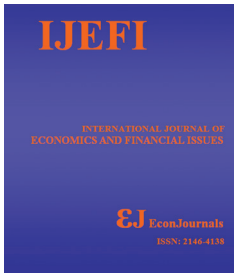

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Can Social Capital Investment Reduce Poverty in Rural Indonesia?

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ABSTRACT

This study investigates the impact of social capital investment on the poverty of rural households in Indonesia using nationally representative datasets, namely Susenas 2012. Employing a logistic regression model to examine the effect of social capital on household poverty, this study tests whether the ownership of social capital reduces households' probability of being poor. The analysis shows that the effect of social capital on decreasing the probability of a rural household being poor is higher than that of human capital. The findings imply that, compared to other factors, social capital is the most important in reducing household poverty. Therefore, government agencies, the private sector, and other stakeholders should encourage investment in households' social capital to accelerate poverty reduction in Indonesia, complementary to other forms of "conventional" capital accumulation.

Keywords: Poverty, Social Capital, Rural Household, Indonesia, Logistic Regression
JEL Classifications: C13, I32, R58

1. INTRODUCTION

In 2015, Indonesia registered a gross domestic product (GDP) of around USD 861.93 billion, with a GDP per capita of USD 3834.06, which places it within the range of the G20 group of countries. However, the poverty rate in Indonesia is still high, followed by a worsening income inequality as well as regional disparity. The number of poor people, which refers to a population with a monthly per capita expenditure below the poverty line, in March 2016 reached 28.01 million people, 63.08% of them being located in rural areas (Badan Pusat Statistik [BPS] 2016). Imbalance of regional development also reflects uneven poverty reduction among regions. Some regions manage faster poverty faster reduction (i.e., Kalimantan and Sumatera), while in others (i.e., Maluku and Papua), the poverty rate declines slowly. The difference in terms of the speed of poverty reduction indicates that development in the Western region of Indonesia (Kawasan Barat Indonesia [KBI]) is ahead of eastern Indonesia (Kawasan Timur Indonesia [KTI]) (Sutomo 1995). Similar results from Hadi (2001), and Miranti and Resosudarmo (2005) also show that poverty in KTI is worse than in KBI.

Nevertheless, poverty is still a priority development issue to be settled by the Government of Indonesia through various development programs. Since the New Order government (the Soeharto Regime, 1967-1998), poverty alleviation programs have been implemented by various ministries and agencies. A famous one is the Presidential Program for Disadvantaged Villages (IDT) from 1994 to 1999. The program included: PPK (Subdistrict Development Program), implemented by the Department of Home Affairs from 1999 to 2008; P2KP (Urban Poverty Program), implemented by the Department of Public Works from 1999 to 2008; P4K (Project Increasing Farmers' Income and Small Fishermen), implemented by the Ministry of Agriculture from 1979 to 2005; PEMP (Coastal Community Economic Empowerment), implemented by the Department of Marine and Fisheries from 2001 to now; KUBE (Business Group), held by the Ministry of Social Affairs from 1982 to 2006, etc. These programs operate independently according to the relevant department policies and are not fully integrated into inter-ministerial collaboration programs; they are mostly partial and sectoral (Hadi, 2010).

Nonetheless, their results show the failure of these programs. Rustiadi et al. (2009), Fauzi (2010), and Chambers (2014) find that the following factors contribute to the failure of poverty alleviation programs: (1) The target approach and top-down; (2) neglect of local values and biased outsiders; (3) lack of participation;

(4) lack of a holistic approach; and (5) the illusion of investment. Furthermore, general poverty reduction programs still focus on the development of infrastructure (physical capital), credit assistance (financial capital), and educational assistance (human capital [HC]). However, since 2007, the Government of Indonesia has been expanding its poverty reduction programs through the National Program for Community Empowerment (Hadi, 2010). This program emphasizes community empowerment, associated with the use of social capital and local economic development.

