	0.520	0.039***
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	0.001	0.098	0.017	0.088	0.170	0.098*
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	0.546	0.028***	0.204	0.026***	1.759	0.033***
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	-0.296	0.095***	0.076	0.079	0.103	0.089
Public Project (1=having public project in surrounding living area; 0=other)	-0.140	0.034***	-0.049	0.030*	-0.091	0.032***
Regional Characteristics						
Agricultural Productivity of Food Crops (100kg/hectare)	-0.005	0.001***	0.006	0.001***	-0.016	0.001***
Human Development Index	0.008	0.005	-0.033	0.004***	-0.024	0.005***
Paved Roads (% good condition of total paved roads)	0.008	0.001***	-0.001	0.001*	-0.008	0.001***
Sanitation Availability (% of Population)	0.010	0.001***	0.008	0.001***	-0.004	0.001***
Relative Conditions Compared to Society						
Relative Size of Land Ownership	0.098	0.035***	-0.013	0.031	0.088	0.033***
Relative Size of House Ownership	-0.005	0.028	-0.120	0.024***	-0.018	0.026
Relative Development of Public Facility (Public Project)	-0.025	0.023	-0.020	0.020	0.055	0.022**
Relative Education Attainment	-0.177	0.036***	-0.063	0.031**	-0.088	0.034***
Relative Consumption on Durable Goods and Fashions	0.366	0.023***	-0.016	0.019	-0.012	0.021
Relative Internet and Telephone Connection	0.054	0.030*	-0.038	0.026	-0.150	0.029***
Household Poverty Conditions						
Expenditure Poverty (1=poor; 0=non-poor)			-0.074	0.028***	0.786	0.032***
Relative Poverty (1=poor; 0=non-poor)			0.437	0.023***	0.748	0.025***
Constant	-3.758	0.314***	1.276	0.272***	4.761	0.302***
Wald Chi-Square	**7,301**		**2,640**		**12,170**	
Log Pseudolikelihood	**-31,500**		**-38,236**		**-33,311**	
Pseudo R2	**0.132**		**0.036**		**0.218**	
Number of Observation	**62,625**		**62,625**		**62,625**	

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

Source: Authors' calculation.

Table 6. Estimation results of partial effect (dy/dx) of poverty determinants (%)

Variables	Calorie Poverty	Expend. Poverty	Relative Poverty		SWB Poverty		Subjective Poverty	
	Partial Effect	Partial Effect	Partial Effect	Partial Effect	Partial Effect	Partial Effect	Partial Effect	Partial Effect
Demographic Characteristics of Household Head								
Marital Status (1=marriage; 0=other)	-0.80	0.83	3.45	3.45	-0.51	-0.72	-5.66	-5.79
Educational Attaintment (completed schooling)	-0.14	-4.63	-8.67	-9.57	-3.20	-3.01	-12.14	-11.11
Number of Household Member	0.70	3.45	4.72	4.74	0.61	0.22	-1.96	-3.97
Number of Children under 5 years	0.51	2.86	6.87	6.83	2.20	1.55	7.89	6.19
Location Dummy (1=urban; 0=other)	0.69	2.91	23.75	24.39	0.75	-1.26	0.00	0.00
Socio-Economic Characteristics of Households								
Log Size of Land Ownership (hectare)	-0.10	0.60	1.05	1.31	-0.13	-0.28	0.53	0.62
Log Size of House (square meter)	-0.11	-1.02	-2.83	-2.22	-0.25	-1.46	-4.75	-4.71
Household with Migrant Worker (1=having TKI; 0=other)	-0.60	-2.75	-4.25	-4.28	-4.92	-4.58	-2.80	-1.63
Employment (1=having work activity; 0=unemployment)	-0.56	0.16	0.13	0.19	-0.44	-0.39	4.38	4.75
Self food production (% of total consumption)	0.02	0.13	0.20	0.20	0.03	0.01	0.22	0.16
Shocks and Coping Strategies								
Layoffs (1=experience; 0=other)	0.31	0.53	6.28	6.46	25.70	25.21	15.02	14.59
Health Problems (1=experience; 0=other)	0.24	-0.80	2.85	2.89	22.85	22.67	12.68	12.84
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	-0.07	1.60	0.54	0.02	0.38	0.38	4.37	4.14
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	0.17	7.81	10.76	10.70	5.32	4.56	42.19	40.78
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	0.44	-2.42	-5.18	-4.83	1.27	1.68	1.09	2.51
Public Project (1=having public project in surrounding living area; 0=other)	-0.86	-0.17	-2.32	-2.41	-1.33	-1.07	-2.49	-2.16
Regional Characteristics								
Agricultural Productivity of Food Crops (100kg/hectare)	-0.01	0.10	-0.07	-0.10	0.09	0.12	-0.37	-0.37
Human Development Index	-0.01	-0.17	0.15	0.13	-0.75	-0.73	-0.66	-0.58
Paved Roads (% good condition of total paved roads)	-0.02	-0.01	0.14	0.14	-0.01	-0.03	-0.16	-0.19
Sanitation Availability (% of Population)	-0.01	-0.05	0.18	0.18	0.19	0.18	-0.07	-0.10
Relative Conditions Compared to Society								
Relative Size of Land Ownership				1.72		-0.28		2.10
Relative Size of House Ownership				-0.09		-2.64		-0.43
Relative Development of Public Facility (Public Project)				-0.44		-0.43		1.32
Relative Education Attainment				-3.17		-1.39		-2.12
Relative Consumption on Durable Goods and Fashions				6.24		-0.35		-0.29
Relative Internet and Telephone Connection				0.96		-0.83		-3.65
Poverty Conditions								
Expenditure Poverty (1=poor; 0=non-poor)						-1.61		19.34
Relative Poverty (1=poor; 0=non-poor)						9.86		18.27
Probability (y=j|x)	**2.56**	**10.43**	**23.21**	**23.05**	**32.43**	**32.32**	**40.46**	**40.29**

Note: dy/dx is for discrete change of dummy variable from 0 to 1.

Source: Authors' calculation.

Estimated coefficients attached to the interaction variables of layoffs and government assistance—subsidized rice (RASKIN)—are supposed to show the marginal impact of this safety net. Although the estimated negative coefficient (-0.027) in calorie poverty indicates a marginally mitigating impact of this subsidized rice distribution, results are largely negligible or counterintuitive. This distribution of cheap rice has not been well-targeted to the poor or the shocked and this, in turn, may have caused these negligible or counterintuitive results in the current study.[19] Similarly, the positive (poverty mitigating) impact of government's provision of subsidized health insurance on the households with health problems was not confirmed in the current study. Rather, the study confirmed, that in addition to the increase in subjective poverty (12.68%) with health problems, the receipt of subsidized health insurance payments make households feel poorer (42.19% increase in subjective poverty category)(Table 6). A re-design of existing safety-net programs may be called for.

The current study confirms that availability of own savings works well as a buffer against shocks. Households that experience layoffs and/or health problems but with own savings seem to be able to cope with these shocks to some extent. This function of savings is visible in the case of expenditure poverty and relative poverty. Given the shocks, the availability of own savings will reduce the probability of being expenditure poor by 2.42% and relative poor by 5.18% (Table 6). The positive shocks of improvements in public facilities such as development of bridges and roads have positive effects on poverty alleviation. The probability of being poor decreases by 0.86% (calorie), 0.17% (expenditure), 2.32% (relative), 1.33% (SWB) and 2.49% (subjective) along with the development of public facilities in their living area (Table 6).

19. In order to avoid a (strong) endogeneity problem—the poor receive government assistance—the current study sets the dummy of one for the layoffs with cheap rice and zero for the others including the layoffs without cheap rice and the non-layoffs with and without cheap rice. If the analysis focus on the differences among only the layoffs, that is, the layoffs with and without cheap rice, the results would likely be more significant. In fact, Sumarto et al. (2005) found that the subsidized rice program appeared to reduce the risk of falling into poverty.

