Determinants of social capital formation in rural Uganda: Implications for group-based agricultural extension approaches

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Abstract

Although social capital is a potentially important asset for poverty reduction in developing economies, there has been little analysis of factors affecting its formation in developing countries such as Uganda. This paper analyzes what influences households to join local organizations and the intensity of social networks in central Uganda. Social networks were disaggregated by major activity to gain insight into household access, and the interaction between local organizations and social networks was examined. Probit and ordered probit models were estimated to identify what led households to participate in organizations and the intensity of participation. A negative binomial model was applied to analyze the household intensity of social networks. The findings revealed that household characteristics and aspects of village homogeneity influence various dimensions of social capital and that there was positive interaction between the social capital generated by local organizations and that derived from social networks. The study has important policy implications for agricultural extension programs that use a group based approach.

Keywords: Social capital; group based extension approaches; Uganda

Bien que le capital sociétal constitue un actif d'une importance potentielle de la réduction de la pauvreté dans les économies émergentes, il existe peu d'analyses ayant étudié les facteurs qui influent sur sa formation dans les pays en voie de développement comme l'Ouganda. Cet article analyse ce qui pousse les ménages à joindre des organisations locales ainsi que l'intensité des réseaux sociaux du centre de l'Ouganda. Les réseaux sociaux ont été désagrégés selon leur activité la plus importante afin d'avoir une idée sur l'accès des ménages, et l'interaction entre les organisations locales et les réseaux sociaux a été examinée. On a évalué les modèles probit et probit ordonnés pour identifier la raison pour laquelle les ménages ont participé à des organisations et l'importance de la participation. On a utilisé un

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modèle binomial négatif pour analyser l'intensité des ménages dans les réseaux sociaux. Les conclusions ont révélé que les caractéristiques des ménages et les aspects de l'homogénéité des villages influent sur diverses dimensions du capital sociétal et qu'il existait une interaction positive entre le capital sociétal généré par les organisations locales et celui issu des réseaux sociaux. L'étude entraîne des implications politiques importantes dans les programmes d'extension agricoles qui utilisent une approche basée sur le groupe.

***Mots-clés** : Capital sociétal; approches en matière d'extension agricole basées sur le groupe; Ouganda*

1. Introduction

Since the late 1990s, particular attention has been given to the concept of social capital, broadly understood as 'social structures such as networks and organizations that facilitate exchange of resources between actors' (Bourdieu 1985, cited in Portes 1998; Coleman 2000; Putnam 1993). Social capital is important in developing countries such as Uganda, where formal institutions for enforcing contracts and protecting rights are weak. Also, many transactions in poor economies are small and involve buyers and sellers who cannot afford court action to enforce reparation (Bigsten et al. 2000). In such an environment, social capital complements (and sometimes acts as a substitute for) formal institutions. Networks and organizations generate personalized trust and enhance information exchange, which, in turn, improve the efficiency of social exchange (Durlauf & Fafchamps 2004). This realization has stimulated interest among policymakers and development practitioners in village level organizations as a vehicle for local development.

Uganda is one of the countries that have embraced the idea of social capital as an additional asset for economic development (MAAIF & MFEP 2000). The country is pursuing an agricultural extension policy that diverges from the traditional extension models in favor of farmer group based approaches. Farmers are advised to form organizations where they can collectively discuss their problems and identify appropriate interventions. As an extension methodology, the group based approach provides an effective platform for diverse stakeholders to interact, thereby facilitating the accumulation of social capital that can be used to solve their problems.

If the benefits of social capital principally accrue to members, those who happen to be included in organizations/networks benefit from increased efficiency (Durlauf & Fafchamps 2004; Dasgupta 2005) but those who are excluded may be penalized. This is because members of organizations or networks find it easier to deal with each other and as a result may stop dealing with non-members (Durlauf & Fafchamps 2004). Such outcomes could create polarization that can be counterproductive to the development effort. Thus, if social capital is to be effective in reducing poverty, policymakers need to understand who has access to which type of social capital.

This paper uses econometric methods to (a) identify factors that influence household decisions to participate in local organizations; and (b) determine the intensity of membership in local organizations and social networks in rural Uganda. It examines the nature of the interaction between rural organizations and social networks. With the exception of Godquin and Quisumbing's (2005) investigation, the nature of the

interaction that may exist between organizations and social networks has not been explored.

The remainder of the paper is divided into five sections. Section 2 provides a conceptual framework for understanding patterns of social capital accumulation among rural households. Section 3 presents the estimation procedures. Section 4 describes the local organizations and social networks of rural households in Uganda, and presents the empirical findings of the study. The paper concludes with a discussion of policy implications.

2. Conceptual framework

An individual can accumulate social capital by participating in organizations or investing in social networks, or both. Organizations are finite closed groupings of people with a common interest, whereas social networks are more complex situations in which individual agents are linked to other agents through bilateral relationships. The two forms of social capital may interact and reinforce each other. Social networks generate externalities such as information and trust that influence decisions about participation in organizations. Similarly, membership in an organization can stimulate investment in social networks.

An individual's social capital is viewed as resulting from the individual's efforts and as a consequence of the social environment (Glaeser et al. 2001). The social environment determines the incentives and constraints associated with social capital accumulation. The individual effort is an endogenous process that involves comparing the costs and benefits of participating in a social network or organization. It is reasonable to expect that when an individual considers investing in an organization or social network, he or she will take into account the current expenditure in terms of time and other goods as evaluated against immediate and future expected returns.