However, the poverty rate in Indonesia is still relatively high, mainly in rural areas. This high rate indicates that development in the rural areas does not optimally utilize various types of resources (Hayami, 2001), although the components of the three capitals of development, i.e., HC, natural capital, and social capital, are mostly located in rural areas (Fauzi, 2010). Other causes include less than optimal implementation of rural development, because of the occurrence of the backwash effects, which means that various resources (natural capital, HC, and financial capital) flow from rural to urban areas (Rustiadi et al., 2009; Ke and Feser, 2010).

Moreover, poverty issues are closely related to the nature and pattern of development in the region, which can be realized through changes in social organizations and value systems (Rustiadi et al. 2009), while the productivity of an economic system and its resource management is conditioned by culture and institutions in the local community (social institutions) (Hayami, 2001). Therefore, the implementation of rural development should encourage social institutions. Since social institutions can allow the formation of social capital, it can reduce poverty in rural Indonesia (Rustiadi et al., 2009; Fauzi, 2010; Slamet 2010; Nasution et al., 2014, 2015).

Social capital has been proven a potential source of regional economic growth and development (Putnam et al., 1994; Knack and Keefer, 1997; Grootaert, 1999; Iyer et al., 2005). Many studies in developing countries indicate an important role of social capital in reducing poverty (Narayan and Pritchett 1999; Grootaert 2001; Aker 2007; Okunmadewa et al., 2007; Hassan and Birungi, 2011; Tenzin et al., 2013; Nasution et al., 2014, 2015). Different results are found by Abdelhak et al. (2012), who argue that social capital does not affect the registered increase in revenue. According to (ibid.), this condition occurs due to the lack of social organizations, not only in rural areas but also in the majority of households in a homogeneous poor community. Therefore, they cannot help each other.

The reduction of poverty in rural areas requires measures at the micro level (household or community). As such, accumulated social capital among households is potentially one of the strategies to reduce poverty in rural Indonesia. This study is based on the hypothesis that social capital investment of households can contribute to poverty reduction efforts in rural Indonesia. Proving this argument requires a quantitative assessment of the impact of social capital in improving household welfare, which, in turn, reduces poverty. Studies related to social capital by using empirical nationwide household data is still very limited. The objective of this study is to investigate the impact of social investments on the poverty of rural households in Indonesia. This study is intended to provide a significant contribution to the scientific literature by using statistical simulation on nationally representative rural households data set. The next section sets out the social capital's conceptual framework of this study. The third section presents the method of the study by introducing the logistics regression. The fourth section is a discussion of our findings and the last section is the conclusion of the study.

2. CONCEPTUAL FRAMEWORK

Social capital, which consists of social structures, obligations and expectations, information channels, and a set of norms and sanctions, is effective in inducing and/or restricting certain behavior (Coleman, 1988). Putnam (2001) explains that social capital as a feature of social organization, such as networks, norms, and social trust, allows community members to act collectively so that they mutually benefit by coordinating and cooperating. Social capital is defined by Durlauf (2002) as the institutions and informal organizations based on social relationships, networks, and associations that create shared knowledge, mutual trust, and social norms. According to Imandoust (2011), social capital refers to the social relations that allow individuals or groups to have access to various resources. It is an important source that provides access to physical capital or HC in production activities that can contribute to the productivity and well-being of households.

Although there are several definitions of social capital, many scholars suggest that social networks have value. Sociologists and economists recognize the important role of social networks in reducing poverty, supporting economic development and sustainable development of human resources, and facilitating rural development through social relationships (Yusuf, 2008; Hayami, 2009; Ishise and Sawada, 2009; Imandoust, 2011). Another aspect is that social capital improves access to credit through the mechanism of strengthening social connection and social security, especially in developing countries (Fafchamps and Gubert 2007), and solving problems of credit risk-sharing arrangements (Karlan, 2007; Paal and Wiseman, 2011). Credits that are distributed based on strengthened social capital (trust, a kinship between a borrower and bank officers, and the involvement of communities leaders can generate better repayment rates (Nugroho, 2008). Other studies also demonstrate that community involvement can reduce the crime level (Yamamura, 2009) and the number of deaths from natural disasters (Yamamura, 2010).