Regional Characteristics

The availability of paved roads as well as the sanitation is statistically significant in alleviating calorie poverty and subjective poverty. However, road availability has a negative impact on relative poverty. Similar to regional infrastructure variables, the human development (index) has a significant role in reducing poverty both in the absolute and subjective measurements. However, this index for human development has a reverse impact on relative poverty. Results summarized in Tables 4 and 6 show that households located in regions with good infrastructure and human development, and high agricultural productivity tend to evaluate themselves as non-poor. These results confirm Kingdon and Knight's (2006) findings that community road availability influences households' happiness positively. The current study observes that regional characteristics adopted in this study, except for agricultural productivity, will increase relative poverty.[20] With expanded opportunity provided by better infrastructure and human capacity, society tends to create winners and losers and thus experiences widening gaps between households. The availability of expanded opportunities may not be evenly distributed among community members, in the first place. Promoting equal development of (equitable access to) infrastructure such as roads, schools, public health facilities and irrigation among households (and across regions) in Indonesia would be important. Those are the areas that can be effectively supported by ODA projects, and as such, wide and equitable distribution of benefits will reduce the negative impact on relative poverty while effectively reducing absolute poverty and improving residents' subjective well-being.[21]

20. Productivity increases in the agricultural sector tend to benefit farmers who constitute a large segment of the poor in Indonesia and, therefore, tend to reduce relative poverty.
21. For example, Japan's ODA-financed major road infrastructure projects are often coupled with domestic provision of local access roads and, whenever possible, community-based feeder roads. This concept of networking/connecting surrounding regions/localities would maximize the positive diffusion effects while minimizing possible negative relative impacts.

Relative Conditions Compared to Society's Averages

A household considers neighbors' socio-economic conditions in evaluating their own well-being/happiness. Luttmer (2005) found that, controlling an individual's own income, higher earnings of neighbors are associated with lower levels of self-reported happiness. The negative effects of increases in neighbors' earnings on one's own well-being is most likely caused by interpersonal preferences, that is, people having utility functions that depend on relative consumption in addition to absolute consumption.[22] Table 5 shows results from regressions that included variables of relative conditions for relative, SWB, and subjective poverty categories. In these regressions, relative variables are dummies that take the value of 1 when households' possession/attainment/consumption/access is less than society's average, and 0 otherwise. For example, Relative Size of Land Ownership is a dummy (1: owning land smaller than the average size in society; 0: otherwise) where a negative estimated coefficient means a reduction in probability of being poor while a positive coefficient means an increase in probability of being poor, if the household's land size is smaller than society's average. Therefore, positive coefficients – having less than society's average makes households poorer – are expected a priori.

Relative variables affect poverty status differently in three relative and subjective poverty measurements. Households having less than others in society in terms of land ownership and access to public facilities assess themselves as subjectively poor (Table 5). The probability of being subjectively poor will increase by 2.1% when households own land less than others in the same municipality/regency (Table 6). In contrast, in terms of relative poverty, households having less land ownership, less consumption of durable goods and fashion, and less telecommunication services tend to be relatively poor (Table 6).

22. In a game-theoretic analysis of the provision of public goods, this phenomenon is treated as people's spitefulness. In order for voluntary contributions and/or collaboration among people – that are necessary for the provision of pure and impure public goods including protection of environmental commons – to happen, community social capital and education supporting this norm are said to be imperative. ODA projects should also contain, for residents' better well-being, the elements that foster local collaborative institutions such as water-usage groups in the case of irrigation projects.

Interestingly, having educational attainment less than society's average does not necessarily make households assessing themselves as subjectively poor. This variable has also a negative relationship with relative poverty. One possible reason is that education has positive externalities. Households feel happier if they live in a society where people are generally better educated. As is noted in footnote 22, education reduces people's spitefulness and thus creates a more collaborative society where people's happiness is mutually promoted.

Although relative access to telecommunication services such as telephone and Internet exacerbates relative poverty, it in fact reduces subjective poverty. A family, who does not have an access to telecommunication services at home but lives in a society where telecommunication access is available, does not evaluate themselves as subjectively poor. If a household without their own access to telecommunications is in need of making an emergency call, they can borrow devices at their neighbors.

Expenditure Poverty, Relative Poverty, and Subjective Poverty

In the last section of Table 6, it is shown that being (absolute) Expenditure Poor increases the probability of being Subjective Poor by over 19%. Similarly, being Relative (Income) Poor increases the probability of being Subjective Poor by over 18%. Although it is not the whole part of Subjective Poverty (as stated in Section 4), poverty measured in expenditure/income in both absolute and relative terms is still an important part of households' own subjective assessment of poverty.

5.2 Determinants of ordered poverty experiences

The analyses so far discussed what the main determinants of poverty were for each one of the five poverty measurements. In this section, the study focuses on the main determinants for multi-layered poverty. Why some households experience poverty in only one poverty measurement while others experience poverty in more than one (some in all) poverty measurements. This analysis of ordered poverty experience is for us to check the consistency

and robustness of the estimation results obtained from the simple logit models (Eq. 1). Although the ordered logit model (Eq. 2) is useful for understanding the relative effects of different household characteristics on their multifaceted poverty status, it is less useful for distinguishing poverty categories.

The current study made three orders of poverty experiences: ordered poverty A, ordered poverty B and ordered poverty C. Three ordered poverty schemes classify households into six categories (0, 1, 2, 3, 4, 5), but the differences among them are based on the starting point of poverty ordering. Ordered poverty A sorts experienced poverty starting from the absolute to relative, and to the subjective measurements. The adopted ordering is as follows: 0= no experience in any of the poverty measurements; 1= experience of Calorie Poverty; 2= experience of Calorie Poverty and Expenditure Poverty; 3= experience of Calorie Poverty, Expenditure Poverty and Relative Poverty; 4= experience of Calorie Poverty, Expenditure Poverty, Relative Poverty and SWB Poverty; and 5= experience of poverty in all poverty concepts. Ordered poverty B sorts experienced poverty as follows: 0= no experience in any of the poverty measurements; 1= experience of Subjective Poverty; 2= experience of Subjective Poverty and SWB Poverty; 3= experience of Subjective, SWB, and Relative Poverty; 4= experience of Subjective, SWB, Relative and Expenditure Poverty; 5= experience of poverty in all poverty concepts In contrast, ordered poverty C only pays attention to the number of poverty layers as follows: 0= no experience in any of the poverty measurements; 1= experience in one poverty layer; 2= experience in two poverty layers; 3= experience in three poverty layers; 4= experience in four poverty layers; 5= experience in all of the poverty layers at the same time.[23]

23. Order C represents a standard multifacetedness of poverty situation (being categorized as poor in multiple notions/metrics). Staking Orders A and B are provided for reference and to show a range of estimates. As is presented in Table 1, the probability of being identified as poor increases as we move from Calorie Poverty to Expenditure Poverty, to Relative Poverty, SWB Poverty, and to Subjective Poverty. And therefore, if the stacking has to be ordered, Order A is an intuitive and logical way of stacking. However, as the number of households identified as Calorie Poor is small, Order A may also quickly lose a large portion of the available set of information (refer to the bottom panel of Table 7 that shows the changes in the number of households categorized as poor in the combined poverty status). Order B, even if it seems a bit illogical, the decline in the number of households categorized as

Estimation results obtained from the three sets of ordered logit models are generally similar across three orders (A, B, and C) in terms of magnitude and significance (Table 7). Households with marriage status and having higher educational attainments tend to never be poor in any of the poverty categories. Households having many family members and children under 5 years of age tend to be poor in more than one category of poverty. The probability of never being poor in any one of the five poverty categories increases by 1.96% (ordered A), 14.72% (ordered B) and 10.92% (ordered C) with a stepwise increase in educational attainment, such as an advancement from no school to primary school, primary school to junior secondary school, secondary school to tertiary education (Table 8). This 11 percent increase (in the benchmark Order C) in the probability of being never poor in any one of the five poverty metrics with an advancement in educational attainment should be one of the key findings of this study, together with the finding of the positive externality of education.

Earlier in Table 6, which shows the results of logit regressions, the study found positive externality of education. Interestingly, the results obtained from the ordered logit regressions (Table 7) confirm this point. Relative educational attainment significantly increases the probability of being never poor by 0.46% (ordered A), 3.47% (ordered B) and 2.61% (ordered C), again pointing to the existence of positive externality in education attainment (Table 8).