Denote U_{ik}^{*} as the expected utility from the net benefit of membership in a rural organization/social network (k). The utility underlying the decision to join a local organization/social network is a linear function of its observed (Z_k) and unobserved (ε_k) determinants such that

$$U_{ik}^{*} = \beta Z_k + \varepsilon_k \qquad (1)$$

In equilibrium, the decision to join an organization/social network (k) is observed if $\beta Z_k + \varepsilon_k > 0$ and will remain unobserved if $\beta Z_k + \varepsilon_k \leq 0$. The expected utility rural households derive from a specific organization/social network is expected to differ based on their characteristics, initial social capital endowment and village level factors. The observed decision to participate in an organization is also the outcome of the organization's willingness to accept the member. It is assumed that there are no eligibility restrictions for joining an organization in rural Uganda as long as one pays

the dues. However, we expect households to differ in attributes, which may be desired by organizations (e.g. social status and education level). The differences in household attributes affect the willingness of organizations to confer membership status on households and, therefore, may lead to variations in household participation in organizations.

2.1 Household characteristics

Household characteristics expected to influence the perceived net benefit derived from membership in local organizations/social networks include age, consumer : worker ratio, gender, household wealth, education, social status, production status and access to communication facilities. Age influences the way the individual discounts the future and lowers the propensity to invest in social capital (Glaeser et al. 2001). The effect of age on participation in organizations is likely to depend on the type of organization. Age may increase the likelihood of participation in social interactions that require trust (Haddad & Maluccio 2003) because the two are positively correlated (Alesina & La Ferrara 2002).

A higher consumer : worker ratio increases the opportunity cost of investing in social interactions. Households with a high consumer : worker ratio, however, are also more exposed to risks of death and starvation, and these risks could increase their dependence on others and their demand for social capital.

Gender may create differences in preferences and barriers to social capital formation because of differences in roles and constraints. Compared to men, women in rural Africa tend to have a higher opportunity cost of time, and gender norms in the community sometimes constrain their social interactions. Female-headed households may also be unable to participate in organizations that require membership fees or other contributions (Maluccio et al. 2003). However, such organizations require a high degree of cooperation among members, and such cooperation is likely to be higher among women than men (Molinas 1998). Hence, the effect of gender on social capital formation cannot be determined a priori and is likely to depend on the type of social capital.

Household wealth may influence membership in local organizations/social networks through the budget constraint or expected incentives (La Ferrara 2002). Participation in social capital accumulation requires time and sometimes money that could be beyond the means of the households that control fewer resources. Gleaser et al. (2001) show that individuals who invest in other types of capital (e.g. physical and human capital) also invest in social capital. Although membership in socially oriented organizations is relatively costless, poorer households are likely to find fewer incentives since their immediate need is survival. Wealthier households may join social organizations for social recognition in the community and they are also likely to be more willing to participate in social interactions because they are more trusting (Alesina & La Ferrara 2002) than poorer households.

Education is linked to information acquisition and trust formation (Alesina & La Ferrara 2002). An individual's confidence to speak up in a group also increases with education. Better educated households may have a higher demand for membership in

organizations because they can more easily benefit from their positive externalities (Helliwell & Putnam 1999).

An individual's social status may work through two mechanisms that complement each other. Social status may stimulate demand for social capital because individuals with a high social status may want to maintain their social positions in the community. Supply-side effects may also exist. Generally, people desire to associate with people who are superior to them. This could draw those individuals considered superior by the majority of the community members into social participation.

The household's production orientation is also expected to affect participation in specific organizations through incentives derived from production. Households engaged full time in agriculture might derive more incentives from agricultural organizations than those that spend more time in off-farm activities. They are also likely to be targeted by external agents promoting group based approaches, creating an upward bias in participation.

Poor access to communication facilities, such as roads, may increase the cost of participating in organizations/social networks. However, because poor access also means reduced physical access to markets it obliges people in such areas to be more interdependent, thus possibly increasing the incentive for social capital formation. Hence, the nature of the relationship between social capital and infrastructure development cannot be determined a priori.

2.2 Initial social capital endowment

The initial social capital endowment is another factor that may explain variability in the expected utility derived from investment in social capital accumulation (Glaeser et al. 2001). People with more initial social capital learn to trust not only group members but also non-members, which further increases their willingness to participate in organizations/social networks. The initial social capital may also increase the expected benefits from organizations/social networks because the individual expects future interaction to occur. Besides this, social capital endowment may provide social insurance and hence reduce risk aversion, which, in turn, increases the willingness to join organizations/social networks. The self reinforcing nature of social capital may also enhance or inhibit participation in organizations/social networks. For example, individuals who have friends or relatives who have joined new organizations or social networks may be persuaded to join those as well.

2.3 Village-level factors

The expected utility from membership in a local organization/social network also depends on the social, economic and institutional environment. Heterogeneity in social norms and preferences may make agreements difficult to reach (McCarthy et al. 2004), reduce trust among members (Alesina & La Ferrara 2002) or lower the direct utility of participation (Alesina & La Ferrara 2000). Differences in economic activities create asymmetry in benefits and contributions among different members (La Ferrara 2002), making it difficult to find an organization that will satisfy all the

various needs or preferences (Olson 1965). This could limit the membership of organizations when only one group is to be formed (La Ferrara 2002) or increase the aggregate membership if the population can stratify into homogeneous groups (Cornes & Sandlers 1986). When the population can do this, supply-side effects may emerge to influence the decision to join organizations. For example, each social group may persuade its members to join its organization in order to survive being assimilated by other groups. The institutional environment measures the incentives and level of information diffusion about others in the village and hence is expected to have a positive effect.