Furthermore, Chamlee-Wright (2008) uses the concept of social capital to explain the process of economic development derived from entrepreneurial activities. He argues that the existence of inter-agency networks and the flow of information between them improve access to market information. Additionally, collective action creates lower transaction costs and provides a wide range of output transactions, labor, credit, and land, which can increase revenue (Paavola and Adger, 2005). Finally, participation in group activities is proven to improve the technological transformation positively (Birungi and Hassan, 2007; Katungi et al., 2007). Moreover, the society with better access to social capital is more likely to benefit because of the smaller crime rate, better health,

higher educational achievement, and better economic growth (Halpern, 2010). Otherwise, social capital can also have a negative impact on economic and environmental outcomes by widening the gap, especially in depressed communities (depression), and in low tolerance ones (Ray and Bijarnia, 2007; Halpern, 2010).

Although there is no consensus regarding the definition of social capital, understanding it is useful for planning and policymaking. The generally accepted concept of social capital involves social interaction between individuals, which affects socioeconomic outcomes. The definitions of social capital are diverse and understood differently, but there has been a convergence towards the network, norms, and values that facilitate cooperation (Healy and Hampshire, 2002). Based on this definition, social capital generates externalities that encourage information transmission, build trust, and develop norms of cooperation. Social capital, as measured by participation in associations, reduces poverty through positive externalities (transfer of knowledge and technology), which affect productivity and increase household incomes in rural areas (Foster and Rosenzweig, 1995; Alesina and Ferrara, 2000; Katungi et al., 2007).

The basic idea of the network approach is that social networking is a valuable asset, functioning as a stock that generates measurable returns (flow of income) for households. Social capital is built through interaction, which occurs because of social, cultural, or religious aspects. This allows individuals to build a community, be committed to each other, and knit social order. As such, this sense of belonging and social networks (including the relationship of trust and tolerance) can provide benefits to individuals or groups (Kilpatrick et al., 2003; Yusup, 2008). In other words, the assumption that the involvement and participation of individuals or households within a group (social relationships) have positive socioeconomic consequences is not only for individuals or households but also for the wider community.

The effect of social capital is diverse. Technically, it is largely determined by its definition and measurement. This study uses the index as a proxy for social capital in rural areas. Studies related to social capital measurement, as those carried out by Knack and Keefer (1997), Narayan and Pritchett (1999), and Knack (2002), employ indirect proxies, where the social network is the main component. Social capital associated with the demographic and socioeconomic characteristics of households, and other capitals (human, financial, and physical) are used in productive activities to increase income; they have negative effects on the chances of households being poor (Grootaert and Narayan, 2004; Nasution et al., 2014).

3. DATA AND METHODS

3.1. Data Sources

Data used in the study are collected from the National Statistics Indonesia (BPS), the National Socioeconomic Survey of 2012 (Susenas), National Socioeconomic Survey of socio-cultural and educational modules in Susenas 2012 (MSBP).

Susenas 2012 employs a three-stage stratified sampling method: (1) Selecting sample size of up to 30,000 people in the enumeration area as "probability proportional to size" of the number of households based on the 2010 Population Census. Subsequently, the enumeration area was selected randomly and allocated into four quarters (March, June, September, and December), so that in each quarter there will be as many as 7500 people in the enumeration area. (2) Two census blocks of each enumeration area were selected. Finally, from each census block, groups of 10 households were selected systematically. Therefore, the number of sample households of Susenas 2012 was as high as 300,000 households, with details in each quarter for about 75,000 households (realization in September was as many as 71,803 households).

Susenas 2012 collected data on demographic characteristics, socioeconomic characteristics, and household consumption expenditure (Susenas-Kor). Additionally, in September 2012, with the same respondents, Susenas 2012 also collected information on household social capital (MSPB 2012). This study combines the variables of Susenas 2012 with MSBP 2012 to produce a data set consisting of regional identity, demographic characteristics, socioeconomic characteristics, household consumption, and description of social capital.