Some unexpected results are again observed. Owning a larger piece of land and having work activities do not necessarily reduce the probability of being poor in the multilayer of poverty in ordered B and ordered C. Although it is not statistically significant, both of these variables tend to decrease the probability of being poor in ordered A. The socio-economic variables that significantly increase the probability of being never poor in all poverty categories are house ownership and existence of migrant workers in the family members.

---

multiple-poverty is much more gradual and parallel to that of the simple ordering of Order C. It also sheds some lights on the notion of placing Subjective Poverty as the starting point. As this study intends to challenge new notions of poverty and the multifacetedness with or without a priori judgment of 'logical' ordering of these variations of poverty metrics, the three orderings are provided.

Having migrant workers increases the probability of being never poor by 1.79% (ordered A), 5.74% (ordered B) and 6.14% (ordered C) (Table 8).

The estimation results strongly confirmed that those who are experiencing negative shocks such as layoffs and health problems tend to be poor in all poverty categories. Experiencing layoffs decreases the probability of being never poor by 5.18%, 23.86% and 14.15%, while health problems decrease the probability of being never poor by 4.49%, 19.93% and 11.70% (Table 8). Government assistance through cheap rice does not significantly affect the probability of being never poor. However, if anything, this variable tends to reduce the probability of being never poor (ordered B and C), indicating either the existence of endogenity or ineffective targeting of this subsidy. As in the cases of logit models, the estimation results from ordered logit models also indicate that the targeted health insurance for the poor is ineffective in protecting household from health problems. This might be again due to poor targeting and uneven distribution of government assistance (Dartanto and Nurkholis forthcoming). As it was found in many other studies, this study also confirmed that infrastructure development is one of the effective policies for poverty alleviation. Provision of roads and bridges does not only reduce transportation costs but also enables people in remote areas to gain new access to markets. Having public projects in the area will increase the probability of being non-poor by 1.65%, 3.19% and 2.81%.

The regional characteristics of agricultural productivity, human development (index) and road infrastructures significantly and consistently increase the probability of never being poor in all poverty categories. The results in Table 7 confirm the findings in Tables 4 and 6 that people having less than society in terms of land ownership and consumption of durable goods and fashion items tend to be relatively and subjectively poor. Neighbors' consumption of durable goods and fashion items often make households jealous and spiteful, and thus, a family feels poverty when neighbors have more. This finding confirmed Luttmer (2005) that stated "neighbors as negative", meaning higher earnings of neighbors were associated with lower levels of self-reported happiness.

Table 7. Ordered logit model of poverty experience

Variables	Ordered Poverty A		Ordered Poverty B		Ordered Poverty C	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Demographic Characteristics of Household Head						
Marital Status (1=marriage; 0=other)	-0.384	0.084***	-0.131	0.026***	-0.092	0.022***
Educational Attaintment (completed schooling)	-0.370	0.036***	-0.595	0.014***	-0.511	0.011***
Number of Household Member	0.316	0.015***	0.040	0.006***	0.156	0.005***
Number of Children under 5 years	0.451	0.042***	0.352	0.017***	0.351	0.014***
Location Dummy (1=urban; 0=other)	0.379	0.065***	0.008	0.024	0.371	0.020***
Socio-Economic Characteristics of Households						
Log Size of Land Ownership (hectare)	-0.023	0.020	0.045	0.006***	0.042	0.006***
Log Size of House (square meter)	-0.146	0.057**	-0.171	0.020***	-0.156	0.017***
Household with Migrant Worker (1=having TKI; 0=other)	-0.397	0.164**	-0.230	0.048***	-0.275	0.042***
Employment (1=having work activity; 0=unemployment)	-0.125	0.081	0.114	0.028***	0.060	0.023***
Self food production (% of total consumption)	0.019	0.001***	0.007	0.000***	0.010	0.000***
Shocks and Coping Strategies						
Layoffs (1=experience; 0=other)	0.714	0.155***	1.109	0.066***	0.787	0.048***
Health Problems (1=experience; 0=other)	0.646	0.103***	0.879	0.034***	0.616	0.027***
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	-0.099	0.275	0.081	0.086	0.066	0.075
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	1.368	0.080***	1.025	0.021***	1.011	0.021***
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	-0.061	0.207	0.040	0.086	-0.047	0.068
Public Project (1=having public project in surrounding living area; 0=other)	-0.354	0.101***	-0.129	0.030***	-0.129	0.025***
Regional Characteristics						
Agricultural Productivity of Food Crops (100kg/hectare)	-0.013	0.003***	-0.007	0.001***	-0.005	0.001***
Human Development Index	-0.032	0.013**	-0.022	0.004***	-0.021	0.004***
Paved Roads (% good condition of total paved roads)	-0.008	0.002***	-0.004	0.001***	-0.001	0.001
Sanitation Availability (% of Population)	0.001	0.004	0.003	0.001***	0.004	0.001***
Relative Conditions Compared to Society						
Relative Size of Land Ownership	0.028	0.094	0.092	0.030***	0.038	0.026
Relative Size of House Ownership	-0.029	0.071	-0.053	0.025**	-0.043	0.021**
Relative Development of Public Facility (Public Project)	-0.200	0.056***	0.012	0.021	-0.026	0.017
Relative Education Attainment	-0.087	0.093	-0.140	0.034***	-0.123	0.027***
Relative Consumption on Durable Goods and Fashions	0.439	0.058***	0.129	0.020***	0.218	0.016***
Relative Internet and Telephone Connection	-0.204	0.071***	0.009	0.027	-0.026	0.022
/cut1	-0.944	0.798***	-3.057	0.254***	-2.449	0.227***
/cut2	-0.138	0.796***	-1.279	0.253***	-0.878	0.227***
/cut3	0.219	0.794***	-0.143	0.253***	0.437	0.227***
/cut4	1.167	0.796***	0.653	0.253***	1.858	0.227***
/cut5	1.509	0.798***	2.977	0.260***	4.386	0.235***
Wald Chi-Square	**2,189**		**12,009**		**13,904**	
Log Pseudolikelihood	**-8,145**		**-55,148**		**-82,251**	
Pseudo R2	**0.126**		**0.105**		**0.081**	
Number of Observation	**23,169**		**47,543**		**62,625**	
# of Poverty 0	21,222		21,222		21,222	
# of Poverty 1	928		15,583		20,055	
# of Poverty 2	263		6,275		12,436	
# of Poverty 3	431		2,254		6,221	
# of Poverty 4	88		1,972		2,454	
# of Poverty 5	237		237		237	

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

Source: Authors' calculation.

Table 8. Estimation results of partial effect (dy/dx) on the ordered poverty experience (%)