3. Data and estimation procedures

3.1 Data sources

Data were obtained from two surveys conducted in the central parts of Uganda. The study area is within a radius of about 80 km from the capital city (Kampala), with a relatively well-developed road network and good physical access to markets. The first survey conducted in 2001 included 100 households and was designed to collect baseline data as part of a project on reviving banana production in the central parts of Uganda. As such, the dataset included information on household assets and demographic factors but there was little information on social capital. The sample was drawn from five villages randomly selected from five subcounties in five districts where the banana project was implemented. Ninety-five households were re-interviewed between December 2003 and October 2004 to collect more detailed information on social capital.[1]

3.2 Econometric method

Participation in organizations/social networks consists of two decisions: (a) whether or not to participate in an organization/social network *k* and (b) how many organizations/social networks to join. Both decisions are based on the expected net benefit (U_{ik}), which is unobservable but assumed to be positive when the household decides to join an organization/social network. A probit model was used to analyze the factors that influence the decision whether or not to join organizations.

An ordered probit was used to estimate the number of household memberships in organizations. The ordered probit was preferred to a Poisson model because of correlation[2] between memberships in some organizations (e.g. informal credit and social organizations) that renders a Poisson model inappropriate. The ordered probit model for the number of membership in organizations (y) can be derived from the latent variable (U^*) determined by a set of explanatory variables (Z) such that:

[1] Five households could not be re-interviewed because some respondents had died, leaving behind very young children, while others had migrated. Given the small number of dropouts (five observations), attrition could not be tested.

[2] Each discrete variable of membership in one organization was regressed on membership in other organizations while controlling for other explanatory variables. Correlation between memberships in organizations may result from either complementarity between organizations or correlations between the organizations and unobserved variables that affect membership of an organization.

$$
\begin{aligned}
y = 0 \quad & if \quad U^* \le 0 \\
y = 1 \quad & if \quad 0 < U_* \le \alpha_1 \\
& \vdots \\
y = j \quad & if \quad U^* > \alpha_j
\end{aligned}
$$

This is the kind of censoring where $\alpha_1 ... \alpha_j$ are unknown and are to be estimated along with vector β.

The number of trusted friends to whom a household is connected can be modeled as a series of discrete household decisions that sum across an aggregation of choices to a Poisson or negative binomial distribution. The Poisson model is a non-linear specification that estimates the effect of independent variables on a scalar dependent variable. The density function for the Poisson regression is

$$f(S_i \mid Z) = \frac{\exp(-\mu)\mu^{S_i}}{S_i} \qquad (2)$$

$$(S \mid Z) \sim Poisson(\mu) \quad or\ Neg \quad Bin(\mu, \phi),$$

where the mean parameter (μ) is a function of explanatory variables that influence the household decision to join an organization/social network expressed in vector Z and a parameter vector, γ. The scalar, S_i, is the dependent variable representing household membership in an organization or household density of social networks.

The choice between a Poisson and a negative binomial depends on whether or not the conditional mean is equal to the variance $E(S \mid Z) = Var(S \mid Z) = \mu$. A negative binomial regression that accounts for unobserved heterogeneity was fitted in order to test for over-dispersion. Statistical significance of the over-dispersion parameter against the null hypothesis of equi-distribution was rejected for both variables (number of friends and number of people in off-farm employment linked to the household) capturing the density of social networks, implying that the data might not exhibit a Poisson distribution. Hence, a negative binomial regression model that allows for over-dispersion in the data (Greene 2000) was used to estimate the two models on the density of social network.

3.3 Measurement of variables

The relevant statistics describing the dependent variables are presented in Table 1.

Table 1: Descriptive statistics for the social capital dependent variables

Variable	Definition	Mean	SD
Membership in any association	A dummy variable = 1 if the household participates in organization and 0 otherwise	0.747	0.435
Membership in social organizations	A dummy variable = 1 if the household participates in organization and 0 otherwise	0.610	0.490
Membership in informal saving and credit organizations	A dummy variable = 1 if the household participates in informal saving and credit organization and 0 otherwise	0.222	0.416
Membership in agricultural organization	A dummy variable = 1 if the household participates in agricultural organization and 0 otherwise	0.175	0.380
Intensity of participation in organizations	Total number of memberships in different types of organizations held by household members	2.232	2.256
Intensity of participation in social networks	Number of friends the household can talk to closely, share family secrets with, or approach for help in case of any problem	14.958	13.719

The decision to join an organization/social network is defined as a binary equal to one, if the household has a membership in an organization/social network, and zero otherwise. Three categories of organizations are considered: (a) social organizations (i.e. burial societies, and religion based and culture based associations), (b) revolving credit and savings associations, and (c) agricultural organizations.

The intensity of participation in an organization is defined as the total number of memberships in various organizations held by household members. The intensity of participation in social networks is defined as the number of trusted friends to whom the household can talk closely or approach for any problem or with whom the household can freely share a family secret. This definition of a social network excludes relatives because they constitute a 'given' social capital whose formation may be beyond the influence of the decision maker (Wintrobe 1995).

The explanatory variables, their mean values and the hypothesized signs are presented in Table 2.

Table 2: Definitions of explanatory variables, hypothesized signs and summary statistics

