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Two-Way Causality between Social Capital and Poverty in Rural Indonesia

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Abstract

Although the causal effect of social capital on poverty in developing countries has been increasingly documented, the empirical evidence regarding the two-way causality between social capital and poverty is still limited. This study empirically explores the relationship between social capital and poverty in rural areas of Indonesia. Using two nationally representative data sets, this analysis showed social capital defined by participation in social activities positively affects household expenditure (proxy poverty). Besides household expenditure, the findings on the determinants of social capital are (a) well educated (measured by years of formal schooling), (b) the number of social organizations in the village, (c) permanent market infrastructure, and (d) home ownership. These factors constitute a possible means to facilitate poor household access to social capital, which will increase income and reduce poverty especially in rural areas.

Keyword: rural Indonesia, participation in social activities, household expenditure, two-way causality

1. Introduction

In most developing countries a large proportion of the poor are in rural areas and their poverty is generally far more severe than in urban areas (Heinemann et al., 2011; Khan, 2000; Thapa, 2004; World Bank, 2015). This issue also occurs in Indonesia. In 2012, approximately 25.59 million people were classed as poor, and 63.25% of them were located in rural regions (BPS, 2012).

Until now, poverty is still a priority development issues to be settled by the Government of Indonesia through various development programs. These programs operate independently according to the relevant department policy, they not integrated, partial and sectoral (Hadi, 2010). Various studies that examine the implementation of poverty alleviation programs identified the successes and also the failure of these programs. Rustiadi et al. (2009), Fauzi (2010), Slamet (2010) and Chambers (2014) found that the factors that cause the failure of poverty alleviation programs are: (1) the target approach and top-down; (2) neglect of local values and biased outsiders; (3) lack of participation; (4) not a holistic approach; and (5) the illusion of investment. Besides, the general poverty reduction programs are still focused on the development of infrastructure (physical capital), credit assistance (financial capital) and educational assistance (human capital). However, since 2007, the Government of Indonesia expanded poverty reduction programs through the National Program for Community Empowerment (Hadi, 2010). This program emphasizes the community empowerment associated with the use of social capital and local economic development.

The concept of social capital has recently been accepted in economic research. Social capital has been shown to be a potential source of economic growth and economic performance (Knack & Keefer, 1997; Putnam, 1993). Some studies in developing countries showed the important role of social capital in reducing poverty. Narayan and Pritchett (1999) found that social capital was an important factor affecting household income in rural Tanzania. Grootaert (2001) found that social capital affected welfare by reducing the chances of households in Bolivia, Burkina Faso and Indonesia falling into poverty. Aker (2007) found that households with higher levels of social capital were associated with an increase in household expenditure in rural Tanzania. Okunmadewa et al.

(2007) found that social capital and its various dimensions have reduced rural Nigeria's poverty levels. Hassan and Birungi (2011) in Uganda, and Tenzin et al. (2013) in Eastern Bhutan showed that social capital measured by group participation positively affects household expenditure (as a proxy for poverty).

The literature above indicates that the impact of social capital on poverty is well documented. However, literature on determinants of social capital is limited. Alesina and Ferrara (1999) in the US; Christoforou (2004) in Europe, Haddad and Maluccio (2003) in South Africa, Hassan and Birungi (2011) in Uganda, and Tenzin et al. (2013) in Eastern Bhutan show that group participation as a measure of social capital is determined by a host of factors such as education, homogeneity of communities, trust and other household characteristics. The results of this study confirm that it is important to generate policies that support the development of social institutions and thus reduce poverty. Research into understanding the factors forming social capital will make a major contribution to policy making in Indonesia.

Studies that have examined the link between social capital impact on household poverty and social capital formation in Indonesia are not available. Therefore, the aim of this study is to investigate the causal relationship between social capital as measured by participating in social activities, and household level poverty. Specifically, we examine the importance of social capital in explaining the level of household poverty in rural Indonesia and the importance of poverty and other determinants in the decision to participate in social activities. We will use an econometric technique a two-stage probit least squares (2SPLS), using data from nationally representative data sets from Indonesia. A study focusing on a causal understanding of social capital on poverty and a process through which social capital would make a great contribution to policy making has the potential to accelerate poverty reduction in Indonesia.

