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CAPRI Working Paper No. 55 • OCTOBER 2006

Groups, Networks, and Social Capital in the Philippine Communities

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**International Research Workshop on 'Gender and Collective Action'
October 17-21, 2005 • Chiang Mai, Thailand**

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ABSTRACT

This paper explores the determinants of group membership and social networks of rural households using a unique longitudinal data set from the rural Philippines. We investigate two types of social capital: membership in groups (production, credit, burial, religious and civic groups), or “formal” social capital, and size of trust-based networks or “informal” social capital. Because men and women may have different propensities to invest in social capital, we analyze the determinants of group membership both at the household level and for men and women separately. We also disaggregate the analysis by type of group. The paper examines the determinants of the density of social capital, proxied by the number of groups and the number of network members. Finally, it explores various reasons why people might join groups—whether groups increase trust, or whether groups increase well-being, as proxied by per capita expenditure. We find that asset-rich, better-educated households and households living closer to town centers are more likely to participate in groups and to have larger social and economic assistance networks. Different aspects of village-level heterogeneity have different impacts on group membership, and greater exposure to shocks and a higher incidence of peace and order problems increase group membership. Men and women do not differ significantly in the number of groups they join, however, there are clear gender differences in the types of groups to which men and women belong. We also find that group membership does not, in general, increase network density and we do not find evidence of positive returns to group membership in terms of increased per capita expenditures.

Keywords: Groups, Network, Social capital, Gender, Philippines, Asia

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INTRODUCTION

This paper explores the determinants of group membership and social networks of rural households using a unique longitudinal data set from the rural Philippines. We investigate two types of social capital: membership in groups (production, credit, burial, religious and civic groups), or “formal” social capital, and size of trust-based networks or “informal” social capital. Because men and women may have different propensities to invest in social capital, we analyze the determinants of group membership both at the household level and for men and women separately. We also disaggregate the analysis by type of group. The paper examines the determinants of the density of social capital, proxied by the number of groups and the number of network members. Finally, it explores various reasons why people might join groups—whether groups increase trust, or whether groups increase well-being, as proxied by per capita expenditure. We find that asset-rich, better-educated households and households living closer to town centers are more likely to participate in groups and to have larger social and economic assistance networks. Different aspects of village-level heterogeneity have different impacts on group membership, and greater exposure

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to shocks and a higher incidence of peace and order problems increase group membership. Men and women do not differ significantly in the number of groups they join, however, there are clear gender differences in the types of groups to which men and women belong. We also find that group membership does not, in general, increase network density and we do not find evidence of positive returns to group membership in terms of increased per capita expenditures.

Formal membership in groups has increasingly been promoted as a way for the asset-poor to invest in another type of asset—social capital. Defined by Putnam (1995) as “features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation,” social capital has attracted much attention from development practitioners, especially in grassroots participation and empowerment efforts. International organizations, governments, and nongovernmental organizations (NGOs) have enthusiastically embraced the concept as an alternative to government or market-based approaches, with the World Bank hailing it as “the missing link” in development (Dikito-Wachtmeister 2001). Working through groups also reduces the cost of delivering services to many individuals, making the outreach of programs more cost-effective. While Narayan (1999) emphasizes the “social” aspects of social capital, various studies (e.g. Narayan and Pritchett 1999; Maluccio et al. 2000; Haddad and Maluccio 2003) have emphasized its “capital”-like qualities by demonstrating the positive impact of social capital on measures of household welfare such as per capita household consumption or income.

Participation in groups is a commonly used indicator of social capital, although there are, of course, many alternative definitions (see the survey by Durlauf and Fafchamps 2004;

and Haddad and Maluccio 2003). One reason behind development practitioners' interest in social capital as an asset for the poor is the perception that it is relatively costless to acquire, unlike other assets such as land. However, the poor may face barriers to participation in groups. Participation in groups is not costless—networking takes time, especially when formal group meetings are required, and many groups require fees to participate. Individuals with less education may feel intimidated about speaking up in a group, especially groups with better-educated and higher-status members. Social inequality and ethnic differences may also create barriers to social capital accumulation. Alesina and La Ferrara (2000) demonstrate, using data from the United States, that after controlling for individual characteristics, participation in social activities is significantly lower in more unequal and in more racially or ethnically fragmented localities.