Variable	Variable description	Expected sign	Mean	SD
Age	Number of years of age of the household head	-	49.87	15.412
Consumer worker ratio	Continuous ratio computed as the total number of household members aged 15 years and below and those aged above 64 years divided by the number of household members aged between 15 and 65	+/-	1.627	1.702
Gender	Gender of the household head = 1 if household head is male and 0 if female	+/-	0.74	0.440
Education	Number of years of schooling of the household head	+	5.580	4.350
Wealth index	A continuous index generated as latent variable from wealth factors (i.e. livestock capital, landholding and household consumer durable goods) using principal component	+	2.2e-09	1.107
Social status	A dummy = 1 if the household head either a village leader, sub-county/parish chief, from a royal family /clan head, church leader or a member of any community development committee	+	0.25	0.435
Farm production orientation	A dummy = 1 if the household head is primarily employed on farm and 0 if the household head is primarily employed off-farm	+/-	0.660	0.470
Relatives	Number of relatives the household members can talk to freely and approach for help in case of any problem	+/-	4.670	5.780
Duration in the village	Number of years the household has resided in the village	+	31.960	16.190
Distance to post office	Distance in km from the homestead to the nearest post office	+/-	1.420	2.390
Distance to road	Distance in km from the village centre to the nearest paved road	+/-	8.12	6.328
Economic fragment ation	Continuous index measuring the degree of economic fragmentation in the village	+/-	0.471	0.115
Ethnic fragment ation	Continuous index measuring the degree of ethnic fragmentation in the village	+/-	0.484	0.135
Extension contact	Average number of extension contacts within a village	+	1.620	0.742
Social institutions	An index of the number of times the household participates in marketplaces, festivals, drinking clubs, school open days, village activities and prayer meetings in a year	+	53.502	48.733

Since decisions on participation in an organization/social network and accumulating household assets (i.e. landholding and livestock) may be made simultaneously, household asset variables from the 2001 household survey data were used as regressors in the equations for social capital accumulation to control for endogeneity

of the wealth variables in social capital formation. Information on household assets obtained from the 2001 dataset included physical livestock units, landholding and the value of other household assets (i.e. furniture, radios, bicycles and motor bikes). Because of the small sample size and hence the need to save on the degrees of freedom, all the wealth assets were reduced to one variable using a factor analysis method.[3]

The data show that the majority of memberships in organizations/social networks reported were acquired after 2001. The exact reason for this could not be established from the data. However, as noted by Meinzen-Dick et al. (2004), collective action can be a one-off event or a process depending on the objectives. Thus, it is possible that self-help organizations in the study area are formed for specific purposes and dissolve once the purpose has been achieved.

The initial endowment of social capital was represented by the duration of residence in the community, measured as the number of years the household has lived continuously in the village. The duration of residence in the community indicates the length of time the household has had to make friends. The number of relatives household members talk to closely and can rely on in times of need is also included as a measure of social capital endowment. The distance from the homestead to the nearest post office and the distance from the village to the nearest paved road represent access to communication facilities and the remoteness of the area in which the farmer lives.

Social heterogeneity was represented by a continuous index measuring the degree of ethnic[4] fragmentation and was computed, following La Ferrara (2002), as

$$F_j = 1 - \sum \phi_{hj}^{\,2};\ h = 1,...h_j, \qquad (3)$$

where ϕ_{hj} is the share of respondents in village j who belong to the ethnic group h, and in each village there are h_j number of different ethnic groups. The index represents the probability that two individuals drawn from the same village belong to different ethnic groups. The village economic fragmentation index was computed in the same way as the ethnic fragmentation index, where h represents occupation. The index of economic fragmentation represents the probability that two individuals drawn from the same village have different occupations.

The level of extension services and social institutions in the village represents the institutional environment in the analysis. The level of extension services was computed as the average number of contacts with extension agents within a village. The level of social institutions is measured as the total number of times a household head participated in marketplaces, festivals, drinking clubs, school open days, village activities and prayer meetings in the year prior to the interviews. The extension and

[3] A principal components factor method with Varimax rotation in STATA 8.0 was used.
[4] The concept of ethnicity is used here to refer to a social group of people with a shared tribal affiliation based on patrilineal descent.

ethnic fragmentation also served as instrumental variables for the organizations in the accumulation of social network. We expected extension and ethnic fragmentation to affect the participation in organizations but to have no direct impact on the accumulation of social networks.

4. Results and discussion

4.1 Description of local organizations and social networks

Compared to other major banana producing areas in Uganda, membership in rural organizations in the central region, the study area, is low (Katungi 2006) and much lower for organizations with purely social motives (cultural, religious, sports or choirs). About 55% of the surveyed households had membership in at least one organization (see Table 3).

Table 3: Proportion of households belonging to organizations in the study area

	of households
At least one organization	54.73
Economically oriented organizations	47.95
Informal credit	14.58
Formal credit	13.58
Agricultural	19.79
Social organization (burial, religious and culture based)	32.34
Burial societies	16.67
Religion based	11.46
Culture based	4.21

Economically oriented organizations were the most popular, with 38% of the households participating in them, followed by social organizations, with 32% participating. Overall, most organizations require their members to pay membership fees or contribute resources, or both. This is the only requirement for households to join the organizations but may prevent poorer households from participating.

Ugandan rural households also belong to social networks, which are less formal than organizations. Such networks have been studied as a possible mechanism for risk smoothing (Fafchamps & Lund 2003) and are thus important for rural households. Nearly every household had at least one friend. To gain an insight into the resource endowments of the social networks maintained by rural households, the household's social network was divided into categories based on the major activity of the network members, in decreasing order of importance, as: (a) formal employment, if the individual was in teaching, political or religious leadership,[5] (b) trade, if the

[5] The least qualification for this category was political leadership or religious leadership at LC11 (parish level). Teachers at primary schools and above were included.

individual was in agricultural or non-agricultural trade as the main activity, and (c) farming, if the individual was in crop farming and cattle keeping. In rural parts of Uganda the main activity is often positively correlated with resource endowment. Individuals in formal employment are expected to be relatively more resource endowed.

4.2 Factors affecting the probability that a household belongs to an organization

Table 4 presents results on the probability of membership in at least one organization and in specific organizations[6] (social, revolving saving and credit, and agricultural).