2. Conceptual Framework and Methodology

2.1 Conceptual Framework

The concept of social capital, which involves social interaction between individuals, becomes a key term in various fields of study. Although it is still arguable, social capital is a concept that is built into an important idea worthy of study-that social interactions are important because they help individuals, communities and the public achieve a collective goal. The idea behind the concept of social capital, that social interaction affects socioeconomic outcomes is not a new idea. The definition of social capital is very diverse and understood differently, but there has been a convergence towards a definition that focuses on networks, norms, and values that facilitate collaboration among groups (Aker, 2007; Alesina & Ferrara, 1999; Hassan & Birungi, 2011; Healy & Hampshire, 2002; Nasution et al., 2014; Putnam, 1995; Tenzin et al., 2013). In fact, many definitions tend to show that the interaction of the individual is the essence of social capital. From this definition, it is clear that social capital generates externalities and mechanisms that encourage social capital that is carried by the transmission of information, build trust and develop norms of cooperation.

The effects of social capital differ according to its definition and choice of proxy. Therefore, this study follows a framework suggested by Hassan and Birungi (2011) and Tenzin et al. (2013) who defined social capital based on social networks as defined by participation in social groups. The central idea of the network approach framework is that social networks are a valuable asset that generates an income stream for the household. Social capital is built during interactions, which occur for social, cultural, or religious reasons. It enables people to build communities, to commit themselves to one another, and to knit social order. It is argued that a sense of belonging and the concrete experience of social networks can benefit people (Yusuf, 2008). In other words, the assumption of the network approach is that individuals' involvement and participation in groups (i.e. having social ties and relation with others in social activities) can have positive socioeconomic consequences, not only for the individual household but also for the community at large.

Social capital can reduce poverty through positive externality (knowledge transfer) combined with some agricultural technology that affects productivity and rural income improvement. Social group participation and social systems have a positive relationship with technological access. Research on innovation adoption showed that the spillover effect in rural area has contributed to the individual adoption decision, improved an agricultural productivity, and resulted in household income improvement (Foster & Rosenzweig, 1995; Hassan & Birungi, 2011; Katungi et al., 2007; Narayan & Pritchett, 1999). Alesina and Ferrara (1999) found that social capital as measured by participation in the association is correlated with political participation and has important implications for policy options to improve well-being.

Social capital may reduce a market failure, especially in information which lower transaction cost and provides a great range of market transactions in output, credit, labor, and land, leads to higher household income. For example, in the credit market, there are two ways social capital may reduce transaction costs (Heikkilä et al.,

2009). Firstly, by increasing the flow of information between creditors and debtors, it reduces adverse selection and moral hazard problems in the credit markets, and secondly, by expanding the range of enforcement mechanisms for default in the obligations environment to provide a lower cost or even a possible legal system of address. Social capital can also facilitate cooperation in the provision of services that benefit all members of society and thus improve household welfare.

Studies on the determinants of social capital focus on different sets of individual and aggregate factors, and view social participation as an outcome of investment decisions or contextual influences. Glaeser et al. (2002) adopted an individual-oriented approach based on a standard optimal investment model. They investigated the impact of individual and group characteristics on individual membership, measured as the number of social organizations to which individual respondents belong. They concluded that people with more income and education invest more in social capital because of the social status they exercise within society. Van Oorschot et al. (2006) suggest a capital accumulation effect, where more human capital (life experience and education), and more economic capital (income and work) go together with more social capital. They found that membership is highest among Europeans who are older, who have a higher education and household income, who are male, and who are employed. When they examined the role of regional differences across countries, they found that regional factors appear to be relatively less important than the social determinants of income, education, gender, and work.