Variables	Partial Effect of Ordered Poverty A						Partial Effect of Ordered Poverty B						Partial Effect of Ordered Poverty C					
	P-0	P-1	P-2	P-3	P-4	P-5	P-0	P-1	P-2	P-3	P-4	P-5	P-0	P-1	P-2	P-3	P-4	P-5
Demographic Characteristics of Household Head																		
Marital Status (1=marriage; 0=other)	2.31	-1.20	-0.32	-0.48	-0.09	-0.22	3.21	-1.29	-1.12	-0.41	-0.35	-0.04	1.94	0.07	-1.08	-0.66	-0.25	-0.02
Educational Attaintment (completed schooling)	1.96	-1.03	-0.27	-0.40	-0.08	-0.19	14.72	-6.21	-5.00	-1.81	-1.52	-0.18	10.92	0.14	-6.03	-3.59	-1.33	-0.12
Number of Household Member	-1.68	0.88	0.23	0.34	0.06	0.16	-0.99	0.42	0.34	0.12	0.10	0.01	-3.33	-0.04	1.84	1.09	0.40	0.04
Number of Children under 5 years	-2.39	1.25	0.33	0.49	0.09	0.23	-8.71	3.68	2.96	1.07	0.90	0.10	-7.51	-0.10	4.14	2.46	0.91	0.08
Location Dummy (1=urban; 0=other)	-2.03	1.06	0.28	0.41	0.08	0.19	-0.21	0.09	0.07	0.03	0.02	0.00	-7.81	-0.30	4.35	2.67	1.00	0.09
Socio-Economic Characteristics of Households																		
Log Size of Land Ownership (hectare)	0.12	-0.06	-0.02	-0.03	0.00	-0.01	-1.10	0.47	0.37	0.14	0.11	0.01	-0.89	-0.01	0.49	0.29	0.11	0.01
Log Size of House (square meter)	0.77	-0.41	-0.11	-0.16	-0.03	-0.07	4.23	-1.79	-1.44	-0.52	-0.44	-0.05	3.33	0.04	-1.84	-1.09	-0.40	-0.04
Household with Migrant Worker (1=having TKI; 0=other)	1.79	-0.95	-0.25	-0.36	-0.07	-0.17	5.74	-2.67	-1.83	-0.64	-0.53	-0.06	6.14	-0.49	-3.20	-1.76	-0.63	-0.06
Employment (1=having work activity; 0=unemployment)	0.69	-0.36	-0.10	-0.14	-0.03	-0.07	-2.82	1.24	0.94	0.33	0.28	0.03	-1.30	0.00	0.71	0.42	0.15	0.01
Self food production (% of total consumption)	-0.10	0.05	0.01	0.02	0.00	0.01	-0.17	0.07	0.06	0.02	0.02	0.00	-0.22	0.00	0.12	0.07	0.03	0.00
Shocks and Coping Strategies																		
Layoffs (1=experience; 0=other)	-5.18	2.64	0.72	1.09	0.21	0.52	-23.86	2.63	10.85	5.06	4.76	0.58	-14.15	-4.57	8.45	7.05	2.94	0.28
Health Problems (1=experience; 0=other)	-4.49	2.30	0.62	0.94	0.18	0.45	-19.93	4.23	8.45	3.61	3.26	0.39	-11.70	-2.67	6.94	5.17	2.07	0.19
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	0.50	-0.26	-0.07	-0.10	-0.02	-0.05	-1.99	0.81	0.69	0.25	0.21	0.02	-1.40	-0.05	0.78	0.48	0.18	0.02
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	-12.73	6.22	1.80	2.79	0.54	1.38	-23.30	5.25	9.72	4.14	3.74	0.45	-18.15	-5.72	10.63	9.05	3.82	0.36
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	0.31	-0.16	-0.04	-0.06	-0.01	-0.03	-1.00	0.41	0.34	0.12	0.11	0.01	1.02	0.00	-0.56	-0.33	-0.12	-0.01
Public Project (1=having public project in surrounding living area; 0=other)	1.65	-0.87	-0.23	-0.34	-0.06	-0.16	3.19	-1.42	-1.05	-0.37	-0.31	-0.04	2.81	-0.07	-1.52	-0.87	-0.32	-0.03
Regional Characteristics																		
Agricultural Productivity of Food Crops (100kg/hectare)	0.07	-0.04	-0.01	-0.01	0.00	-0.01	0.17	-0.07	-0.06	-0.02	-0.02	0.00	0.10	0.00	-0.06	-0.03	-0.01	0.00
Human Development Index	0.17	-0.09	-0.02	-0.04	-0.01	-0.02	0.55	-0.23	-0.19	-0.07	-0.06	-0.01	0.44	0.01	-0.24	-0.14	-0.05	0.00
Paved Roads (% good condition of total paved roads)	0.04	-0.02	-0.01	-0.01	0.00	0.00	0.09	-0.04	-0.03	-0.01	-0.01	0.00	0.02	0.00	-0.01	-0.01	0.00	0.00
Sanitation Availability (% of Population)	0.00	0.00	0.00	0.00	0.00	0.00	-0.08	0.04	0.03	0.01	0.01	0.00	-0.09	0.00	0.05	0.03	0.01	0.00
Relative Conditions Compared to Society																		
Relative Size of Land Ownership	-0.15	0.08	0.02	0.03	0.01	0.01	-2.28	0.98	0.76	0.27	0.23	0.03	-0.82	0.00	0.45	0.27	0.10	0.01
Relative Size of House Ownership	0.15	-0.08	-0.02	-0.03	-0.01	-0.01	1.30	-0.55	-0.44	-0.16	-0.14	-0.02	0.92	0.02	-0.51	-0.31	-0.11	-0.01
Relative Development of Public Facility (Public Project)	1.11	-0.58	-0.15	-0.23	-0.04	-0.11	-0.29	0.12	0.10	0.04	0.03	0.00	0.55	0.01	-0.31	-0.18	-0.07	-0.01
Relative Education Attainment	0.46	-0.24	-0.06	-0.09	-0.02	-0.04	3.47	-1.43	-1.19	-0.43	-0.37	-0.04	2.61	0.06	-1.45	-0.87	-0.32	-0.03
Relative Consumption on Durable Goods and Fashions	-2.19	1.15	0.30	0.45	0.08	0.21	-3.19	1.38	1.07	0.38	0.32	0.04	-4.72	0.09	2.56	1.48	0.54	0.05
Relative Internet and Telephone Connection	1.15	-0.60	-0.16	-0.24	-0.04	-0.11	-0.22	0.09	0.08	0.03	0.02	0.00	0.55	0.01	-0.31	-0.18	-0.07	-0.01
Probability (y=j|x)	**94.39**	**3.02**	**0.76**	**1.11**	**0.21**	**0.51**	**44.74**	**37.99**	**10.99**	**3.35**	**2.64**	**0.29**	**30.94**	**37.39**	**20.60**	**8.16**	**2.68**	**0.24**

Source: Authors' calculation.

6. Concluding remarks

Poverty is a multifaceted phenomenon. Different societies have different perceptions of poverty. It may also change over time even in the same society, with different stages of development. Facing the MDGs target year of 2015, the world development community has been actively looking into more diversified goals and therefore measurements of development for the post-MDGs era. Various notions of poverty that are widely discussed can then be classified as: 1) absolute poverty, 2) relative poverty, and 3) subjective poverty. In this study, the notions of absolute poverty and relative poverty are operationalized using objective metrics. These, in turn, are compared to the subjective metrics of subjective well-being and subjective poverty.

Indonesia, as one of the emerging economies and also as a most diverse country, should compile/evaluate not only absolute measures but also relative measures of poverty, not only objective measures but also subjective measures of poverty. A multifaceted poverty analysis helps us to identify the issues related to decent living, social exclusion and satisfaction/happiness/well-being of the people in society. It will also promote discussions about the goals of development. Even in the same country, the state of development and the elements of poverty-related problems could be much different. And this will call for a set of anti-poverty initiatives tailored to each locality.

This article classifies poverty experienced by Indonesian households using five poverty indicators: absolute measures—calorie intake poverty and expenditure poverty, relative measures, and subjective measures—subjective well-being (SWB) poverty and subjective poverty. Analyzing the 62,625 sample households from the 2005 Susenas, the study found that there was a roughly 28 percentage-point difference in the poverty headcount ratios computed by applying the absolute and subjective poverty metrics. Around 37.2% (19,900/53,566) of households that are absolute (expenditure) non-poor reported as subjective

poor. At the same time, around 29.1% (2,638/9,059) of households that are expenditure poor reported as subjective non-poor. As discussed widely in the post-MDGs consultations, expenditure (and income) is not everything, though it is an important factor for being non-poor. Among the regions of Indonesia, Jakarta has the lowest absolute poverty measurement (7.35%). But at the same time, it has the highest relative poverty measurement (44.36%). Jakarta is facing a serious problem of inequality and social exclusion. Low Spearman's rank correlations among the five metrics of poverty across the regions of Indonesia point to the needs of a tailor-made anti-poverty initiative across regions.

Results of logit model and ordered logit model estimations of the possible determinants of multifaceted poverty indicate that the main determinants of poverty are educational attainment, number of household members, physical assets (land and house ownership), existence of migrant workers (possible remittances), negative shocks of layoffs and/or health problems, development of public services, and the availability of road infrastructure.

Households experiencing layoffs will reduce the probability of never being poor in all poverty categories by almost 24%. However, the government assistance of cheap rice distributed to those who experience layoffs does not show statistically significant impact in reducing the probability of being poor, probably due to poor targeting and uneven distribution of assistance. The same is found in the impact of the subsidized health insurance scheme. It is often pointed out in Indonesia that the large portions of those social-safety-net subsidies accrue for those who are not targeted. Anti-poverty initiatives should be better targeted.