3.2. Determination of the Poverty Line and Poor Households

This study defines poor households as those having an average monthly per capita expenditure below the local poverty line. The expenditure per household capita as a monthly measure of household consumption of food and non-food is stated in nominal terms. Goods consumed can be derived from purchase, self-manufacture, gifts, or payment in kind. The poverty line refers to the welfare of poor households as opposed to non-poor households. This line is determined and defined as the standard income or the value of consumption (expenditure). The rural poverty line employed in this study has been calculated by BPS.

3.3. Methods of Analysis

Data analysis includes descriptive and inferential analysis. Descriptive statistical methods, which include the calculation and the average frequency of the sample, are presented in tabular format. The inferential analysis is performed using empirical models of residual assumed distribution logistics, so it can be estimated using the logit regression method. The empirical model used in this study is as follows:

$$y_i^* = \beta_0 + \sum_{j-1}^{n} \beta_j x_{ji} + \varepsilon_i \quad (1)$$

In equation (1), y* cannot be measured directly because it is a latent variable, but measuring the classification of households is feasible. For quantitative analysis purposes, the household is defined as 1 if it belongs to the income poor category (household monthly per capita expenditure below the poverty line in rural areas of local provinces), and 0 otherwise. Classification of households worth is 1 (poor) or 0 (not poor), so that the value of y_i follows a discrete scale, with the following provisions:

$$y_i = 1 \text{ if } y^* > 0 \text{ and } 0 \text{ if } y^* \leq 0 \quad (2)$$

Therefore, referring to equation (2), if the household is classified as poor, it can be written as follows:

$$\Pr(y_i=1/x)=\psi(y_i^*) \quad (3)$$

Which ψ(.) is the cumulative distribution function (CDF). The logit estimation method assumes that the CDF has a logistic distribution so the equation (3) can be written as follows:

$$\Pr(y_i=1|x)=\frac{\exp\left(\beta_0+\sum_{j=1}^{8}\beta_j x_{ji}\right)}{1+\left(\beta_0+\sum_{j=1}^{8}\beta_j x_{ji}\right)} \quad (4)$$

The marginal effect of the probability for a household being poor is a combination of two factors. The effect of variable x_j on latent variables y_i^* and CDF derivatives are evaluated at y_i^*. Therefore, the marginal effect of x_j for y is as follows:

$$\frac{\partial \Pr(y=1|x)}{\partial x_j}=\frac{\partial \Pr(y=1|x)}{\partial(z)}.\frac{\partial(z)}{\partial x_j}$$

$$\Psi'(z).\beta_j=\psi(z).\beta_j \quad (5)$$

Where ψ is the probability density function (pdf) of the logistic distribution, which can be formulated as follows:

$$\psi(z)=\frac{\exp(z)}{\{1+\exp(z)\}^2} \text{ and } z=\beta_0+\Sigma_{j=1}^{8}\beta_j x_j \quad (6)$$

3.4. Definitions and Operational Variables

Numerous studies show that household poverty in rural areas is determined by a number of factors, such as social capital (participation in groups), HC (education), physical capital, and household characteristics (age, marital status, household size, gender, and dependency ratio) (Yusuf 2008; Abdul-Hakim et al., 2010; Hassan and Birungi, 2011; Baiyegunhi, 2014; Nasution et al., 2014a; 2014b; 2015). The independent variables used in this study include: Aggregate index of social capital, years of schooling for household heads (HC), physical capital proxies indicated by the main occupations of household heads, and demographic and socioeconomic characteristics of households (age of household heads, marital status of household heads, household size, gender of household heads, and dependency ratio).