This leads to the argument put forward in this study that rural household poverty reduction requires measures to be taken at the micro level (i.e. household). In this regard, it is foreseen that the potential of encouraging the accumulation of social capital among rural households in Indonesia is one possible strategy to reduce poverty. This argument, however, needs a quantitative assessment of the effects of social capital in enhancing household welfare and thereby reducing poverty. The study, therefore tests the hypothesis that social capital has positive effects in poverty reduction and explores the determinants of social capital, with particular focus on the rural areas.

2.2 Source of Data and Sampling Procedure

Data is drawn from the National Socio-Economic Survey 2012 (SUSENAS 2012), specifically the core data (SUSENAS KOR) and Module of Culture and Education (MSBP 2012). Another data source is the Potential Village data collection 2011 (PODES 2011). SUSENAS 2012 and MSBP 2012 are household-based survey, while PODES 2011 is a village registration.

SUSENAS 2012 uses a three-stage stratified sampling method. At the first stage, of the 30 000 enumeration areas, a sample is selected by the Probability Proportional to Size- method. The auxiliary variable is the number of households based on the Population Census 2010 (SP 2010). Then, from the selected enumeration areas, a sample is allocated quarterly, so each quarter will have 7 500 enumeration areas sampled. At the second stage, two census blocks are selected from each enumeration area. Finally, ten households are selected for each census blocks systematically. Thus, a total sample of households in SUSENAS 2012 comprises 300 000 households from which 75 000 are allocated for each quarter. (Realization in September is 71 803 sample households).

SUSENAS KOR 2012 attempts to collect information about demographic characteristics, socio-economic characteristics and household consumption expenditure. For September 2012 only, information on social capital is also collected from MSBP 2012. Therefore, PODES 2011 collects village infrastructure information. This research is only using some data related to the instrumental variable and social capital formation which is representde by the number of social organizations and the presence of a permanent market.

We merge two data sets twice. First, we combine variables from SUSENAS 2012 and MSBP 2012 (called SUSENAS-MSBP 2012). Then, we combine this with variables in PODES 2011. Because both surveys have a different observational unit, we then conduct a matching process. Results show that 98.8% of village code is properly matched. The 1.2% unmatched codes are caused by separation villages or merging villages between 2011 and 2012 and therefore we treat these as a non-response.

Some of information obtained from this combination data are the identity of the region, demographic and socioeconomic characteristics, household consumption expenditure and a description of social capital. Information about a number of social organizations and the existence of a permanent market will be repeated for households in the same village. The combined result shows that there are 70 954 sample households in rural and urban areas. Because of the main purpose of this research, we only used 40 479 sample households in a rural area of Indonesia.

2.3 Method of Data Analysis

The methods of analyzing the role of social capital on poverty are similar to the other forms of capital that

generate income for the household. Social capital together with human capital, natural capital, physical capital, and financial capital were used in the production activities to generate income for households. Following Alesina and Ferrara (1999), Hassan and Birungi (2011), and Tenzin et al. (2013), we propose that social capital increases household expenditure and, therefore, lowers poverty. The first equation of household per-capita expenditure (Y) as a function (f) of social capital (S) is as follows:

$$Y = f(S, W) \tag{1}$$

Where W is a vector of independent variables. In some cases, the social capital (participation in social activities) is a leisure activity will increase as the income increases. This leads to the reversed causality of household expenditure and social capital, indicated by the following equation:

$$S = g(Y, T) \tag{2}$$

where T is a vector of the other independent variables. The model above shows a two-way causality between social capital and household expenditure which raises endogeneity and simultaneity problems (Alesina & Ferrara, 1999; Christoforou, 2011; Maluccio et al., 2000; Nasution et al., 2014; Tenzin et al., 2013). Thus, to overcome these problems, then the application of the ordinary least squares (OLS) is not suitable, because it will produce biased estimators and inconsistency. The usual remedy for the existence of an endogeneity problem is the adoption of an instrument variable (IV) estimation or a two-stage least squares (2SLS) estimation.