The estimation results show that being (absolute) Expenditure Poor and Relatively Poor increase the probability of being Subjective Poor by over 19% and 18%, respectively. This study also confirmed that households having less than society's average in terms of the physical asset of land, access to public facilities, and consumption of durable goods and fashion tended to subjectively assess themselves as poor. While the existence of public

works/projects and the availability of road infrastructure improve the welfare of the targeted regions, in a relative sense, it may reduce the welfare of the surrounding localities. This suggests a need for a more careful allocation of public projects. People and regions have to be well connected through a road network that would probably promote positive diffusion effects across localities.

Interesting and important findings are made for the roles of education, and thus, they should be consolidated here in a consistent manner. First of all, educational attainment and the number of children under 5 years of age are the two most significant factors that consistently influence poverty status in all poverty measures. The probability of being absolutely and subjectively poor will decrease by 4.63% and 12.14%, respectively, when the completed schooling increases from one step to the other, like elementary school to junior high school. Higher educational attainment increases the probability of never being poor in any of the five poverty metrics by almost 11 percentage points. More interestingly, having educational attainment less than society's average does not necessarily make households assess themselves as subjectively poor. Households feel happier (less poor) if they live in a society where people are generally better educated. Thus education, or an investment in human capital, not only improves one's welfare directly, but also benefits neighbors in the same society indirectly through its positive externality.

References

Adam, R. H., and J. H. Jane. 1995. Sources of income inequality and poverty in rural Pakistan. *International Food Policy Research Institute Research Report* 102. Washington, DC.: International Food Policy Research Institute.

Alesina, A., and R. Perotti. 1996. Income distribution, political instability and investment. *European Economic Review* 40: 1203-28.

Anyanwu, J. C. 2005. Rural poverty in Nigeria: Profile, determinants and exit paths. *African Development Review* 17 (3): 435-60.

Atkinson, A. B., and F. Bourguignon. 2001. Poverty and inclusion from a world perspective. In *Governance, equity and global markets*, ed. J. Stiglitz and P.A. Muet, New York: Oxford University Press.

Balisacan, A. M., E. M. Pernia, and A. Asra. 2002. Revising growth and poverty reduction in Indonesia: What do subnational data show?, ERD Working Paper 25. Asian Development Bank.

Bidani, B., and M. Ravallion. 1993. A new regional poverty profile for Indonesia. *Bulletin of Indonesian Economic Studies* 29 (3): 37-68.

Bigsten, A., B. Kebede, A. Shimeles, and M. Taddesse. 2003. Growth and poverty reduction in ethiopia: Evidence from household panel surveys. *World Development* 31 (1): 87–106.

Booth, A. 2000. Poverty and inequality in the Soeharto era: An assessment. *Bulletin of Indonesian Economic Studies* 36 (1): 73-104.

Corazzini, L., L. Esposito, and F. Majorano. 2011. Exploring the absolutist vs. relativist perception of poverty using a cross-country questionnaire survey. *Journal of Economic Psychology* 32: 273-83.

Danziger, S., J. van der Gaag, E. Smolensky, and M. Taussig. 1984. The direct measurement of welfare levels: How much does it take to make ends meet? *Review of Economics and Statistics* 66 (5): 500-05.

Dartanto, T., and Nurkholis. Forthcoming. The determinants of poverty dynamics in Indonesia: Evidence from panel data, *Bulletin of Indonesian Economic Studies*.

Davis, J. A., T. W. Smith, and P. V. Marsden. 2001. *General social survey, 1972-2000: Cumulative codebook*. Storrs, CT: Roper Center for Public Opinion Research.

Deaton, A., and S. Zaidi .2002. Guidelines for constructing consumption aggregates for welfare analysis. LSMS Working Paper 135. Washington, DC: World Bank.

de Janvry, A., and E. Sadoulet. 2000. Rural poverty in Latin America determinants and exit paths. *Food Policy* 25: 389-409.

de Silva, I. 2008. Micro-level determinants of poverty reduction in Sri Lanka: A multivariate approach. *International Journal of Social Economics* 35 (3): 140-58.

Eurostat. 2005. Income poverty and social exclusion in the EU25. *Statistics in Focus 03/2005*. Luxembourg: Office of Official Publications of the European Communities.

Fajnzylber, P., D. Lederman, and N. Loayza. 2002. Inequality and violent crime. *Journal of Law and Economics* XLV: 1-40.

Fields, G., P. Cichello, S. Freije, M. Menendez, and D. Newhouse. 2003. Household income dynamics: A four-country story. *Journal of Development Studies* 40 (2): 30-54.

Fouarge, D., and R. Layte. 2005. Welfare regimes and poverty dynamics: The duration and recurrence of poverty spells in Europe. *Journal of Social Policy* 34 (3): 407-26.

Frey, Bruno S., and A. Stutzer. 2002. What can economists learn from happiness research? *Journal of Economic Literature* 40: 402–35.

Goedhart, T., V. Halberstadt, A. Kapteyn, and B. M. S. Van Praag. 1977. The poverty line: Concept and measurement. *Journal of Human Resources* 12 (4): 503-20.

Grootaert, C. 1997. The determinants of poverty in Cote d'lvoire in the 1980s. *Journal of African Economies* 6 (2): 169-96.

Hagenaars, A. J. M., and K. de Vos. 1988. The definition and measurement of poverty. *Journal of Human Resources* 23 (2): 211-21.

Hagenaars, A. J. M., and B. M. S. Van Praag. 1985. A synthesis of poverty line definitions. *Review of Income and Wealth* 31 (2):139-54.
Hall, A. L. 2007. Moving away from poverty: Migrant remittances, livelihoods, and development. In *Moving out of poverty: Cross-disciplinary perspectives on mobility,* ed. D. Narayan and P. Petesch, 307-32. New York: World Bank and Palgrave Macmillan.
Hassan, R. M., and S. C. Babu. 1991. Measurement and determinants of rural poverty: Household consumption patterns and food poverty in rural sudan. *Food Policy* 16 (6): 451-60.
Herrera, J., M. Razafindrakoto, and F. Roubaud. 2006. *The determinants of subjective poverty: A comparative analysis in Madagascar and Peru*. Document de Travail DT/2006-01. Paris: Developpement Institutions & Analyses de Long Terme.
Inglehart, R., et al. 2000. *World values surveys and European values surveys, 1981–1984, 1990–1993, and 1995–1997* (ICPSR Version). Ann Arbor: Institute for Social Research, University of Michigan.
Islam, I., and H. Khan. 1986. Spatial patterns of inequality and poverty in Indonesia. *Bulletin of Indonesian Economic Studies* 22 (2): 80-102.
Kapteyn, A., P. Kooreman, and R. Willemse. 1988. Some methodological issues in the implementation of subjective poverty definition. *Journal of Human Resources* 23 (2): 222-42.
Kedir, A. M., and A. McKay. 2005. Chronic poverty in urban Ethiopia: Panel data evidence. *International Planning Studies* 10 (1): 49–67.
Kelly, M. 2000. Inequality and crime. *Review of Economics and Statistics* 84 (4): 530-39.
Kenworthy, L. 1999. Do social-welfare policies reduce poverty? A cross-national assessment. *Social Forces* 77 (3): 1119-39. doi: 10.1093/sf/77.3.1119.
Kingdon, G. G., and J. Knight. 2006. Subjective well-being poverty vs. income poverty and capabilities poverty. *Journal of Development Studies* 42 (7): 1199-224.
Ladiyanto, E. A., J. Ling, M. Puspitasari, and S. E. Irianti. 2010. Wealth and happiness: Empirical evidence from Indonesia. Paper presented at the 10th Indonesian Regional Science Association (IRSA) International Conference, July 28-29, 2010, Airlangga University, Surabaya, Indonesia.
Luttmer, Erzo F. P. 2005. Neighbours as negatives: Relative earnings and well-being. *Quarterly Journal of Economics* 120 (3): 963–1002.
Mok, T. Y., C. Gan, and A. Sanyal. 2007. The determinants of urban household poverty in Malaysia. *Journal of Social Sciences* 3 (4): 190-96.
Moller, S., E. Huber, J. D. Stephens, D. Bradley, and F. Nielsen. 2003. Determinants of relative poverty in advanced capitalist democracies. *American Sociological Review* 68 (1): 22-51.
Mukherjee, S., and T. Benson. 2003. Determinants of poverty in Malawi, 1998. *World Development* 31 (2): 339-58.
Niemietz, K. 2011. *A new understanding of poverty.* London: Institute of Economic Affairs. http://www.iea.org.uk/sites/default/files/publications/files/IEA%20New%20Understanding%20of%20Poverty.pdf.
Organization for Economic Co-Operation and Development (OECD). 2008. *Growing unequal? Income distribution and poverty in OECD countries*. Paris: OECD.
Pradhan, M., and M. Ravallion. 2000. Measuring poverty using qualitative perceptions of consumption adequacy. *Review of Economics and Statistics* 82: 462–71.
Ravallion, M. 1994. Poverty comparisons. *Fundamentals of Pure and Applied Economics* 56. Chur, Switzerland: Harwood Academic Press.
Ravallion, M., and B. Bidani. 1994. How robust is a poverty profile? *World Bank Economic Review* 8 (1): 75-102.
Ravallion, M., and S. Chen. 2011. Weakly relative poverty. *Review of Economics and Statistics* 93 (4): 1251-61.
Rodriguez, A. G., and S. M. Smith. 1994. A comparison of determinants of urban, rural and farm poverty in Costa Rica. *World Development* 22 (3): 381-97.