Table 4: Probit estimates of the factors influencing membership in organizations (Standard errors in parentheses)

	Marginal effects			
Variable	**Social organization**	**Agriculture oriented organization**	**At least one organization**	**Revolving saving and credit organization**
Age household head	-0.008*	0.001	-0.009*	-0.002
	(0.004)	(0.003)	(0.005)	(0.002)
Consumer : worker ratio	0.056*	0.035**	0.028	-0.001
	(0.032)	(0.019)	(0.041)	0.013)
Gender household head	-0.205	0.063	-0.188	-0.163*
	(0.155)	(0.067)	(0.134)	(0.129)
Education household head	-0.019	0.018*	-0.002	0.016***
	(0.014)	(0.010)	(0.018)	(0.010)
Wealth index	0.150***	-0.013	0.256***	0.027*
	(0.055)	(0.032)	(0.099)	(0.021)
Social status	0.479***	0.069	0.559***	-0.014
	(0.164)	(0.107)	(0.090)	(.093)
Farm production orientation	0.241**	0.162**	-0.087	0.046
	(0.094)	(0.063)	(0.140)	(0.039)
Number of relatives	-0.002	0.024***	0.015	0.000
	(0.010)	(0.009)	(0.017)	(0.002)
Duration of residence in the village	0.103	-0.058	0.114	0.019
	(0.187)	(0.120)	(0.237)	(0.060)
Distance from home to nearest post office	-0.011	0.008	-0.023	0.078***
	(0.028)	(0.016)	(0.041)	(0.054)
Distance from village to nearest paved road	0.016	-0.004	0.001	0.001
	(0.012)	(0.008)	(0.017)	(.009)
Economic fragmentation	1.456**	-0.277	0.672	0.037*
	(0.619)	(0.463)	(0.72)	(0.031)
Ethnic fragmentation	1.727***	-0.513*	0.966*	0.046
	(0.489)	(0.264)	(0.503)	(0.170)
Observed probability	0.305	0.179	0.564	0.207
Predicted probability	0.222	0.089	0.658	0.096
Number of observations	95.000	95.000	94.000	94.000
LR chi2 (13)	35.710	32.090	48.600	28.550
Probability > chi2	0.001	0.002	0.000	0.003
Pseudo R2	0.306	0.360	0.377	0.341
Log likelihood =	-40.592	-28.586	-40.087	-27.575

*** Significant at 1% ** significant at 5% * significant at 10%

[6] In rural areas, the functions (social or economic) of an organization may overlap. Here, categorization of organizations is based on the organization's dominant activity.

The estimates presented are the marginal effects, measuring the change in the probability of membership in an organization for a given change in the explanatory variables computed at the mean values.

The possibility of omitted variable bias was checked and the results were found to be robust.[7] Omitted variable bias was tested by including other possible determinants of participation in organizations/social networks in the estimation. A dummy variable computed from the answer to the question about the willingness to spend time on or contribute money to a community project even when the benefits to the individual were not visible was used as a proxy of whether the household was outgoing or not.

Both household characteristics and village attributes are important determinants of the probability that a household belongs to organizations but the effects are specific to the organization.

4.3 Household characteristics

The age of the household head is negatively associated with membership in social organizations, perhaps because older people discount the future heavily. This result is consistent with the findings of other studies (Alesina & La Ferrara 2000; Haddad & Maluccio 2003; Godquin & Quisumbing 2005).

The consumer : worker ratio is positively associated with the probability that a household belongs to agricultural and social organizations. In the world of imperfect markets, the consumer : worker ratio may capture the household consumption demand or the risks of starvation. Households with a higher consumer : worker ratio may join agricultural organizations to obtain more information so as to increase their agricultural productivity. Given their higher risk of starvation, households with a higher consumer : worker ratio may demand more social insurance and hence join social organizations. Since the contribution to social groups is not based on the number of dependants, larger households find it more advantageous to join.

Household wealth is a more important factor associated with the decision to participate in at least one organization. Wealthier households are more likely to join at least one organization than poorer households. Household wealth is also positively associated with membership in social and informal credit organizations. The positive association between household wealth and social organizations disappears when burial societies are excluded from social organizations. The implication is that the effect of wealth on the household participation in social organizations derives largely from the higher propensity of households to participate in these societies. Since burial societies require their members to contribute resources, the budget constraint may limit the participation of poorer households. Godquin and Quisumbing (2005) also found that wealthier households in the Philippine communities were more likely to participate in burial societies. The positive correlation between household wealth and participation in informal credit organizations may imply that credit in rural areas is a normal good.

[7] The adjusted R^2 in the first stage regression is 0.352, the first stage F-statistics is 3.81 and its P-value is 0.000.

Households headed by better educated individuals are more likely to join economically oriented organizations, perhaps because of the higher productivity of these organizations when an individual is better educated. Better educated individuals may also join agricultural organizations because they are more targeted in rural interventions, most of which use a group based approach, than less educated ones. Education also enhances trust in others and hence the willingness to participate in organizations of a sensitive nature (Alesina & La Ferrara 2002; Haddad & Maluccio 2003; Godquin & Quisumbing 2005).

After controlling for household wealth assets and educational attainment, the results also indicate that people with a higher social status in the community are more likely to belong to at least one organization besides social ones. There are two possible explanations for this result. First, individuals with a high social status in the community may have a greater demand for social interactions to maintain their social position in the community. Second, individuals with a high social status may be persuaded to join community organizations because people like to be identified with them, suggesting the positive impact of supply-side factors on participation in organizations.

Production orientation is only important for membership in social and agricultural organizations. As expected, households headed by full-time farmers are likely to join agricultural organizations. This could be interpreted as meaning that the benefits derived from membership in agricultural organizations are greater for households that derive their livelihoods primarily from agriculture. An alternative interpretation is that full-time farmers are more likely to be targeted by extension workers than part-time farmers in non-farm jobs. The high propensity of households that are primarily employed in farming to have membership in social organizations can be explained in the same way as the consumer : worker ratio. The high uncertainty that characterizes agriculture may stimulate a higher demand for social insurance by these households. An alternative explanation is that these households have a lower opportunity cost of time than those with members employed in off-farm activities.