However, in this case, one of the endogenous variables is dichotomous, while another endogenous variable is continuous. Therefore, this study follows a two-stage probit least squares (2SPLS) regression for such a simultaneous equation model (Alvarez & Glasgow, 1999; Amemiya, 1978; Hassan & Birungi, 2011; Keshk, 2003; Tenzin et al., 2013). The conceptual framework above is constructed in a two-stage model of a non-recursive and can be determined as follows:

$$Y = \gamma_1 S^* + \alpha_i W_i + \mu_1 \tag{3}$$

$$S^* = \gamma_2 Y + \beta_i T_i + \mu_2 \tag{4}$$

where household expenditure is a continuous variable defined by Y, social capital is a dichotomous variable defined by S*, W and T are vector of independent variables, the measurement error is defined by μ1 and μ2, and the coefficients to be estimated are γ1, γ1, αi and βi. However, S* cannot be measured directly but rather by measuring the choices made by households head as 1 or 0 (have social capital = 1, does not have social capital = 0), so the value of the S is as follows:

S=1 if S*>0 and 0 if S*≤0

From the above equation, a reduced form equation becomes:

$$S = \lambda_i W_i + \pi_i T_i + v_1 \tag{6}$$

$$Y = \lambda_i W_i + \pi_i T_i + v_2 \tag{7}$$

In the approach of a two-stage probit least squares (2SPLS), each endogenous variable is estimated using a reduced form equation. Equation (6) is estimated using probit analysis while equation (7) is estimated using OLS. The parameter of the reduced form equation is used to generate a predicted value for each endogenous variable. The predictive values are substituted into each endogenous variable in equation (3) and (4). Then the equation is estimated with the predicted value of the reduced form equation as an instrument in the right hand side of the equation. It has been shown that the estimated original model equation in the second stage showed consistent results (Alvarez & Glasgow, 1999; Amemiya, 1978).

2.4 Measurement of Variables

2.4.1 Social Capital Variable

Various proxies (single measure or index) have been adapted to measure social capital at an individual or household level. Several studies measuring social capital are based on the existence of membership in local associations and networks (Alesina & Ferrara, 1999; Grootaert, Christian, 1999; Hassan & Birungi, 2011; Narayan & Pritchett, 1999; Tenzin et al., 2013), indicators of trust and norms (Haddad & Maluccio, 2003) and indicators of collective action (Grootaert, Christiaan, & Van Bastelaer, 2002).

In this paper, we conceptualize social capital as measured by participation in social activities. The social capital

variable is derived from a question that proxies indicators of social participation: it asks individual respondents (household heads) to declare whether they are a member of any club or organization, such as an informal rotating savings and credit association called 'arisan', a sport club or, an art group. Participation in social community is the choice of the head of the household, so that this measure is a binary scale. If the household head participated in a social gathering, sports, or arts group, then that household is considered to have social capital regardless of the number of group operations. In addition, the empirical literature also notes that participation in community groups creates loyal and strong beliefs (Grootaert, Christiaan & Narayan, 2004; Uslaner, 2004).

2.4.2 Poverty Variable

This study uses the household expenditure per capita as a proxy of poverty. This approach has also been applied by Narayan and Pritchett (1999), Grootaert et al. (2003), Okunmadewa et al. (2007), and Hassan and Birungi (2011). The assumption is that household expenditures is related to income and negatively related to poverty. Therefore, the factors that increase household expenditures would increase income and reduce poverty (Mukherjee & Benson, 2003).

To compute household expenditure per capita, data from SUSENAS 2012 are used. Household expenditure per capita is obtained from the amount of the monthly expenditure for food and non-food items which then is divided by the number of the family members. Using household expenditure per capita in this case assumes that (i) each person in the household consumption of goods and services is the same, regardless of age and gender, (ii) everyone has the same needs, regardless of age and gender, and (iii) the combined cost of two or three or more people living together is the same as if they were living separately (Mukherjee & Benson, 2003).