Rowntree, B. S. 1901. *Poverty: A study of town life*. London: Macmillan.
Sachsida, A., M. J. C. Mendonça, P. R. A. Loureiro, and M. B. S. Gutierrez. 2010. Inequality and criminality revisited: Further evidence from Brazil. *Empirical Economics* 39 (1): 93-109. doi: 10.1007/s00181-009-0296-4
Sen, A. 1979. Issues in the measurement of poverty. *Scandinavian Journal of Economics* 81 (2): 285-307.
———. 1983. Poor, relatively speaking. *Oxford Economic Papers* 35: 153-69.
Sumarto, S., A. Suryahadi, and W. Widyanti. 2005. Assessing the impact of Indonesian social safety net programmes on household welfare and poverty dynamics. *European Journal of Development Research* 17 (1): 155-77.
Suryahadi, A., D. Suryadarma, and S. Sumarto. 2009. The effects of location and sectoral components of economic growth on poverty: Evidence from Indonesia. *Journal of Development Economics* 89: 109-17.
Townsend, P. 1954. Measuring poverty, *British Journal of Sociology* 5 (2): 130-37.
———. 1962. The meaning of poverty. *British Journal of Sociology* 13 (3): 210-27.
———. 1979. Poverty in the United Kingdom: A survey of household resources and standard living. Harmondsworth: Penguin Books.
Van Praag, B. M. S., and A. Ferrer-i-Carbonell. 2008. A multidimensional approach to subjective poverty. In *Quantitative approach to multidimensional poverty measurement*, ed. N. Kakwani and J. Silber, 135-54. New York: Palgrave McMillan.
Whitworth, A. 2012. Inequality and Crimes across England: A multilevel modelling approach. *Social Policy and Society* 11 (01): 27-40. http://dx.doi.org/10.1017/S1474746411000388.
Wooldridge, J. M. 2010. *Econometric analysis of cross section and panel data*. 2nd ed. Cambridge, MA: MIT Press.

Appendix 1. Description of explanatory variables

Variables	Description
Demographic Characteristics of Household Head	
Marital Status (1=marriage; 0=other)	Dummy variable of marital status
Educational Attaintment (completed schooling)	Categorical variables (0: no schooling; 1: elementary; 2: junior HS 3: Senior HS; 4: 1-3 years vocational; 5: 4 years undergraduate; 6: post-graduate
Number of Household Member	Number of family member
Number of Children under 5 years	Number of Children under 5 years old
Location Dummy (1=urban; 0=other)	Dummy variable of location (1: urban; 0: rural)
Socio-Economic Characteristics of Households	
Log Size of Land Ownership (hectare)	Household land ownership in hectare (in log form)
Log Size of House (square meter)	Size of house ownership in hectare (in log form)
Household with Migrant Worker (1=having TKI; 0=other)	Dummy variable of having family member working outside Indonesia
Employment (1=having work activity; 0=unemployment)	Dummy variable of having job/working activity during (1: having working activity; 0: others)
Self food production (% of total consumption)	Ratio between self foods production over total food consumption
Shocks and Coping Strategies	
Layoffs (1=experience; 0=other)	Dummy variable of experiencing layoffs
Health Problems (1=experience; 0=other)	Dummy variable of experiencing health problems
Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	Dummy variable of having saving to cope layoffs and health shocks
Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	Dummy variable of interaction variable between health problems and health insurance targeted to the poor
Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	Dummy variable of having saving to cope layoffs and health shocks(1: having saving, 0: other)
Public Project (1=having public project in surrounding living area; 0=other)	Dummy variable of public project (1: having public project in surrounding living area, 0: other)
Regional Characteristics	
Agricultural Productivity of Food Crops (100kg/hectare)	Composite agriculture productivity of four commodities (cassava, sweet potato, maize and paddy) with the composition 15%, 15%, 20% and 50% at provincial level
Human Development Index	Provincial regional development index
Paved Roads (% good condition of total paved roads)	Ratio between good condition of paved roads and total paved roads at provincial level
Sanitation Availability (% of Population)	Ratio between household with sanitation facility and total household at provincial level
Relative Conditions Compared to Society	
Relative Size of Land Ownership	Dummy variable of relative land ownership (1: household having land less than the regional average; 0: other)
Relative Size of House Ownership	Dummy variable of relative size of house (1: household having size of house less than the regional average; 0: other)
Relative Development of Public Facility (Public Project)	Dummy variable of relative public facility/project (1: public project surrounding living area less than the regional average; 0: other)
Relative Education Attainment	Dummy variable of relative educational attainment (1: head of household attainment less than the regional average; 0: other)
Relative Consumption on Durable Goods and Fashions	Dummy variable of relative consumption (1: household consumption of durable goods and fashion less than the regional average; 0: other)
Relative Internet and Telephone Connection	Dummy variable of relative facility of internet and telphone (1: household internet and telephone facility less than the regional average; 0: other)

Note: All data except regional characteristics are drawn from the 2005 Susenas. Data of agricultural productivity and human development index are retrieved from the BPS website (www.bps.go.id). Data of infrastructure (sanitation and paved roads) are drawn from the Ministry of Public Works.

Source: Authors.

Appendix 2. Descriptive statistics of explanatory variables

Variable		Mean	Standard Deviation	Minimum	Maximum
Poverty Status					
Y1	Calorie (Absolute) Poverty	0.031	0.174	0.00	1.00
Y2	Expenditure (Absolute) Poverty	0.145	0.352	0.00	1.00
Y3	Relative Poverty	0.266	0.442	0.00	1.00
Y4	Subjective Poverty	0.329	0.470	0.00	1.00
Y5	Subjective Well Being Poverty	0.420	0.494	0.00	1.00
Demographic Characteristics of Household Head					
Var_1	Marital Status (1=marriage; 0=other)	0.845	0.362	0.00	1.00
Var_2	Educational Attaintment (completed schooling)	1.442	1.354	0.00	6.00
Var_3	Number of Household Member	4.012	1.723	1.00	18.00
Var_4	Number of Children under 5 years	0.378	0.595	0.00	4.00
Var_5	Location Dummy (1=urban; 0=other)	0.411	0.492	0.00	1.00
Socio-Economic Characteristics of Households					
Var_6	Log Size of Land Ownership (hectare)	1.759	2.182	0.00	9.61
Var_7	Log Size of House (square meter)	4.024	0.639	1.10	6.91
Var_8	Household with Migrant Worker (1=having TKI; 0=other)	0.033	0.179	0.00	1.00
Var_9	Employment (1=having work activity; 0=unemployment)	0.862	0.345	0.00	1.00
Var_10	Self food production (% of total consumption)	12.042	18.001	0.00	100.00
Shocks and Coping Strategies					
Var_11	Layoffs (1=experience; 0=other)	0.025	0.157	0.00	1.00
Var_12	Health Problems (1=experience; 0=other)	0.070	0.254	0.00	1.00
Var_13	Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	0.010	0.099	0.00	1.00
Var_14	Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	0.131	0.337	0.00	1.00
Var_15	Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	0.013	0.113	0.00	1.00
Var_16	Public Project (1=having public project in surrounding living area; 0=other)	0.097	0.296	0.00	1.00
Regional Characteristics					
Var_17	Agricultural Productivity of Food Crops (100kg/hectare)	66.69	10.62	43.10	81.24
Var_18	Human Development Index	69.63	2.94	62.08	76.07
Var_19	Paved Roads (% good condition of total paved roads)	69.54	14.45	31.71	100.00
Var_20	Sanitation Availability (% of Population)	59.96	9.45	29.18	79.50
Relative Conditions Compared to Society					
Var_21	Relative Size of Land Ownership	0.762	0.426	0.00	1.00
Var_22	Relative Size of House Ownership	0.632	0.482	0.00	1.00
Var_23	Relative Development of Public Facility (Public Project)	0.744	0.436	0.00	1.00
Var_24	Relative Education Attainment	0.616	0.486	0.00	1.00
Var_25	Relative Consumption on Durable Goods and Fashions	0.694	0.461	0.00	1.00
Var_26	Relative Internet and Telephone Connection	0.858	0.349	0.00	1.00