Various proxies (single measure or index) have been adapted to measure social capital at an individual or household level. In this paper, we conceptualize social capital as measured by the social capital index. This study refers to the six dimensions of social capital by Jones and Woolcock (2007). The social capital index as a composite index consists of groups and networks, trust and solidarity, collective action and cooperation, information and communication, social cohesion and inclusion, as well as empowerment and political activities. The indicators used to measure each component are described as follows:

- Groups and networks (SC_1): This component is measured by determining membership in formal or informal associations or organizations, and the ability to obtain support from individuals other than family members and relatives in times of distress. In this study, this component is measured by the number of organizations/groups in which household heads become members.
- Trust and solidarity (SC_2): This component is measured by determining whether the majority of people in the community can be trusted and whether they always help each other in times of need. In this study, this component is measured based on whether households entrust the neighboring house when traveling or staying elsewhere.
- Collective action and cooperation (SC_3): This component is measured by whether community members donate time or money for the purposes of public interest, and the possibility of community members to work together to solve common problems. In this study, this component is measured by the way heads of household take part in joint activities in the public interest (such as public facilities, community service, etc.) in their neighborhoods.
- Information and communication (SC_4): This component is measured by the households' experience of listening to the radio, watching television, or reading newspapers. In this study, this component is measured from the experience of the household heads in watching television, listening to the radio, and reading the newspapers over the past week.
- Social Cohesion and inclusion (SC_5): This component is measured by determining whether the households have a strong sense of cohesion in society, and feel safe from crime and violence when alone at home. In this study, this component is measured from the perceptions of the safety of household heads during a stay in the local environment.
- Empowerment and political action (SC_6): This component is measured by whether community members become members of political parties and have control over decisions that affect daily activities. In this study, this component is measured from the memberships of household heads in political parties.

All indicators above are dichotomous variables (or converted into dichotomous variables), which only require a "yes" or "no" answer (set to 1 if yes and 0 otherwise). In order to obtain an aggregate index of social capital (SC_A) for each household, the percentage frequency of "yes" answers (or value of 1) was calculated and the result transformed into a scale from 1 to 10. The transformation of frequency percentages of the "yes' answers (W) into the 1-10 scale uses the following equation:

$$SC_A = h(X) = 1 + (9/10)*W \quad (7)$$

Variables of HC were measured by determining the formal years of schooling for household heads. Physical capital variables (dPC) were measured by the households' assets. However, ownership was not included in the model because of an endogeneity problem, since poor households usually sell assets to meet the shortfall in meeting daily needs (Baiyegunhi 2014). Therefore, the main occupation dummy variables (value of 1 if the household is involved in farming and 0 otherwise) were regarded as a proxy for ownership of agricultural assets.

Household characteristics (X_i) considered in the analysis are as follows: Age of household head (X_1); marital status of household head (dX_2 = 1 if married, 0 otherwise); the sex of the household head (dX_3 = 1 if male, 0 otherwise); household size, the number

of household members (X_4); and the dependency ratio, the ratio of the number of household members who do not work compared to those who do for every household (X_5).

All households in the sample under study are in rural areas, so the area variable (rural or urban) is not included in the model to capture the differences in socioeconomic conditions due to regional differences. Summary of descriptions, measurements, and the hypothesis whether the independent variables included in the model are presented in Table 1.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

Household heads in rural Indonesia are on average 47 years old, they have an elementary school education background, and more than 50% work in agriculture (farming). The average household size is about 4, with high dependency ratios that reach over 75%. The average aggregate index of social capital in rural households is 6.99 (maximum 10).

In this study, rural households were classified into two categories, namely poor and non-poor households. The heads of poor households tend to have lower education than those of the non-poor households. Household size is typically bigger for poor households. In general, the heads of the poor households work in the agricultural sector. Meanwhile, the greater aggregate index of social capital is found in non-poor households. The average aggregate of the social capital index in non-poor households is 7.06, higher than for poorer households (6.52) (Table 2).

4.2. Factors Affecting Household Poverty

The empirical results of the estimation of logistic regression analyzing factors that affect household poverty are presented in Table 3. The likelihood ratio test was used to assess the suitability of the models. The results indicate that the examined factors (exogenous variables) affect household poverty. Furthermore, to test the efficiency of the model predictions, the predictive accuracy percentage was used. In general, the empirical model used in this study is able to predict the classification of poor households with an 87.18% accuracy.