2.4.3 Other Explanatory Variables

Table 1. *A priori* expectations for the explanatory variables used in the model

Variable	Definition	Unit of measure	Expected signs Model 1	Model 2
Social capital	Participation in social activities of household head	D = 1if participate, 0 if otherwise	+	
Household expenditure	Household expenditure per capita of household	IDR/month		+
Household size	Size of household	Numbers of household members	-	+
Education	Education for household head	Numbers of years of formal education	+	+
Sex	Sex of household head	D = 1if male, 0 if female	+	+
Age	Age of household head	Number of years	+	+
Marital status	Marital status of household head	D = 1 if married, 0 if otherwise	+	+
Agriculture	Main occupation sector of household head	D = 1if agriculture, 0 if otherwise	+	+
Home ownership	Home ownership status	D = 1 if own, 0 if otherwise	+/-	+
Floor	Floor area	Meter square (m^2)	+	
Lighting	Home lighting source	D = 1 if electricity, 0 if otherwise		+
Permanent market	Presence of a permanent market in village	D = 1 if available, 0 if otherwise	+	
Social organization	Number of social organizations in village	Number of Social organization		+

Notes: D: Dummy; Model 1: Determinants of household expenditure; Model 2: Determinants of participating in social activities (social capital)

The literature has shown that rural household poverty is determined by a host of factors, such as group participation (social capital), human capital (education), physical capital and other household characteristics, which include age, marital status, household size, and gender (Abdul-Hakim et al., 2010; Hassan & Birungi,

2011; Nasution et al., 2014; Yusuf, 2008). On the other hand, Alesina and Ferrara (1999), Christoforou (2004), Haddad and Maluccio (2003), Hassan and Birungi (2011), and Tenzin et al. (2013) show that group participation as a measure of social capital is determined by a host of factors such as education and other household characteristics. The explanation for all variables used in the empirical model and their expected signs of influence are given in Table 1.

3. Empirical Results

3.1 Socio-economic Characteristics and Social Capital

Table 2 shows the mean values of variables by household expenditure quintiles. The data show that the younger household heads is richer than their older counterparts. This may be happening because younger households are more educated. The education level is also lower for the poor than the rich. As expected, the household size is also smaller for the rich while the poor have more mouths to be fed.

Table 2. Descriptive statistics by household expenditure quintiles (mean scores)

Variable	household expenditure quintiles (IDR/month)					
	Q1 (poorest)	Q2	Q3	Q4	Q5 (richest)	Total
Age	47.63	47.28	47.68	47.56	47.07	47.45
Education	5.65	6.39	6.79	7.29	8.40	6.90
Household size	4.73	4.16	3.85	3.51	3.09	3.87

A comparison of household expenditure quintiles based on gender reveals a surprising result of more female headed households in the higher household expenditure quintile (Table 3). While the agriculture sector household expenditure is a more important source for the poor, the non-agriculture sector sources are more important for the rich.

Table 3. Additional descriptive statistics by household expenditure

Variable	Description	Household expenditure quantile (IDR/month)					Total
		Q1 (poorest)	Q2	Q3	Q4	Q5 (richest)	
Sex	male	17.40	17.46	17.20	17.10	17.01	86.18
	female	2.60	2.54	2.80	2.90	2.99	13.82
Marital status	married	17.14	17.04	16.82	16.38	15.62	82.99
	not married	2.86	2.96	3.18	3.62	4.38	17.01
Agriculture	agriculture	13.65	12.81	12.01	10.95	9.05	58.47
	others	6.35	7.19	7.99	9.05	10.94	41.53
Home ownership	own	18.28	17.85	17.75	17.37	16.61	87.86
	others	1.72	2.15	2.25	2.63	3.39	12.14
Lighting	electricity	13.06	14.94	15.73	15.61	15.87	75.21
	others	6.94	5.06	4.27	4.39	4.13	24.79

Table 4. Household expenditure quantile according to participating in social activities

Household expenditure quantile	Not-Participate	Participate	Participate (%)
Q1 (poorest)	3 055	5 484	67.74
Q2	2 177	5 901	72.89
Q3	2 039	6 016	74.31
Q4	1 757	6 167	76.17
Q5 (richest)	1 401	6 482	80.07
All	10 429	30 050	74.24

As seen in Table 4, more than 80% of the upper household expenditure respondents (fifth quintiles) have participated in social activities. This may be happening because the poor (67.74%) are being left out owing to their inability to produce a marketable surplus or to pay membership fees.