Among possible barriers to acquiring social capital, gender differences are of special concern to development practitioners, who view social capital as a means for empowering women. In societies where women are disadvantaged in acquiring assets, participation in groups, particularly credit groups, has been touted as a collateral substitute. However, women in poor households face particularly serious time constraints because of their various livelihood activities and childcare responsibilities. Membership fees may create a further barrier to participation by poor women, who have limited control over cash resources. Although both men and women with low levels of education may feel awkward about participating in groups, the fear that they will be perceived as “ignorant” or as having nothing to contribute may be more acute for women when cultural norms discourage women from speaking up in public or from socializing with men. Thus, women may decide that it is not

worth their time and effort to participate in group meetings if they believe they will not be heard (Dikito-Wachtmeister 2001)

Households and individuals may also invest in other forms of social capital that are less formal than membership in groups. Informal social networks have attracted attention as a possible mechanism for risk-smoothing (Fafchamps and Lund 2003; Hoddinott et al. 2005; Fafchamps and Gubert 2004), although recent evidence from the Cordillera region of the Philippines suggests that pre-existing personal relationships, rather than risk-pooling, motivates network formation (Fafchamps and Gubert 2004). In the Cordillera study, interpersonal relationships are strongly correlated with geographic proximity, and only weakly related with diversification against risk, except in the case of health risk.

This paper is an initial exploration into group membership and social networks of rural households using a unique longitudinal data set from the rural Philippines. Findings from this study will be used to design a qualitative study on the role of collective action in coping with risk. The Bukidnon Panel Study follows up 510 families in rural Mindanao who were first interviewed in 1984/85 by the International Food Policy Research Institute and the Research Institute for Mindanao Culture, Xavier University, as well as a sample of their offspring living in the same area and those who have moved to a different location. Parents (original respondents) and a subsample of up to two children who formed separate households in the same locality were interviewed in 2003; migrants to rural and urban areas were interviewed in 2004. The analysis in this paper is restricted to original respondents who were interviewed in both 1984/85 and 2003. This will allow us to make appropriate correction for sample attrition

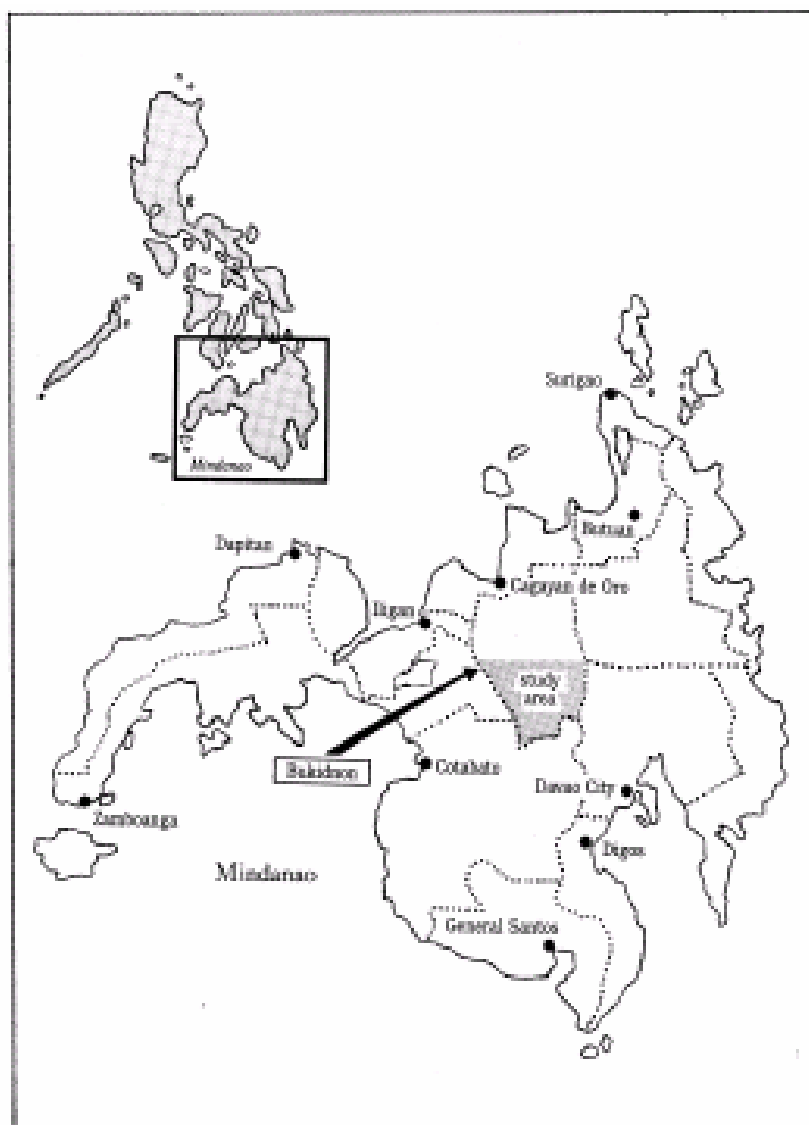
taking into account the 1984 sample design and to use lagged variables from 1984 as instruments for current participation in groups.

Because Mindanao is the Philippines' poorest region, and because asset inequality and ethnic conflict contribute to civil unrest in that region, we pay close attention to the role of asset and other inequality as possible barriers to the accumulation of social capital. We investigate two types of social capital: membership in groups, or "formal" social capital, and size of trust-based networks or "informal" social capital. The data contain information on the kinds of groups that households belong to and the number of people that a household can run to for various matters (their social networks). Because men and women may have different propensities to invest in social capital, we also analyze the determinants of group membership at the household and the individual levels. The paper also examines the determinants of the density of social capital, proxied by the number of groups and the number of network members. Finally, it explores various reasons why people might join groups—whether groups increase trust, or whether groups increase well-being, as proxied by per capita expenditure.