The output result shows that pseudo R^2 is equal to 0.1381. This indicates that only 13.8 percent of the variation in the dependent variable can be explained by the model. However, the small value of pseudo R^2 does not improve the model. This is because the value of pseudo R^2 (from 0 to 1) is an artificial interpretation of the ordinary least squares R-square in a logit model (Greene, 2003). This is supported by Gujarati (2003), who proposes that, in the use of the logistic regression model, the main factors are as follows: Significance indicator models, significance of independent variables, and the sign of variable coefficients. The value of pseudo R^2 is not preferred. In addition, the use of cross-sectional data in this study has the following implications: Lower value of pseudo R^2 indicates that the model used is not necessarily good.

The results in Table 4 show most variables to have the expected sign and be consistent with the hypothesis. The coefficient estimates of the aggregate index of social capital are statistically significantly and negatively related to the likelihood of being poor. This relationship indicates that the higher the social capital stocks of the household are, the smaller its chances to be

Table 1: Definitions, measurement, and hypothesis of independent variables

Variables	Definition and measurement	Hypothesis sign
SC_A	Linear transformation of (SC_1)-(SC_6)	-
HC	Long formal schooling of household head (years)	-
The main job (dPC)	Main occupation of household head (dPC=l if agriculture, 0 if otherwise)	-
Age (X_1)	Age of household head (years)	±
Marital status (dX_2)	Marital status of household head (dX_2=l if married, 0 if otherwise)	±
Gender (dX_3)	The sex of the household head (dX_3=l if male, 0 if otherwise)	±
Household size (X_4)	Number of household members	+
Dependency ratio (X_5)	The ratio of the number of household members who do not work compared to those who do	+

HC: Human capital, SC_A: Aggregate index of social capital

Table 2: Descriptive statistics of households by poverty status*

Variables	Poverty status					
	Non-poor		Poor		Total	
	Mean	SD	Mean	SD	Mean	SD
SC_A	7.06	1.31	6.52	1.41	6.99	1.34
HC	7.18	3.59	5.53	3.30	6.96	3.60
The main job (1=agriculture) (dPC) (%)	57.00	-	72.00	-	59.00	-
Age (X_1)	47.54	13.88	46.71	13.89	47.43	13.88
Marital status (1=married) (dX_2) (%)	83.00	-	86.00	-	83.00	-
Gender (1=male) (dX_3) (%)	86.00	-	88.00	-	86.00	-
Household size (X_4)	3.72	1.65	4.94	1.89	3.87	1.73
Dependency ratio (X_5)	73.72	85.46	90.61	99.36	75.91	87.56

*Comparing the means showed that demographic characteristics, socio-economic and social capital are different and statistically significant between the poor and the non-poor.
HC: Human capital, SD: Standard deviation

Table 3: Estimated logistic regression of factors affecting household poverty

Variables	Coefficient	SE	z-statistics	P>|z|
Aggregate index of social capital (SC_A)	−0.2677***	0.0118	−22.63	0.000
Human capital (dHC)	−0.1502***	0.0053	−28.24	0.000
The main job (1=agriculture) (dPC)	0.5047***	0.0357	14.15	0.000
Age (X_1)	−0.0121***	0.0013	−9.33	0.000
Marital status (1=married) (dX_2)	0.1834**	0.0780	2.35	0.019
Gender (1=male) (dX_3)	−0.2929***	0.0806	−3.64	0.000
Household size (X_4)	0.4090***	0.0093	43.89	0.000
Dependency ratio (X_5)	0.0007***	0.0002	4.20	0.000
Constants	−0.6034***	0.1158	−5.21	0.000
Number of observations		41 003		
Percentage of prediction accuracy (%)		87.18		
Test likelihood ratio (LR χ^2 (8))		4 359.421 (P=0.000)		
Pseudo R^2		0.1381		

*Significant at α=0.10, **Significant at α=0.05, ***Significant at α=0.01. SE: Standard error, HC: Human capital, SC_A: Aggregate index of social capital, LR: Likelihood ratio