Table 5 summarizes the means and standard deviations of the data series based on participation in social activities. Looking at the household and the other demographic characteristics, it is obvious that participation in social activities has higher household expenditure. The household head of the participants have a higher education level than the non-participants. The household head of the participants also has a lower age than the non- participants. In addition, households with more people join in social activities.

Table 5. Descriptive statistics according to participating in social activities

Variable	Not Participants		Participants		Total	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Household expenditure quantile (IDR/Month)	498 467.64	461 677.07	571 602.73	599 131.68	552 760.22	567 810.15
Age	48.99	15.06	46.91	13.33	47.45	13.83
Education	6.05	3.45	7.20	3.40	6.90	3.45
Household size	3.67	1.83	3.94	1.68	3.87	1.73

The SUSENAS 2012 identified different type of social activities. These were re-categorized into several categories for the purpose of this analysis-an informal rotating saving group, a sport group, and art groups (see Table 6). The participation in social activities is higher in the richer households. The poor household must be motivated to join in an informal rotating saving group as it provides economic benefit, and, therefore, has a direct impact on the poor's income.

Table 6. Household expenditure quantile according to type participation in social activities

Household expenditure quantile	Participants in informal rotating saving (%)	Participants in sport club (%)	Participants in art groups (%)
Q1 (poorest)	14.65	1.91	1.37
Q2	15.31	3.36	1.96
Q3	16.01	4.35	1.82
Q4	16.16	6.20	2.09
Q5 (richest)	18.69	10.30	3.03
All	16.16	5.23	2.05

3.2 Determinants of Poverty

This section the presents result of analyses of the determinants of poverty as measured in term of household expenditure. The estimation of the second stage equation for poverty with corrected standard errors is presented in Table 7.

Most of the variables have the expected sign and are consistent with the expectations. Better access to participation in social activities (social capital) significantly affects any increase of household expenditure. The estimation results indicate that the effect of participation in social activities to increase household expenditure is higher than the education factor. This finding is similar to some of the results of previous studies. Narayan and Pritchett (1999), Grootaert (1999), Grootaert et al. (2002), Grootaert and Narayan (2004), Hassan and Birungi (2011), and Tenzin et al. (2013), found that social capital as measured by membership in social groups has a positive impact on poverty proxies using household expenditure. A rise in household expenditure means an increased income and this leads to poverty reduction.

The results also showed that households headed by males tend to be economically better than those headed by females (this is positively related to the household expenditure). This relationship is as expected, but the age of the household head does not have any significant influence on household expenditure. The education variable was found to have a positive and significant relationship with household expenditure and therefore reduces poverty. Education as an element of human capital formation will increase access to new information (such as

access to credit facilities, access to health and so on) and the information processing capabilities, as well as provide better and wider job opportunities. Improving education will eventually encourage household income and prevent a fall into poverty.

Table 7. Second stage results of determinants of poverty with corrected standard errors

Variable	Coef.	se	t-stat
Social Capital	0.2355***	0.073	3.22
Sex	0.1438***	0.013	11.00
Age	0.0004	0.000	1.52
Education	0.0355***	0.004	8.91
Marital Status	-0.1317***	0.018	-7.21
Household size	-0.1025***	0.003	-29.47
Agriculture	-0.1185***	0.007	-16.09
Home ownership	-0.0863***	0.013	-6.47
Floor	0.0051***	0.000	16.85
Permanent market	0.0370***	0.008	4.87
Constant	13.0189***	0.023	574.76
No. of observations	40 479		
Adj. R-square	0.2484		
Prob > F	0.0000		

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

Marital statuses of the coefficient estimates that are indicating a negative sign, mean that the heads of the household who are not married (especially widows) have higher household expenditure than the married heads. In rural areas of Indonesia, most of the heads of household who are not married are widows who live alone. Widows, usually have inherited from her husband and her children no longer live at home, so the household expenditure tends to be higher than that of a pair of families with several children.