Bukidnon is a landlocked province in Northern Mindanao, comprising 20 municipalities and two cities, Malaybalay and Valencia. Bukidnon has a land area of 829,378 hectares, making it the largest province in Northern Mindanao and the eighth largest in the Philippines. The 2000 census reported that Bukidnon's population was about 1,059,355—split about 70 percent to 30 percent between rural and urban areas based on the 1995 census—and had an average population density of 128 people per square kilometer. The national highway links Bukidnon to its neighboring provinces while the Sayre Highway links Bukidnon to Misamis Oriental and North Cotabato. The Bukidnon–Davao road links the province to Lanao

del Sur and North Cotabato. Inter-provincial travel is mainly by bus while inter-municipality and *barangay* travel is by public utility vehicles.³ Since Bukidnon is landlocked, it relies on Cagayan de Oro, the major metropolitan center in Northern Mindanao, as its nearest seaport. Figure 1 shows a map of the Philippines and the location of the study area.

³ The *barangay* is the smallest political unit in the Philippine government, and is similar to a village. We use village and *barangay* interchangeably in this paper.

Figure A1—Map of the Philippines, indicating study area

The data used in this analysis draws from a survey of households conducted by the International Food Policy Research Institute (IFPRI) and the Research Institute for Mindanao Culture, Xavier University (RIMCU) in southern Bukidnon. The original survey from which our sample is derived was designed to investigate the effects of agricultural commercialization on nutrition and household welfare. In 1977, the Bukidnon Sugar

Company (BUSCO) began operating a sugar mill in the area, which had previously been dominated by subsistence corn production. The presence of the mill gave farmers the opportunity to adopt this cash crop, depending on their proximity to the mill. The survey was fielded in four rounds at four-month intervals from August 1984 to December 1985, so that rounds one and four cover the same season. The survey contains information on food and non-food consumption expenditure, agricultural production, income, asset ownership, credit use, anthropometry and morbidity, education and 24-hour food consumption recall. The sample was drawn from 29 *barangays* and was stratified by (i) agricultural production activities, particularly sugar (the cash crop) and corn (the food crop), (ii) proximity to the sugar mill (as a proxy for access to the new crop), and (iii) access to land, including ownership, tenancy and landlessness. The initial sample included 510 households, and 448 households were interviewed in all four rounds. Bouis and Haddad (1990) provide a detailed description of the sample design and survey area. In 1992, 352 of the original 448 households were reinterviewed in a study focusing on adolescents (Bouis et al. 1998). The 1992 survey included only one round of data collection and used a condensed survey instrument.

Following qualitative studies conducted in the study communities in early 2003, IFPRI and RIMCU returned to conduct two rounds of quantitative data collection using a survey questionnaire that closely reflects the one used in 1984/85. Both authors were involved in the design and pretesting of the 2003/2004 survey questionnaires.⁴ In the first wave of data collection in the fall of 2003, all original respondents still living in the survey area were interviewed, as were up to two of their children (randomly selected) that formed households

⁴ We pretested the questionnaire in villages that were similar to the survey sites, but we avoided pretesting with our sample respondents, to avoid contamination of the results.

in the survey area. The first wave yielded 311 original respondents (61 percent of the original respondents) and 261 households formed by non-coresident children living in the same villages as their parents. The second wave of data collection began in April 2004 and ended in July 2004. In this wave, the survey team interviewed any household formed by children who no longer live in the survey area, based on addresses and phone numbers provided by the original respondents and other family members. This includes a large group of households in three major urban areas in Mindanao (Valencia, the commercial center of Bukidnon, Malaybalay, the provincial capital, and Cagayan de Oro in the province of Misamis Oriental, a major port and metropolitan area in northern Mindanao) as well as many households in peri-urban and other rural areas of Bukidnon. The sample size from the migrant wave consisted of 257 households—about 75 percent of potential migrants to be interviewed.⁵

Because we are interested in using information from 1984 as regressors in the equations for current participation in groups, in this paper we restrict the sample to those parents who were interviewed in 1984/85 and 2003. We discuss our procedure for dealing with attrition bias below.

There is no universally accepted definition of social capital. The absence of consensus probably arises from our inability to observe social capital directly; instead we can only observe proxies for social capital. Uphoff (2000) refers to groups and various types of

⁵ While budgetary concerns did not allow all children to be followed up, the survey was designed to obtain information on all children, regardless of location. The initial interview with the parents obtained a basic set of information about all children, including location, educational attainment, and marital status. Obtaining this information from parents, plus assiduous follow-up of migrants and children residing in the community, avoided the common problem of sample selection bias if interviews were based only on residence rules (Rosenzweig 2003).

networks that contribute to cooperation as structural social capital as opposed to cognitive social capital that includes norms, values attitudes and beliefs. Membership in groups can be referred to as institutional structural social capital and it is this dimension of social capital that we first investigate.