Table 4: The estimated effect of partial factors affecting household poverty

Variables	Coefficient	Probability change
Aggregate index of social capital (SC_A)	−0.2677	−0.0229
Human capital (HC)	−0.1502	−0.0129
The main job* (dPC)	0.5047	0.0419
Age (X_1)	−0.0121	−0.0010
Marital status* (dX_2)	0.1834	0.0150
Gender* (dX_3)	−0.2929	−0.0274
Household size (X_4)	0.4090	0.0350
Dependency ratio (X_5)	0.0007	0.0001

HC: Human capital, SC_A: Aggregate index of social capital

poor. The education variable was found to have a negative and significant effect on poverty. Education, as an element of HC formation, increases access to new information and the information processing capabilities, as well as provides better and varied job opportunities. Improving education eventually increases household income and prevents poverty.

The estimation results indicate that the effect of social capital in decreasing the probability of a rural household being poor is higher than the HC factors. This finding is similar to the results of previous studies. Narayan and Pritchett (1999), Grootaert (1999), Grootaert et al. (2002), Grootaert and Narayan (2004), Hassan and Birungi (2011), Tenzin et al. (2013), and Nasution et al. (2015) find that social capital has a negative impact on poverty. They use household expenditure as a proxy for poverty. A rise in household expenditure means an increased income, thus leading to poverty reduction.

Meanwhile, the coefficient of agricultural households (agriculture is the main job) as a proxy for physical capital is positive, implicitly indicating that farming households tend to be poorer than non-farm households. Although the majority of Indonesia's population lives in rural areas and their economic activities depend on natural resources, non-farm income remains an important source of income for the rural population. Therefore, to increase their income, households in rural areas need to participate in the off-farm and non-farm sectors. As suggested by Rustiadi et al. (2009) and Schneider and Gugerty (2011), heads of households in rural areas may have the ability to work off-farm, outside the agricultural season, in order to increase their incomes.

On the other hand, the coefficient of household size is positive and statistically significant. This result suggests that larger household members are likely to be poorer than those of the smaller ones, assuming that all other factors are constant. Thus, the larger the size of the households, the poorer they are. This finding is in line with work conducted by Lanjouw and Ravallion (1995), Grootaert (1999), Datt and Jolliffe (1999), Hassan and Birungi (2011), Adepoju and Oni (2012), Tenzin et al. (2013), and Nasution et al. (2015).

The coefficient of the dependency ratio is positive and statistically significant, the dependency ratio being positively associated with the household being poor. The dependency ratio of the household exhibits a strong and positive relation with household poverty or negative contribution to alleviating poverty. This finding is consistent with the results of Hilina (2005), in that high dependency ratio increases the probability of households to fall into poverty. A household with a large economically non-active family tends to be poorer.

4.3. Partial Effects of the Variable

The marginal effects influencing the determinants of being poor households are presented in Table 4. The effect of partial for each factor is calculated using the approximate difference in the odds of being poor when these determinants change.

Table 4 shows that the partial effect of a unit increase in aggregate household social capital index on the possibility of being poor is −0.0229. This means that the chances of households being poor are reduced by about 2.3% due to an increase in aggregate household social capital index. Similarly, the partial effect of an increase in HC on the possibility to be poor is −0.0129, implying

that the chances of households are also reduced by about 1.3% with the increase in the length of schooling for household heads. The influence of social capital on the possibility of rural households of being poor has a higher magnitude than the HC effect. The marginal effect of increasing the age of the household heads against the possibility of being poor is −0.001. These findings indicate that the chances of poor households are reduced by about 0.1% per year increase in the age of the household heads.

The main job has an interesting partial effect on the household heads as a proxy for physical assets, indicating that the shift from agriculture to non-agriculture is 0.042. This implies that the change of the non-agricultural household to farming increases the chances of becoming poor by around 4.2%. However, the shift from farming households into non-agricultural households is not always discrete. Thus, the activity of rural households outside farming (off-farm or non-farm) could potentially increase revenue and reduce the chances of being poor (Rustiadi, 2009).

Furthermore, the partial effect of the increase in household size and the dependency ratio are 0.409 and 0.001, respectively. These findings indicate that the households chances of being poor in rural areas increase by approximately 40.9% due to the addition of household members and 0.1% per unit increase for the dependency ratio.