Source: Authors' calculation.

Appendix 3. Descriptive statistics of household characteristics based on poverty category

Variable		Calorie Poverty		Expenditure Poverty		Relative Poverty		SWB Poverty		Subjective Poverty	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Demographic Characteristics of Household Head											
Var_1	Marital Status (1=marriage; 0=other)	0.853	0.355	0.882	0.323	0.874	0.332	0.838	0.369	0.812	0.390
Var_2	Educational Attaintment (completed schooling)	1.348	1.266	0.828	0.938	1.076	1.095	1.245	1.233	0.900	1.011
Var_3	Number of Household Member	5.060	2.152	5.022	1.782	4.628	1.762	4.075	1.754	3.948	1.772
Var_4	Number of Children under 5 years	0.588	0.737	0.569	0.708	0.514	0.676	0.397	0.614	0.403	0.622
Var_5	Location Dummy (1=urban; 0=other)	0.438	0.496	0.328	0.470	0.509	0.500	0.390	0.488	0.277	0.447
Socio-Economic Characteristics of Households											
Var_6	Log Size of Land Ownership (hectare)	1.676	2.187	2.215	2.202	1.755	2.171	1.792	2.166	2.146	2.247
Var_7	Log Size of House (square meter)	3.982	0.663	3.983	0.615	3.982	0.633	4.020	0.621	3.972	0.601
Var_8	Household with Migrant Worker (1=having TKI; 0=other)	0.026	0.160	0.033	0.178	0.029	0.169	0.032	0.175	0.039	0.193
Var_9	Employment (1=having work activity; 0=unemployment)	0.840	0.366	0.871	0.336	0.858	0.349	0.847	0.360	0.857	0.350
Var_10	Self food production (% of total consumption)	15.289	24.679	18.060	22.445	13.781	19.830	13.269	18.879	16.599	21.024
Shocks and Coping Strategies											
Var_11	Layoffs (1=experience; 0=other)	0.032	0.176	0.026	0.161	0.033	0.180	0.046	0.210	0.031	0.174
Var_12	Health Problems (1=experience; 0=other)	0.083	0.276	0.080	0.271	0.085	0.279	0.121	0.326	0.100	0.301
Var_13	Government Assistance to Layoffs Shocks (1=Layoffs and receiving cheap rice; 0=others)	0.011	0.103	0.012	0.109	0.011	0.103	0.012	0.109	0.012	0.110
Var_14	Government Assistance to Health Shocks (1=Health shocks and receiving health insurance; 0=others)	0.157	0.364	0.243	0.429	0.188	0.391	0.163	0.369	0.255	0.436
Var_15	Saving as a Coping Strategy to Shocks (1=experiencing shocks and having saving; 0=other)	0.015	0.121	0.009	0.095	0.011	0.103	0.014	0.119	0.012	0.109
Var_16	Public Project (1=having public project in surrounding living area; 0=other)	0.069	0.254	0.104	0.306	0.091	0.287	0.099	0.299	0.099	0.298
Regional Characteristics											
Var_17	Agricultural Productivity of Food Crops (100kg/hectare)	64.486	10.881	66.217	10.928	66.363	10.372	66.868	10.948	65.518	10.897
Var_18	Human Development Index	69.175	3.377	68.939	3.080	69.690	3.164	69.441	2.937	69.066	3.098
Var_19	Paved Roads (% good condition of total paved roads)	65.793	16.977	66.986	14.427	69.899	15.195	69.159	14.448	66.991	14.508
Var_20	Sanitation Availability (% of Population)	59.392	9.513	58.580	9.869	60.504	9.476	59.820	9.240	58.733	10.161
Relative Conditions Compared to Society											
Var_21	Relative Size of Land Ownership (1=less than the average of society; 0=other)	0.775	0.418	0.701	0.458	0.761	0.426	0.758	0.428	0.720	0.449
Var_22	Relative Size of House Ownership (1=less than the average of society; 0=other)	0.633	0.482	0.659	0.474	0.656	0.475	0.624	0.484	0.651	0.477
Var_23	Relative Development of Public Facility (Public Project) (1=less than the average of society; 0=other)	0.676	0.468	0.718	0.450	0.744	0.437	0.741	0.438	0.729	0.445
Var_24	Relative Education Attainment (1=less than the average of society; 0=other)	0.652	0.477	0.789	0.408	0.741	0.438	0.669	0.471	0.764	0.425
Var_25	Relative Consumption on Durable Goods and Fashions (1=less than the average of society; 0=other)	0.737	0.440	0.778	0.416	0.753	0.431	0.697	0.460	0.708	0.455
Var_26	Relative Internet and Telephone Connection (1=less than the average of society; 0=other)	0.827	0.378	0.882	0.323	0.866	0.341	0.860	0.347	0.864	0.343
Number of Poor People		**1,947**		**9,059**		**16,661**		**20,603**		**26,321**	

Source: Authors' calculation.