The survey instrument includes a section on social capital that asks the household members to list all the groups, associations and cooperatives at least one household member belonged to. For each group that the respondent names, he or she was asked which household member belonged to the group as well as several questions on group procedures and operations such as the number of group members, existence of a membership fee, availability of financial services, and homogeneity of group members. In order to complement this information on structural social capital, the survey questionnaire also asked about the number of persons the household can run to in specific circumstances like an important economic loss or the need to look for information on prices or places to sell products. The responses to these questions provide us with information on the size of different types of support networks that the household can depend on for information pooling (price, places to sell products, technology) and mutual assistance, both of which are usually associated with the returns to social capital.

Households provided information on a total of 689 groups, which were classified into production, credit, burial, religious and civic groups. Production groups include farmers' associations, market vendors and other producer associations. Credit groups include credit

cooperatives (41 percent of the credit groups),⁶ rotating savings and credit associations (ROSCAs) (11 percent) referred to as *paluwagan* or *hulugan* and an arrangement called *sosyo* (49 percent). *Sosyos* are informal credit associations to which members contribute money that they can lend out during the year at the market interest rate (5 to 10 percent monthly), usually to the group's members. The members divide the profits and capital among themselves in proportion to their contribution, typically before the town fiesta. Some *sosyos* even require that the returns be used to finance group expenses related to the town fiesta.

Similar to other parts of the world (Hoddinott et al. 2005), burial groups are associations where all the members contribute money or time to finance expenses related to the death of one of the members' close relatives. Civic groups are the most heterogeneous group category as they include not only women's groups (56 percent), but also village youth associations (20 percent), school committees (12 percent), and village officials (12 percent). Table 1 provides information on the prevalence of these types of groups.

⁶ Credit cooperatives usually are formal groups registered with the Cooperative Development Agency.

Table 1—Membership in groups, by type of group and 1984 asset quartile

Type of group	% of type in all cited groups	% households with at least one member (#)	Maximum # of groups of this type to which a household belonged	% households from 1st asset quartile with ≥ 1 member	% households from 2nd asset quartile with ≥ 1 member	% households from 3rd asset quartile with ≥ 1 member	% households from 4th asset quartile with ≥ 1 member
Production group	20.2	26.7 (83)	2	7.7	19.2	34.6	45.4
Credit group	17.7	21.5 (67)	3	12.8	17.9	33.3	22.1
Burial group	21.8	31.5 (98)	3	29.5	29.5	37.2	29.9
Religious group	29.8	33.4 (104)	5	32.0	33.3	32.0	36.4
Civic group	10.6	14.5 (45)	2	6.4	11.5	17.9	22.1

Religious groups are the most frequently mentioned groups, corresponding to 30 percent of the entire list of groups and with 33 percent of the households belonging to at least one group. This might be explained by the diversity of religious groups in the rural Philippines. One household even had members in five different such groups. The largest religious group is the parish community (55 percent); other religious groups include the Knights of Columbus, Couples for Christ and others. Civic groups are the least common type of group, representing 11 percent of the groups mentioned and with 14 percent of the households belonging to at least one group. Household participation in religious and burial groups is about the same across asset quartiles but Table 1 also shows that participation in production, credit and civic groups is clearly increasing with asset quartile.⁷ This first look at group membership highlights that the types of groups households belong to are quite diversified compared to other countries where the most important groups are village women's and/or men's group that cater to diversified activities (like in Senegal or in Kenya (Kariuki and Place, 2005)).

Households belong to an average of 1.6 groups, with a minimum of 0 and a maximum of 11 (Table 2).

Table 2—Group density, by 1984 asset quartile

# of groups the household belongs to	All households	1st asset quartile	2nd asset quartile	3rd asset quartile	4th asset quartile
Mean	1.6	1.1	1.3	1.8	2.1
Standard deviation	1.5	1.2	1.1	1.5	1.9
Maximum (minimum always 0)	11	5	5	7	11

⁷ The data correspond to 311 households so there are 78 households in the first three asset quartiles and 79 in the last one.

Both the average number and the maximum number of groups to which the household belongs increase steadily with the asset quartile. Respondents were also asked which household member belonged to the group. A special code was used when the whole family itself was considered a member of the group. Table 3 indicates who in the household belongs to the group when the group is not the whole family itself.

Table 3—Relationship to the household head of group member (whole family code excluded)

	Times cited	Percentage
HH Head	360	49.7
Spouse	318	43.9
Son	23	3.2
Daughter	14	1.9
Son-in-law	3	0.4
Daughter-in-law	1	0.1
Granddaughter	2	0.3
Other relation of HH Head	4	0.6
Total	725	100

Most of the individual group members are either the household head or spouse (94 percent); this justifies our restricting the analysis of participation by gender to heads and spouses, considering that both of them participate when the whole family is considered a group member.