Household size was found to have a negative relationship with household expenditure, implying that it has positive relationships with poverty. This result suggests that larger households are likely to be poorer than the smaller ones, assuming that the other factors are constant. Thus, the larger the size of the households, the poorer they are. This finding is in line with the conducted by Lanjouw and Ravallion (1995), Grootaert (1999), Datt and Jolliffe (1999), Hassan and Birungi (2011), Adepoju and Oni (2012), and Tenzin et al. (2013).

The results also indicate that farm households have a significant negative relationship with household expenditure. Although the majority of Indonesia's population lives in rural areas and their economic activities are dependent on natural resource, non-farm income remains an important source of income for the rural population. Thus, to increase their income (proxy by household expenditure), households in rural areas need to participate in the non-agricultural 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.

Household assets in this study are measured from the home owner aspect and the house floor area aspect. The floor area was found to be associated with an increase in household expenditure. On the contrary, home ownerships have a negative relationship with household expenditure. In rural Indonesia it is common for a house to be owned by several families. Due to this sharing management, house ownership tends to have a negative relationship with household expenditure. In this study, a household is defined as a group of people or a family who lives together and eats from the same kitchen.

This study found a positive relationship between the existence of a permanent market in the village and household expenditure. These findings indicate that rural households can take advantage of the availability of a permanent market in an effort to increase their income and to reduce poverty. The existence of a permanent market infrastructure allows for economic activity as an instrument of earning income in rural households.

The above findings indicate that, among other factors, access to social capital is essential to increase household expenditure (poverty reduction). Therefore, it is also important to develop an understanding of the determinants

that affect the participation of social activities. The following section will analyze the factors additional to household expenditure that affect participation in social activities as a proxy for social capital.

3.3 Determinants of Participation in Social Activities

As explained earlier, the participation in social activities in this study is intended to measure access to social capital. This section empirically explores the determinants of influencing households to participate in social activities.

Table 8. Second stage results of determinants of participation in social activities with corrected standard errors

Variable	Coef.	dy/dx	se	z-stat
Expenditure	0.214***	0.068	0.0685	3.12
Age	-0.002***	-0.001	0.0006	-2.91
Sex	-0.003	-0.001	0.0311	-0.10
Education	0.040***	0.013	0.0043	9.29
Household size	0.051***	0.016	0.0091	5.61
Marital status	0.197***	0.065	0.0294	6.68
Home ownership	0.151***	0.050	0.0218	6.96
Social organizations	0.005***	0.002	0.0016	3.01
Lighting	0.061***	0.020	0.0169	3.64
Constant	-2.864***		0.8925	-3.21
No. of observations	40 479			
Log Likelihood	-22504.014			
LR chi2(9)	1184.480			
Prob > Chi^2 =	0.0000			

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

The analysis suggests a positive relationship between household expenditure and participation in social activities at a 5% significance level. This suggests that households with higher levels of expenditure join in social activities. As argued by many researchers (Hassan & Birungi, 2011; Narayan & Pritchett, 1999; Portes, 2000; Tenzin et al., 2013; Woolcock & Narayan, 2000), the result of this study also indicates that the poorest are excluded. One reason for this is the burden of paying membership fees and other contributions. This result also suggests that doubling household per-capita expenditure increases the probability of joining groups and associations by 6.8%.

Interestingly a negative relationship was found between the age of the head of the household and participation in social activities. It is possible that young couples have more time to participate in social activities, because they have not been affected by the presence of children. Younger household heads may participate in social activities more frequently, since they have more time than their older counterparts. These findings contradict the results of Alesina and Ferrara (1999) and Hassan and Birungi (2011), who found that younger household heads are particularly busy because of marriage, having children and setting up new households.

The sex variable suggests that being female increases the probability of participating in social activities, especially in 'arisan' (informal rotating saving group). This is probably because most women are housewives. When they have finished the household chores such as cooking, raising children, and so on, they will have more free time to attend the gathering. These findings contradict the results of Hassan and Birungi (2011), who found that being male increases the probability of joining a social group. Being married also significantly increases the probability of participating in social activities. This suggests that unmarried people have fewer incentives to join social activities.