Households located in villages far from a post office, with implicitly poor physical access to markets and communication infrastructure, are more likely to participate in informal credit and savings organizations. This may be attributed to the higher transaction costs of using services from formal credit institutions for isolated households. Infrastructure development and remoteness were not statistically significant determinants of participation in other organizations.

4.4 Initial social capital endowments

The number of relatives interacting with the household has a positive and significant association with the decision to join an agricultural organization. The number of relatives may reduce the aversion to risk and hence increase the household's willingness to participate in organizations of whose benefits it is less sure. Households that interact closely with more relatives are also likely to be better informed about the benefits of participating in organizations. Besides being better informed, individuals are likely to persuade their relatives to join organizations/social networks of which they are members.

4.5 Village social and economic heterogeneity

The effect of village economic and social heterogeneity was ambiguous and organization specific. The results show that households in villages with high ethnic heterogeneity are likely to join social organizations but less likely to join agricultural ones. Since organizations included as social organizations are likely to be guided by social norms, this result can be interpreted as meaning that an increase in ethnic heterogeneity induces the population to stratify into homogeneous social groups, thereby increasing the overall participation rate in social organizations. Unlike in other parts of the country, burial societies in the Central region, from which the data for this study was collected, are organized as small social networks rather than on a village level. A similar explanation may be given for the positive correlation between village heterogeneity in terms of economic activities and the probability of participation in informal credit and social organizations. The negative correlation between ethnic heterogeneity and membership in agricultural organizations probably reflects the differences in social norms and communication difficulties associated with social heterogeneity. While social organizations may form as small homogeneous ethnic groups, the benefits in the form of information about new technologies and methods of farming from agricultural organizations may become fewer when such organizations are homogeneous.

4.6 Household social capital intensity

An ordered probit model was used to estimate the intensity of household membership in organizations. A negative binomial model was used to analyze the factors that influence the entire size of the social networks and the number of links a household has with individuals in off-farm employment, (i.e. resource endowed social networks). The results of the estimation are presented in Tables 5 and 6. Models 2 and 4 were estimated to test for the interaction between the intensity of social networks and that of organizations by including the number of different types of organizations a household is a member of, as an explanatory variable in the total number of friends and the number of friends engaged in off-farm activities respectively. Models 1 and 3 exclude the interaction effect. In each case, the chi-square value is significant at one percent, implying that the explanatory variables taken together influence social capital intensity. The significance of the likelihood ratio statistic (P-value of less than 0.001) supports the decision to use the negative binomial instead of the Poisson model.

Table 5: Ordered probit estimates of the determinants of household membership in different organizations (Standard errors in parentheses)

Variable	Coefficients	Std err	z	P>z
Age household head	-0.027**	0.011	-2.42	0.015
Consumer : worker ratio	0.078	0.0829	0.94	0.346
Gender household head	-0.256	0.3587	-0.71	0.475
Education household head	0.018	0.0371	0.48	0.629
Wealth index	0.206*	0.1246	1.65	0.099
Social status	0.684**	0.3549	1.93	0.054
Farm production orientation	0.255	0.3232	0.79	0.431
Number of relatives	0.062**	0.0312	2.00	0.046
Duration of residence in the village	-0.374	0.4711	-0.79	0.427
Distance from homestead to nearest post office	0.011	0.0659	0.16	0.872
Distance from village to nearest paved road	-0.062	0.0498	-1.24	0.216
Economic fragmentation	0.679	1.6955	0.4	0.689
Ethnic fragmentation	3.353**	1.5219	2.2	0.028
Village extension	0.839*	0.4421	1.9	0.058
Number of observations	93.000			
LR chi2 (15)	48.630			
Probability > chi2	0.000			
Pseudo R2	0.202			
Log likelihood	-96.335			

** Significant at 5% * significant at 10%

Table 6: Negative binomial regression of the factors affecting the intensity of 'acquired' social networks at household level (Standard errors in parentheses)

	Number of friends		Number of friends in off-farm employment	
Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Age household head	-0.001	0.001	0.004	0.009
	(0.005)	(0.005)	(0.006)	(0.005)
Consumer : worker ratio	-0.013	-0.020	0.043	0.021
	(0.043)	(0.043)	(0.049)	(0.045)
Gender household head	0.211	0.328*	0.431**	0.492***
	(0.173)	(0.178)	(0.199)	(0.188)
Education household head	0.066***	0.069***	0.077***	0.069***
	(0.018)	(0.019)	(0.022)	(0.020)
Wealth index	-0.113*	-0.134	-0.187	-0.192***
	(0.065)	(0.065)	(0.076)	(0.07)
Social status	0.292*	0.234	0.257	0.081
	(0.177)	(0.181)	(0.205)	(0.190)
Farm production orientation	0.014	0.040	0.237	0.104
	(0.156)	(0.170)	(0.185)	(0.174)
Number of relatives	0.005	-0.004	0.023	0.000
	(0.013)	(0.015)	(0.015)	(0.015)
Duration of residence in the village	-0.025	-0.019	-0.420	-0.257
	(0.240)	(0239)	(0.267)	(0.244)
Distance from homestead to nearest post office	-0.008	-0.002	-0.119	-0.152*
	(0.028)	(0.028)	(0.075)	(0.088)
Distance from village to nearest paved road	0.041***	0.041***	0.026	0.032*
	(0.015)	(0.015)	(0.018)	(0.017)
Economic fragmentation	-0.689	-0.454	-0.202	-0.185
	(0.873)	(0.875)	(0.985)	(0.92)
Social institutions	0.004*	0.003	0.002	0.001
	(0.002)	(0.002)	(0.003)	(0.002)
Number of different types of organizations		0.125*		0.203***
		(0.067)		(0.068)
	1.996	1.670**	1.227	0.969
Constant	(0.760)	(0.779)	(0.836)	(0.784)
			-1.045	-1.325
lnalpha	-1.248	-1.297	(0.211)	(0.230)
			0.352	0.266
Alpha	0.287	0.273	(0.743)	(0.061)
Likelihood-ratio test of alpha = 0, Chi sq (01)	238.83	220.090	141.78	96.1
Prob chibar2(01)	0.000	0.000	0.000	0
Number of observations	93	91.000	94	92
LR chi2(14)	70.45	74.290	57.15	66.4
Prob > chi2	0	0.000	0	0
Pseudo R2	0.0948	0.102	0.0886	0.105
Log likelihood =	-336.423	-326.670	-293.8388	-283.162