Table 4 presents the percentage of households across asset quartiles that do not have any members participating in groups.

Table 4—Absence of participation in any group, by 1984 asset quartile

	% households not participating	% males not participating	% females not participating
All households	24.1	36.8	41.3
1 st asset quartile	34.6	46.5	50.7
2 nd asset quartile	24.4	40.9	41.0
3 rd asset quartile	19.2	34.3	32.4
4 th asset quartile	18.2	25.0	40.8

As expected, the asset poor are less likely to participate in groups. This finding holds for both men and women, but the non- participation rate is on average higher for women than for men. We provide the correlations between household level participation in different types of groups in Table 5. None of these correlations is higher than 0.5 and when we consider participation in different types of groups, the highest correlation is only 0.16.

Table 5—Correlation matrix of participation in different types of groups

	Any group	Production group	Credit group	Burial group	Religious group	Civic group
Any group	1					
Production group	0.34**	1				
Credit group	0.30**	-0.07	1			
Burial group	0.38**	0.00	0.15**	1		
Religious group	0.40**	-0.04	0.01	0.11*	1	
Civic group	0.23**	0.02	0.16**	0.13**	0.10*	1

** Indicates a correlation significant at 5%, * a correlation significant at 10%

Table 6 provides some details on the operations of the different groups. Group sizes are quite varied, ranging from four up to 10,000 members.

Table 6—Group operations and procedures, by type of group

	Production group	Credit group	Burial group	Religious group	Civic group
<i>Number of group members</i>					
Mean	1018	142	86	157	105
Minimum	7	4	13	7	4
Maximum	7200	4000	230	3000	10000
Percent requiring membership fee	55%	82%	86%	22%	24%
Mean value of membership fee when required (2003 pesos)	460	455	75	85	37
<i>Percentage of groups with:</i>					
Financial services	62%	84%	5%	6%	22%
Single-sex membership	6%	5%	2%	13%	58%
Similar age	11%	22%	6%	12%	12%
Similar incomes	21%	40%	28%	36%	44%
Similar occupations	44%	51%	28%	38%	40%

Production groups have the largest average number of group members. Sugar producers (36 percent of our sample households are growing some sugar) have to be members of one out of four sugar growers' associations because the sugar mill buys sugar cane only through these

associations. Burial groups are the smallest in terms of average and maximum size but also have the highest minimum number of members (13), as there is no benefit to spreading burial costs across a too small number of households. Burial groups are quite informal in contrast to the other types of groups that are organized as cooperatives or larger federations, which may be why we do not observe burial groups of more than 230 members.

Credit and burial groups are more likely to ask for an initial fee (more than 80 percent of these groups do so) but this is also a common practice in production groups (55 percent). The average size of this fee is higher for production and credit groups (a little more than 450 pesos⁸ compared to less than 90 pesos for other groups). Most of the production (62 percent) and credit groups (84 percent) provide the household with financial (credit or savings) services. In the few cases in which *sosyos* and ROSCAs did not provide credit or a specific credit product (9 out of the 37 *sosyos* and 2 out of the 6 ROSCAs), contributions to these groups can be considered a form of forced savings since the household cannot withdraw its money at will.

Finally, we examine group homogeneity with respect to member characteristics. Table 6 shows that participating in mixed-gender groups is not an issue in the Philippines. The high proportion of civic groups that is single-sex (58 percent) is accounted for by the high proportion of women's groups (56 percent of civic groups are women's groups). Women's group activities are geared towards nutrition and other interests (e.g. cooking); the wife of the village representative (if he is male and married) or the village representative herself (if she is female) usually heads the group. Groups also attract members from very different age ranges,

⁸ 450 pesos were equivalent to USD 8.21 at the time of the survey.

even burial groups. Groups are usually more homogeneous in terms of income (especially for credit and civic groups) and occupation (especially for credit and production groups).

We did not collect information on whether groups were ‘self-formed’ by the constituents or driven by development projects. This could however have direct implications on group participation if development projects target men and more literate persons more often. See Agarwal (2001) for a description of how externally supported initiatives have exacerbated existing inequities between rich and poor, and men and women). It is unlikely, however, that development initiatives would systematically target men rather than women, given the Philippines’ relatively egalitarian society. Rather, it is more likely that some initiatives would be targeted to men, particularly those related to production, while others would be targeted to women.

Although the quality and type of participation in groups can vary widely, we did not collect information on these aspects of participation. Similar to other economic studies, we will restrict our measure of group membership to actual participation in groups and number of groups the household belongs to (Narayan and Pritchett, 1999; Maluccio et al. 2000; Haddad and Maluccio, 2003). A major drawback of this approach is its inability to take into account both the different roles that men or women may take within these groups and the gender dynamics within the groups. To some extent, we are able to analyze some aspects of the gendered participation in groups because we know the type of group to which individuals belong. As we show later on, there are significant differences in the type of group to which men and women belong, even if there is no significant overall difference between men and women in participation in groups or in the number of groups.