The results show a positive relationship between education and participation in social activities. The significance of education for enhancing head of household incentives to join social groups has been confirmed by a number of studies (Alesina & Ferrara, 1999; Christoforou, 2011; Glaeser et al., 2002; Godquin & Quisumbing, 2006). On the contrary, studies by Tenzin et al. (2013), found that education has a negative relationship with group participation. Better educated households may have a higher demand for participation in social activities because they can benefit more easily from the positive externalities. Education is also seen as a way of creating

opportunities for collective action, access to social networks and acquaintances, or of developing moral values that strengthen solidarity. (Alesina & Ferrara, 1999; Christoforou, 2011).

The larger the household, the more likely it is to join in social activities. Increasing the size of households by one member result in an increase of 1.6% for the likelihood of participation. Having a large household size tends to result in an increased participation in social activities. On the other hand, any increase in social activity also requires the contribution of labor and time contributed by the members of the household.

The results also have shown a strong relationship between home ownership and social capital. Ownership of the house itself allows residents to stay longer in the local area. The length of stay in the local area is associated with the formation of social capital but it is not related to household expenditure. These findings suggest the need for an increased provision of low-cost housing in rural areas, since these areas still have large areas of land suitable for housing. Such a policy will not only make rural life more attractive; it will also reduce urbanization.

The number of social organizations or institutions in rural areas was positively related to the household head participation in social activities. The number of social organizations or institutions in rural areas provides opportunities for local people to participate in various social activities. According to Glaeser et al. (2002), membership in religious institutions and many social institutions in rural areas can be beneficial in building a social network.

Households that have an electric lighting source have a higher participation in social activities compared to households that use other energy sources. Household lighting sources other than electricity can be petromak lights (a type of pressurized paraffin lamp), torches, candles, and more. Thus, the Indonesian government needs to encourage the development of infrastructure for household access to electricity which will improve access to social capital in rural areas.

4. Conclusion

Using nationally representative data sets, this study investigated how social capital affects household poverty in rural Indonesia. The result showed that social capital defined as participation in social activities has a positive impact on household expenditure and therefore reduces poverty. Moreover, this study found that the level of household expenditure has an impact on social capital; thus, it suggests a two-way causality between social capital and poverty in rural areas.

Households that participate in social activity tend to have better economic conditions than those who do not participate in social activities. The impact of social capital on household welfare is superior to that of human capital (e.g. education). These findings suggest that the Indonesian government's poverty alleviation programs need to consider existing social activities. This may help identify different intervention programs for different social activities.

Education is not only a crucial factor that determines household expenditure; it also has a positive influence on the probability of participating in social activities. Intervention in the provision of education for rural households would therefore be crucial in the fight against poverty. Continued government support for free primary and secondary education could be important in enhancing social capital and reducing poverty.

The impact of home ownership and the number of social organizations have a positive relationship with the opportunity to participate in social activities. Home ownership enables the household to remain longer in the local area, thus giving the opportunity for social capital investment. Meanwhile, the number of organizations will affect the demand for the type of association and participation in social activities. These findings, suggest that the Indonesian government should develop strategies design to increase social capital by providing low-cost housing and encouraging the number and activities of civil society organizations, thus potentially accelerating poverty reduction 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 (Bofota, 2013; Knack, 2002; Woolcock & Narayan, 2000). The current study used an indicator to measure only one component of social capital. It has been suggested that different components of social capital can operate differently with similar economic outcomes. Second, this study focused only upon the rural area and social capital at the household level. It has been suggested that there are different levels of social capital (e.g. community or macro) and these may operate differently (Chiesi, 2007; Woolcock & Narayan, 2000). Accordingly, the results of the current study do not guarantee that one can find similar results from different levels of social capital.

Despite these limitations, this study contributes to the literature on poverty reduction in developing countries. Firstly, this study is one of the few studies that have attempted to overcome the endogeneity problem in the

estimation of the effects of social capital on poverty. Secondly, this study also provides the factors that contribute to the formation of social capital; while lastly, using a large and representative data set, this study showed that a two-way causality exists between social capital and poverty.

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