4.4. Simulation of the Effect of Changes in Household Poverty Determinants

Simulations were carried out to determine the baseline scenario for the percentage of poor households in rural areas. At the baseline scenario, the percentage of poor households amounted to 0.2394. This figure estimates that there are 24% rural poor households and 76% of non-poor households. The simulation results the effects of each factor change on the household's chances of being poor are presented in Table 5.

The simulation results in Table 5 show that increasing aggregate social capital and HC by 16.7% will reduce the likelihood of poor households by 18.9% (0.2394-0.1941) for social capital and approximately 10.9% (from 0.2394 to 0.2132) forHC. A higher age of the household head lowers the chances of poor households by 0.9%. Additionally, the shift in the occupation of the household's head from agriculture to non-agriculture is likely to reduce the likelihood of becoming poor by 33.3% (0.2394-0.1597).

The simulation results also indicate that the decrease in household members from four to three reduces the likelihood of being poor by 28% (0.239-0.1730). Finally, a decrease in the dependency ratio from 75% to 65% reduces the likelihood of poor households by 0.65% (from 0.2394 to 0.2381).

5. CONCLUSION

This study showed that access to social capital, along with other factors, determined household welfare, particularly in relation to poverty reduction in rural areas. It can be concluded that, among other factors, social capital has an important role in reducing the possibility of poor households. Based on the simulation results, the impact of social capital on poverty reduction is higher than for HC. This indicates that investment of households' social capital can potentially reduce poverty in rural areas.

Poverty reduction programs in rural Indonesia are focused on development through investments in infrastructure and human resources (education, health, and access to financial capital). Well planned and measured actions on social capital investment in rural areas need to be considered since it has been shown to have a positive impact on access to social capital through the participation of households in social groups. This study suggested that the intervention of the government and the private sector in the provision of quality education encourages the increase of social capital, which, in turn, also increases income and reduces poverty in rural Indonesia.

There are several limitations of the current study. First, social capital is a multidimensional concept that cannot be easily captured by a single measure. The current study used a social capital index with six components of social capital. However, different components of social capital can operate differently with similar economic outcomes. Second, this study focused only on rural areas and social capital at a household level. Nonetheless, there are different levels of social capital (e.g., community or macro) and these may operate differently. Accordingly, the results of the current study do not guarantee that different levels of social capital would yield the same results.

We recognize that our results may be compromised by several weaknesses, namely the cross-sectional nature of our dataset and ongoing endogeneity concerns. In this scenario, the OLS estimates would be biased (Adepoju and Oni, 2012). For further research, A unique and context-specific household- and village-level instruments are expected to provide better results, these instruments are expected to be able to isolate the exogenous impact of social capital on expenditures.

Table 5: Simulation of the effect of household poverty determinants

Variables	Base	Unit change	Unit change (%)	Probability	Probability change (%)
SC_A	6	7	16.67	0.1941	18.93
HC	6	7	16.67	0.2132	10.97
The main job* (dPC)	1	0	1.00	0.1597	33.30
Age (X_1)	35	36	2.86	0.2373	0.92
Marital status* (dX_2)	1	0	1.00	0.2077	13.27
Gender* (dX_3)	0	1	1.00	0.1902	20.56
Household size (X_4)	4	3	25.00	0.1730	27.76
Dependency ratio (X_5)	75	65	13.33	0.2381	0.55

HC: Human capital, SC_A: Aggregate index of social capital

Despite these limitations, this study has provided knowledge about the role of social capital in rural poverty reduction. Therefore, on delivering poverty reduction aids, policymakers, the private sector, non-governmental organizations, and social agencies need to pay attention to strengthening social capital in rural areas. In an effort to reduce poverty in rural areas, these results raise the need for further research. Research related to differences between regions or communities related to the characteristics of their social capital and poverty as well as differences in the interaction between the two. Research also needs to be developed is the study of how social capital can be invested in rural areas of developing countries.

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