Aside from information on groups to which the household belongs, we also asked the household about the number of persons it can run to for help on specific occasions. These networks can be classified as private structural capital while the corresponding events mobilize different aspects of social capital, such as trust, mutual insurance, information-pooling or copying. All of these questions were designed in consultation with Filipino researchers and field staff who are familiar with the local culture, and who advised us regarding the appropriate questions and wording. Trust-related questions deal with care of the house, care of children, and family problems. The wording of these questions is as follows:

DATA AND DESCRIPTIVES

The Bukidnon panel survey Measures of social capital

Membership in groups Social and economic networks

- Care of the house: If you had to leave for a week with all your household members, how many persons would you ask to look after your house for you?
- Care of children: In an emergency, how many persons could you leave your young children with?
- Family problem: If you had a family problem (like early pregnancy in the family), how many persons could you confide in and discuss with?
- Questions related to mutual insurance, information pooling or copying, and those pertaining to economic networks deal with economic loss, price and technology, and have the following wording:

- Economic loss: How many persons do you think would help you if you suffered an important economic loss (like a fire, severe illness of a household member or loss of harvest)?
- Price: How many persons can you consult when you need information on prices or on a place to sell your products?
- Technology: *How many persons would you follow if they had adopted a new production technology?*

All of these questions are hypothetical and it is likely that households that have already experienced similar situations will provide more accurate responses. To reduce problems of response bias, we restricted the analysis of these questions to a subsample of households that are more likely to have confronted the corresponding problem. For example, the subsample for analyzing the network for child care consists of households with at least one child under 15; the network for price comprises households engaged in agricultural or non agricultural production; and the network for technology is formed by households engaged in agricultural production.

Table 7 presents the average and median number of persons in the different networks corresponding to the relevant subsamples as well as the percentage of households reporting no persons in their network. This table also includes the average number of persons in different networks for households across asset quartiles and with membership in different groups.

Table 7—Characteristics of social and economic networks

	Network: Care of house	Network: Care of children	Network: Family problem	Network: Economic loss	Network: Price	Network: Technology
Mean	1.8	1.7	2.4	3.4	2.4	1.8
Standard deviation	1.3	0.9	2.4	3.2	2.4	1.2
Median	2	2	2	2	2	1
Households reporting 0 (%)	4.2	4.9	1.3	0.7	1.2	0.9
Maximum (minimum always 0)	10	4	20	20	20	10
<i>Social networks, by 1984 asset quartiles</i>						
First asset quartile	1.68	1.58	1.97	3.04	1.98	1.69
Second asset quartile	1.65	1.58	2.17	2.96	2.20	1.67
Third asset quartile	1.87	1.83	2.69	3.22	2.25	1.71
Fourth asset quartile	2.10	1.65	2.91	4.42	3.03	2.03
<i>Social networks and group membership</i>						
At least one group	1.92 **	1.70	2.71 ***	3.62 **	2.54 **	1.83
Production group	1.87	1.76	2.32 *	3.93 **	2.37	1.95
Credit group	2.06 **	1.84 *	3.25 ***	3.73	2.86 *	1.86
Burial group	1.87	1.76	2.52	3.28	2.28	1.70

Table 7—Characteristics of social and economic networks (continued)

	Network: Care of house		Network: Care of children	Network: Family problem	Network: Economic loss	Network: Price		Network: Technology
Religious group	1.96		1.83 *	2.51	3.26	2.25		1.80
Civic group	2.31	***	1.79	2.76	2.89	3.03	**	2.10

Network samples: all households for care of house, family problem and economic loss;

households with at least one child below 15 for care of children; households engaged in agricultural production for technology

households operating a non agricultural business or engaged in agricultural production for price

* indicates that the mean is significantly higher for the households participating in the group at the 10% level, ** at 5% and *** at 1%

On average, the number of persons households can run to in case of important economic loss is larger than for the other scenarios. The network with both the lowest average number and the lowest maximum number of persons the household can run to is the network related to childcare. The percentage of households reporting that they have no one to run to for any of the different occasions (care of house, care of children, economic loss, price and technology) is relatively low (only 0.7 percent for the network related to economic loss⁹) but the median number of persons in the network is also low (two persons for most of the networks). The average network size households rely on for different types of assistance is larger for households from higher asset quartiles except for the child care network. Households that participate in at least one group know on average more people that they can run to; this difference is significant for networks related to care of the house, family problems, economic loss and price, but not for networks related to child care and technology. Households belonging to burial groups do not seem to know more people, as the difference in the network size between the households that participate in burial groups and the ones that do not is never significant. Households who belong to religious groups have significantly larger networks for care of the house and care of children but not for economic oriented networks. Membership in production groups is the only type of group membership that is associated with a significantly higher network size for economic loss. While it might seem that membership in groups increases the size of one's networks,¹⁰ these differences in means

⁹ Asking a similar question in rural Ethiopia, Hoddinott et al. (2005) found that 9 percent of their sample households had nobody to run to in case of economic failure but that the median number of people in the household's network is five.