*** Significant at 1% ** significant at 5% * significant at 10%

Interesting relationships emerge from the analysis. First, different factors influence different dimensions of social capital, with only the initial social capital cutting across all these dimensions. Second, fewer variables influence the size of social networks than those influencing their quality. Godquin and Quisumbing (2005) also reported few significant variables in their estimation of the determinants of social networks, despite using a larger sample size. Household characteristics emerge as more important determinants of household level social capital intensity than village characteristics. While village social and economic heterogeneity plays a role in influencing participation in organizations, it seems to be unimportant in the accumulation of social networks (i.e. less institutionalized networks).

4.7 Household characteristics

The age of the household head reduces the intensity of membership but not the accumulation of social networks. Older as well as younger household heads accumulate social networks equally, perhaps because of their important role in consumption smoothing (Fafchamps & Lund 2003). Households with a higher consumer : worker ratio are likely to join more organizations, probably because of their relatively high risk of starvation.

An interesting difference was also observed with regard to gender. Male-headed households appear to make more friendships in general and maintain more links with individuals in off-farm activities than female-headed households. Female household heads may experience more barriers than their male counterparts to acquiring this type of social capital.

Wealthier households are more likely to belong to more organizations than poorer ones. This may be because the wealthier ones derive more benefits from or face fewer barriers to participation in organizations. On the other hand, there is a negative relationship between household wealth and the household's number of friends and its links with individuals in off-farm employment. This could imply that wealthier farmers derive more benefits from social links with fellow farmers for information exchange or with poorer households who may use labour in reciprocal exchange. Households headed by people of a higher social status in the community are also more likely to accumulate more social capital of all kinds, perhaps owing to complementary demand- and supply-side effects.

As expected, the coefficient for education has a positive sign in all social capital intensity models, though it is significant in only the accumulation of social networks. Education increases the number of friends in off-farm employment, implicitly with more resource endowments, as well as the size of the social networks. Since formal employment considered in this study is likely to attract better educated individuals, the results imply that education encourages the formation of horizontal networks. Education increases the ability to acquire information (Schultz 1975) and enhances trust in others (Alesina & La Ferrara 2002).

4.8 Social capital endowment

The number of relatives is positively associated with the household's propensity to accumulate organizational capital. However, the number of years a household has lived in the village was not statistically significant in any of the social capital intensity equations.

4.9 Village characteristics

The remoteness of the village is negatively associated with the number of links with people in off-farm activities. Remote households may incur higher costs in interacting with individuals employed in off-farm activities owing to poor communication facilities. The distance from the village to the nearest paved road is positively associated with the intensity of social networks. Considered together, these results suggest that households in remote villages are likely to compensate for their fewer links with resource-endowed individuals by making and maintaining many friends in their villages. Ethnic heterogeneity is positively associated with participation in organizations because the population is likely to stratify into homogeneous groups. The institutional environment (represented by the presence of agricultural extension services in the village) and the number of organizations a household belongs to are also positively related.

4.10 Interaction between social networks and organizations

The results indicate that, after controlling for the hypothesized household and village determinants of participation in organizations and social networks, there is a positive and significant interaction between social networks and organizations, suggesting that the two forms of social capital complement each other. The number of groups increases the total number of friends and the links with persons in off-farm activities.

A two-stage least squares (2SLS) regression method, in which the number of different organizations to which a household belonged was treated as endogenous in the accumulation of social networks, was considered. Table 7 presents the results from the two-stage least squares regressions of the total number of networks to which a household belongs, and the number of persons in off-farm activities in direct bilateral relationships with the household.

Table 7: Two-stage least squares regression of effect of number of memberships in different types of organizations on the number of friends in off-farm activities

	First stage regression of the number of memberships in different types of organizations on all variables			Number of friends in off-farm employment		
Variables	**Coefficient**	**Std err.**	**t-value**	**Coefficient**	**Std err.**	**t-value**
Number of memberships in different types of organizations				4.929*	2.623	1.88
Age household head	-0.017**	0.008	-2.070	0.121*	0.070	1.72
Consumer : worker ratio	0.032	0.071	0.450	-0.087	0.513	-0.17
Gender household head	-0.172	0.286	-0.600	4.236*	2.174	1.95
Education household head	0.006	0.032	0.170	0.707***	0.234	3.03
Wealth index	0.111	0.109	1.010	-1.994**	0.844	-2.36
Social status	0.605*	0.322	1.880	0.863	2.632	0.33
Farm production orientation	0.377	0.272	1.390	1.214	2.121	0.57
Number of relatives	0.086***	0.023	3.780	-0.072	0.261	-0.28
Duration of residence in the village	-0.471	0.393	-1.200	-1.969	3.031	-0.65
Distance from homestead to nearest post office	-0.005	0.048	-0.090	-0.350	0.352	-0.99
Distance from village to nearest paved road	-0.057	0.046	-1.230	0.244	0.187	1.30
Social institutions	0.010**	0.005	2.160	-0.013	0.031	-0.40
Economic fragmentation	-0.376	1.468	-0.260	-9.938	9.466	-1.05
Village extension	0.808**	0.403	2.000			
Ethnic fragmentation	2.629**	1.281	2.050			
Constant	-0.692	1.481	-0.470	-0.816	8.410	-0.1
Number of observations	92.000			92.000		
F(18, 73)	3.750			5.270		
Probability > F	0.000			0.000		
R^2	0.4802			0.515		
Adj R^2	0.3521			0.419		