Appendix 4. Cross correlation matrix

	Y1	Y2	Y3	Y4	Y5	Var_1	Var_2	Var_3	Var_4	Var_5	Var_6	Var_7	Var_8	Var_9	Var_10	Var_11	Var_12	Var_13	Var_14	Var_15	Var_16	Var_17	Var_18	Var_19	Var_20	Var_21	Var_22	Var_23	Var_24	Var_25	Var_26
Y1	1																														
Y2	0.193	1																													
Y3	0.115	0.464	1																												
Y4	0.009	0.057	0.109	1																											
Y5	0.036	0.240	0.208	0.143	1																										
Var_1	0.004	0.042	0.048	-0.014	-0.077	1																									
Var_2	-0.012	-0.186	-0.163	-0.102	-0.341	0.135	1																								
Var_3	0.109	0.241	0.215	0.026	-0.032	0.335	0.048	1																							
Var_4	0.063	0.132	0.138	0.023	0.036	0.188	0.108	0.367	1																						
Var_5	0.010	-0.069	0.120	-0.030	-0.233	-0.038	0.358	0.005	-0.006	1																					
Var_6	-0.007	0.086	-0.001	0.011	0.151	0.036	-0.207	0.022	0.015	-0.456	1																				
Var_7	-0.012	-0.026	-0.040	-0.004	-0.069	0.008	0.016	0.011	-0.025	0.016	0.059	1																			
Var_8	-0.007	-0.001	-0.014	-0.007	0.025	-0.004	-0.075	-0.017	-0.012	-0.058	0.014	0.013	1																		
Var_9	-0.011	0.011	-0.006	-0.029	-0.012	0.306	0.088	0.135	0.117	-0.083	0.076	-0.002	-0.034	1																	
Var_10	0.032	0.138	0.058	0.048	0.216	-0.072	-0.268	-0.056	-0.025	-0.313	0.247	-0.043	0.053	-0.052	1																
Var_11	0.007	0.003	0.031	0.093	0.032	0.003	0.015	0.021	0.008	0.040	-0.034	-0.007	0.009	-0.068	-0.015	1															
Var_12	0.010	0.017	0.037	0.141	0.104	-0.055	-0.094	-0.021	-0.025	-0.025	0.009	0.004	0.015	-0.122	0.083	0.092	1														
Var_13	0.002	0.009	0.005	0.016	0.021	0.000	-0.014	0.006	0.000	-0.008	-0.015	-0.009	0.003	-0.006	0.002	0.100	0.036	1													
Var_14	0.014	0.137	0.102	0.066	0.314	-0.044	-0.175	0.019	0.018	-0.111	0.045	0.002	0.033	-0.022	0.110	0.004	0.077	0.020	1												
Var_15	0.003	-0.014	-0.011	0.009	-0.007	-0.003	0.028	0.001	-0.008	0.036	-0.024	0.030	0.007	-0.007	-0.009	0.039	0.047	0.117	-0.001	1											
Var_16	-0.017	0.011	-0.012	0.006	0.006	0.016	-0.030	0.007	-0.003	-0.049	0.028	0.032	0.010	0.019	0.039	0.021	0.057	0.015	0.033	0.022	1										
Var_17	-0.037	-0.018	-0.019	0.012	-0.094	-0.033	-0.055	-0.114	-0.096	0.087	-0.164	0.179	0.054	-0.063	-0.090	0.003	-0.001	0.008	-0.007	0.004	0.062	1									
Var_18	-0.028	-0.097	0.012	-0.046	-0.164	-0.009	0.172	-0.034	-0.046	0.222	-0.127	0.074	-0.122	-0.008	-0.257	0.008	-0.037	-0.013	-0.119	0.006	-0.002	0.039	1								
Var_19	-0.047	-0.073	0.015	-0.019	-0.150	-0.036	0.069	-0.116	-0.091	0.230	-0.250	0.038	0.028	-0.046	-0.211	0.012	-0.013	-0.015	-0.066	0.016	0.001	0.515	0.375	1							
Var_20	-0.011	-0.060	0.035	-0.011	-0.111	-0.001	0.134	0.015	-0.010	0.151	-0.091	0.060	-0.102	0.015	-0.117	0.006	-0.030	-0.008	-0.076	0.002	0.010	-0.072	0.660	0.166	1						
Var_21	0.006	-0.058	-0.001	-0.006	-0.084	-0.025	0.136	-0.005	-0.003	0.266	-0.749	-0.084	-0.004	-0.052	-0.154	0.024	0.001	0.011	-0.025	0.011	-0.020	0.071	0.059	0.149	0.043	1					
Var_22	0.001	0.024	0.031	-0.011	0.035	-0.002	-0.030	-0.015	0.001	0.009	-0.091	-0.650	-0.005	0.001	-0.009	0.001	-0.008	0.009	0.010	-0.023	-0.003	0.002	0.008	0.014	-0.003	0.102	1				
Var_23	-0.028	-0.025	-0.001	-0.004	-0.030	-0.003	0.030	-0.020	-0.009	0.081	-0.108	0.018	0.026	-0.021	-0.077	0.014	0.009	0.007	-0.002	0.014	0.007	0.134	0.065	0.167	0.048	0.071	0.007	1			
Var_24	0.013	0.146	0.155	0.076	0.259	-0.119	-0.799	-0.022	-0.111	-0.161	0.120	-0.010	0.043	-0.080	0.190	-0.005	0.075	0.004	0.133	-0.016	0.010	-0.001	-0.086	-0.026	-0.065	-0.080	0.026	-0.021	1		
Var_25	0.017	0.075	0.076	0.004	0.025	-0.001	-0.054	-0.005	-0.009	0.004	-0.013	-0.102	0.002	-0.007	-0.008	-0.001	-0.003	0.014	0.012	-0.014	0.004	0.036	0.025	0.042	0.013	0.024	0.123	0.026	0.052	1	
Var_26	-0.016	0.028	0.014	0.004	0.015	0.002	-0.115	-0.034	-0.022	-0.114	0.054	-0.150	0.017	0.009	-0.018	-0.009	0.012	0.015	0.024	-0.012	0.040	0.161	0.036	0.089	-0.006	-0.045	0.162	0.013	0.059	0.130	1

Source: Authors' calculation.

Appendix 5. Spearman's rank correlations among provincial rankings of poverty measurements

Correlation	Calorie Poverty	Expenditure Poverty	Relative Poverty	SWB Poverty	Subjective Poverty
Calorie	1				
Expenditure	0.381	1			
	*0.038***				
Relative Poverty	0.230	0.236	1		
	0.222	*0.210*			
SWB Poverty	-0.191	-0.015	-0.233	1	
	0.312	*0.940*	*0.216*		
Subjective Poverty	0.211	0.758	0.115	0.198	1
	0.262	*0.000****	0.547	*0.295*	

Note: ** and *** are significant at 5% and 1%, respectively. Figures in italics are p-values.
Source: Authors' calculation.

Abstract (in Japanese)

要約

Post-MDGs の開発議論を睨んで、世界では今、「貧困」の概念議論や、満足度、幸福度等を用いた政策分析･採用に関する議論がたけなわである。「貧困」の概念や捉え方は多様であり、またそれらは固定化されたものではなく時とともに変化するものでもある。異なる社会経済規範を有する諸国においてそれらは異なり、同じ社会や国家に於いても経済や社会の発展に伴い変容する。開発の初期段階において諸国は絶対的貧困と立ち向かうが、１人当たりの所得が高まってくるにつれ、人々は相対的貧困（格差）や主観的貧困（満足度や幸福度の概念を含む）をより考える様になると思われる。本論文は、絶対的貧困（カロリー摂取、消費額基準）と相対的貧困（所得格差）、およびこれら客観的貧困と主観的貧困を計る諸指標とをそれぞれ対比させつつ構築提示し、それら諸指標の間の関係、各指標で計られた「貧困」の決定要因を探っている。インドネシアをケース国としてその２００５年の全国社会経済調査（Susenas）を用いて分析した結果、１人当たりの消費額を用いた貧困率(14.5%)と主観的貧困率(42%)の間には 28 パーセント近い隔たりがあることがわかった。それは重要な一面ではあるが、客観的･物質的に貧困でないことは、主観的に貧困でない事の十分条件でもなく、また必要条件でもないことも分析結果は示している。

絶対的貧困指標から主観的指標に至る５種類の貧困指標を構築し、インドネシアの各地域の各指標によるランク付けを行うと、それらランキングの間には有為な相関がないことがわかる。貧困の中身･構成は各地域特有なものが多く、貧困削減政策が各地域に合った形でテイラー･メイドされている必要が浮かび上がる。Logit および Ordered-Logit モデル推計から得られた結果は、諸指標で計った「貧困」の決定要因としては、教育達成度、家計サイズ（人数）、不動産の所有度（農地や家屋を含む）、外国への出稼ぎ労働者の有無、一時帰休や失職などの経済的ショックの有無、病気等の健康ショックの有無、公共サービスや公共プロジェクトの有無、道路インフラ等へのアクセス等が重要であることを示している。

教育の効果については特に重要な発見がある。教育無しから初等教育完結、初等教育から中等教育完結へと教育達成度が１段階向上する度に、５つの貧困指標のどれにおいても「貧困でない」とされる確立は１１パーセントずつ向上するという結果が得られた。更に重要なことが、相対的貧困分析が示す結果から見いだされている。物理的資産や耐久消費財の消費レベルが居住する社会の平均より低いことは（格差が大きいことは）住民の相対的および主観的貧困度を増すことが示されるが、教育達成度については正の外部性(positive externality)が確認される。即ち、人々は教育水準の高い社会に居住することによってより「貧困でない」と感じるのである。教育は正に人造り、国造りの中心にある。

分析結果はまた、絶対的貧困と相対的貧困の双方への働きかけを考えるのであれば、貧困削減プログラム（公共投資や ODA によるインフラ整備等も含む）の実施において、対象となる地域や住民とそうでない地域や住民の双方への配慮が重要であるという政策含意も示している。地域をまたがって住民を繋ぐこと、正の開発効果が他地域へ波及しやすくする配慮を怠らないことが肝要であることを分析結果は示している。

本論文が、今後の多様化する「貧困」議論や「開発」議論に一石を投じることとなれば、それは著者にとって望外の喜びである。