¹⁰ Group membership can both increase the size of one's network and be facilitated by one's network if for example members of networks have better access to information or if membership in one group is restricted to acquaintance of current group members.

might also arise from characteristics of households that also affect their propensity to join groups. Thus, in the next section, we investigate the determinants of membership in groups and networks, controlling for individual, household, and community characteristics.

DETERMINANTS OF GROUP MEMBERSHIP

Empirical specification

Household level group membership

We hypothesize that, at the household level, the probability of joining a group in 2003 is a function of household characteristics, namely: human capital of the household head, household demographics, the household's position in the asset distribution, the composition of the household's asset portfolio, its production status, religion, length of time in the community, its exposure to shocks, and distance to facilities, as well as village-level characteristics. These village-level characteristics are village-level measures of heterogeneity, presence of cooperatives, nongovernmental organizations (NGOs) and government programs in the community, and the peace and order situation in the community. Means and standard deviations of the variables used in the group membership regressions are found in Appendix Table 1.

Indicators of human capital of the household head are age and age squared in 2003, whether the household head completed elementary education (six years or more of schooling) or secondary education (10 years or more of schooling). Household demographics in 2003

include household size and the proportion of household members in different age categories.¹¹ Because we are interested in the role of asset inequality in the accumulation of social capital, we use a number of asset measures. Since decisions regarding the accumulation of assets and decisions to join groups may be made simultaneously, we use indicators of past asset position, using the 1984 data. We include dummy variables for the household's asset quartile in 1984 (the highest quartile is the excluded category). Since it is possible that the composition of the asset portfolio affects the accumulation of other forms of (social) assets, we include as regressors the proportions of the household's assets held in land, productive assets, and livestock. The excluded category consists of housing and consumer durables. We also include a dummy variable indicating whether the household is a sugar producer, whether it is an agricultural household, or whether it is a nonagricultural household (the excluded category derives its income exclusively from wages and consists mainly of landless households).¹² We include a dummy variable for whether the household head is Catholic (the majority religious denomination). The duration of residence in the community proxies the household's connectedness to the community, given that 83 percent of household heads are migrants to Bukidnon.¹³ To test whether exposure to unfortunate events increases the likelihood of joining groups, we include the cumulative number (count) of shocks reported from 1984 to 2001.

¹¹ While we could also have disaggregated demographic categories by sex, we wanted to conserve degrees of freedom. Moreover, disaggregating by sex may not be too important in the Philippine setting, where intrahousehold allocation tends to be relatively egalitarian, at least with respect to expenditure shares (Quisumbing et al. 2004).

¹² Some households are engaged in both agricultural and nonagricultural production and the corresponding dummies are therefore not exclusive.

¹³ However, the households in the 2003 sample have lived continuously in the community since 1984.

Measures of distance to facilities include: (1) road distance to the town center or *poblacion* in 1984; (2) travel time to the nearest hospital; and (3) road distance from the *barangay* center to the nearest sugar mill.¹⁴ The first and second distance measures are at the household level; the third is at the village level. We employ a number of measures of village-level heterogeneity, following Alesina and La Ferrara (2000) and Haddad and Maluccio (2003). Our measures of heterogeneity are: (1) heterogeneity with respect to region of origin, henceforth origin heterogeneity; (2) asset heterogeneity; (3) heterogeneity with respect to ethnicity of the household head, henceforth ethnic heterogeneity; and (4) educational heterogeneity (based on the education of the household head). The first and third measures are based on categorical variables and are computed as follows:

$$\text{Heterogeneity measure}_i = 1 - \sum s_{ki}^2$$

where i represents a village and k the different regions of origin or ethnic groups, depending on whether origin heterogeneity or ethnic heterogeneity is being measured. The second and fourth heterogeneity measures use the standard deviations of the 1984 value of assets and years of schooling of the household head as proxies for asset and educational heterogeneity, respectively. We also include a measure for the intensity of peace and order problems in the village, which is relevant since incidents of armed conflict are common in Mindanao up to the present. This measure is computed using community level data and is the sum of the percentage of households affected by peace and order problems each year since 1984. Finally, we hypothesize that households will be better able to participate in groups if there are existing groups in the community. We use the numbers of cooperatives, NGO programs, and

¹⁴ A new sugar mill, Crystal Sugar Mill, has been operating in the area since 1998 and is situated in the municipality of Maramag.

government programs in the community in 2000-2001 mentioned in community level data to capture the range of activities in which households can participate.