*** Significant at 1% ** significant at 5% * significant at 10%

The coefficient for the number of different organizations to which a household belongs is 4.929, slightly higher than the one obtained without instruments, with a standard error of 2.623. The qualitative results are slightly stronger without instruments. A Durbin Wu Hausman test was applied to test the null hypotheses of weak exogeneity of the number of organization types in the accumulation of household linkages with individuals in off-farm activities. We failed to reject the null hypothesis (p-value = 0.331). According to the Sargan test of over-identification, our instruments are valid (p-value = 0.725). This suggests that our concerns about the reverse causation are not warranted empirically.

5. Conclusions and policy implications

The Ugandan economy is characterized by various market imperfections and formal institutional constraints, underscoring the importance of local organizations and social networks for economic development. This paper analyzes (a) the determinants of rural households' membership in local organizations and social networks, and (b) the interaction between the two types of social capital derived from organizations and social networks. By disaggregating local organizations by type and social networks according to the major activity of social network members, more insight is provided into disparities in the accumulation and access to social capital among Ugandan rural households. The paper is the first of its kind to provide in-depth analysis of social capital formation in Uganda.

The research results support the initial premise that access to social capital in Uganda's rural areas is not universal. Different household characteristics influence different dimensions of social capital. Wealth and age are the most important determinants of participation in at least one organization. Household wealth positively influences the probability of participation in at least one organization, socially oriented organizations and credit organizations, but does not seem to affect the decisions about membership of agricultural organizations. Since most of the credit organizations required payment of membership fees or contribution of material resources, poor households may be unable to participate in such organizations. Agricultural organizations do not require payment of membership fees, which makes household wealth an unimportant determinant of participation in these organizations. However, there could be biases resulting from the recent interventions to revive banana productivity in the study area that explicitly required all income categories to be represented in the project organizations.[9] Wealth also reduces the propensity to accumulate social networks and interact with individuals in off-farm employment.

Membership in organizations is also positively affected by education. Gender disparities in social capital accumulation are also evident, with men being likely to have more friends and to form more links with individuals in off-farm employment than women. It can therefore be concluded that male- and female-headed households in rural areas of Uganda accumulate social capital differently.

The research findings also indicate that a network of relatives is an important source of organizational capital but not social network capital. This is because access to a network of relatives generates positive externalities such as trust and reduces risk aversion, encouraging participation in organizations. The results of the study support the expectation that social networks and organizations complement each other, possibly because both organizations and social networks generate trust, which increases the propensity to invest in social capital. This finding further supports the findings of other studies that social capital is self-reinforcing.

The social and economic heterogeneity of a village also plays a role in social capital accumulation. Economic and ethnic fragmentation is important in determining

[9] One of the farmer selection criteria for the project on reviving banana productivity in central Uganda, in which the first author participated, was that all categories of farmers be represented in the sample. This project used group-based approaches.

whether a household participates in an organization. However, differences in social norms associated with ethnic fragmentation tend to discourage participation in agricultural organizations. Ethnic fragmentation also increases the overall number of organizations a household participates in. The results of the study also suggest that village homogeneity is not important in the accumulation of social networks.

The research results have several policy implications. The positive effect of wealth and education on participation in organizations poses policy challenges for interventions that use grassroots organizations for local development, given that the majority of the rural people are poor and have lower levels of formal education. Thus, there is a need to design strategies that encourage poor households and those with low levels of formal education to participate in local organizations.

The research findings also have important policy implications in favor of group based approaches to agricultural extension. While household wealth is important for most organizations, it is not important for membership in agricultural organizations. This implies that participation in these organizations is wealth neutral. Thus, promoting agricultural organizations is less likely to isolate the poor. However, there is a need to sensitize the masses with the aim of making them aware of their mutual interdependence so as to reduce the biases created by formal education in decisions regarding participation in agricultural organizations. In addition, most of the agricultural organizations were externally initiated and more research is needed to understand whether their income neutrality holds without external influence.

The relatively low participation rate in various organizations also means that incentives to and constraints on participation in organizations are likely to be specific to the organization. This implies that while organizations may exist in the village, their contribution to collective action for improved community welfare may be limited if people are divided into small groups. Hence there is a need to encourage organizations with diversified activities while minimizing the barriers to participation so as to increase community representation in each organization. This is also important for information pooling and diffusion in the community, which are necessary for the success of group based agricultural extension approaches.

The study also shows that an increase in ethnic fragmentation is likely to reduce the propensity to participate in agricultural organizations. This implies that group based approaches may not be a viable strategy for disseminating technologies in communities with a high degree of ethnic heterogeneity such as those found in some parts of central Uganda. The same implication can be drawn for the case of communities dominated by households with an off-farm production orientation.

The positive interaction between social networks and the accumulation of social capital suggests that group based approaches should be encouraged not only for their role in collective action but also for their positive externalities in strengthening community networking. Finally, if men and women accumulate different types of social capital, strategies that link the two social groups may have a greater impact on information diffusion and thus improve the effectiveness of group based extension approaches.

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