Attrition and selectivity

Because the 2003 survey was conducted 19 years after the first survey round in 1984, we expect that some households would have left the sample, whether due to death, migration, or refusal to be interviewed. While a complete attrition analysis is outside the scope of this paper (see McNiven and Gilligan 2005), we need to control for attrition if the factors that lead households to leave the sample create biases in our estimates of the determinants of social capital. We control for attrition by accounting for the probability that the household is reinterviewed in 2003 in our analysis; this is, of course, the mirror image of attrition from the sample. We posit that the reinterview probability is a function of the household head's age, age squared, years of schooling, position in the asset distribution, the portfolio composition of assets, the share of household members of working age, the share of female working age members, the number of working age members, distance from the household (in 1984) to the town center and the sugar mill, travel time to the nearest hospital (in 1984), and village-specific attributes such as the percentage of other households interviewed in the village between 1984/85 and 2003, and the percentage increase in the number of households in the village between 1980 and 2000. Means and standard deviations of these variables are found in Appendix Table 2.

Individual group membership

Because men and women may have different preferences regarding group participation, or face different barriers to participation, we examine the role of gender in

group participation by: (1) estimating a pooled regression on the total number of groups and the probability of participating in different types of groups with a dummy variable for being female; and (2) estimate regressions for the total number of groups and participation in specific groups separately for males and females. Since the household head and spouse represent 94 percent of the persons specifically mentioned as the group member, we use the sample of heads and spouses for the analysis of individual group membership. Household level attrition is corrected in these analyses for the absence of husband or wife in some households. Age, age squared and schooling variables now refer to the husband or wife; other household and village-level variables remain the same.

Determinants of group membership at the household level

Table 8 examines the probability of participating in at least one group, production groups, and credit groups, while Table 9 presents similar regressions for burial, religious, and civic groups using a probit model with sample selection (Heckman 1979; Van de Ven and Van Praag 1981).

Table 8— Household membership in at least one group, production and credit groups:

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	At least one group		Production group		Credit group	
	Coeff	z	Coeff	z	Coeff	z
Age of head in 2003	-0.153	-0.98	-0.337	-2.20	0.238	1.44
Age of head in 2003, squared	0.002	1.09	0.003	2.31	-0.002	-1.32
Elementary education: Head has 6 years of schooling or more	0.304	1.43	0.104	0.41	0.144	0.60
High school education: head has 10 years of schooling or more	1.307	2.93	1.104	3.31	-0.119	-0.44
Household size in 2003	0.136	1.46	-0.081	-1.16	-0.022	-0.40
<i>Percentage of household members in 2003:</i>						
Aged 0 to 14	0.913	1.25	0.592	0.67	0.700	0.84
Aged 15 to 19	0.735	0.84	-0.276	-0.29	-0.694	-0.77
Aged 35 to 54	1.949	1.80	0.052	0.05	1.284	1.21
Aged 55 and over	1.841	1.65	-0.137	-0.15	0.152	0.18
<i>Asset quartile (in 1984; highest quartile excluded)</i>						

Table 8— Household membership in at least one group, production and credit groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	At least one group		Production group		Credit group	
	Coeff	z	Coeff	z	Coeff	z
Lowest asset quartile	-0.387	-0.85	-1.371	-2.11	-0.032	-0.04
Second asset quartile	-0.087	-0.25	-1.229	-3.13	-0.027	-0.05
Third asset quartile	-0.123	-0.38	-1.071	-3.40	-0.064	-0.21
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>						
Land	-0.003	-0.60	0.006	1.02	0.001	0.33
Productive assets	-0.006	-0.92	0.008	0.90	0.002	0.17
Livestock	-0.009	-1.40	0.009	1.01	-0.004	-0.57
<i>Dummies for type of household in 2003</i>						
Sugar producing household	0.039	0.15	1.134	4.09	0.180	0.75
Agricultural producer household	-0.074	-0.25	0.672	2.07	0.039	0.17
Nonagricultural producer household	0.227	0.93	0.438	1.74	-0.062	-0.27
<i>Other household characteristics</i>						
Household head is Catholic	-0.067	-0.19	0.176	0.38	0.580	1.34

Table 8— Household membership in at least one group, production and credit groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

Years present in community	0.006	0.56	-0.011	-0.79	-0.018	-1.29
Number of shocks	0.111	1.31	0.011	0.13	0.146	1.18
<i>Distance from household</i>						
Distance to town center (kilometers)	-0.135	-3.83	-0.025	-0.58	-0.163	-2.83
Travel time to nearest hospital in 1984 (minutes)	0.000	0.16	-0.003	-1.02	0.001	0.46
Distance to nearest sugar mill (kilometers)	-0.003	-0.20	-0.020	-1.12	-0.024	-1.10
<i>Indices of barangay heterogeneity</i>						
Region of origin of the household head	1.180	1.19	2.624	2.14	1.625	0.74
Asset heterogeneity (1984 household assets)	0.000	-0.78	0.000	-1.18	0.000	2.32
Ethnicity of the household head	-1.844	-2.83	-0.860	-1.23	-1.948	-1.48
Education of the household head	-0.088	-1.23	-0.073	-0.79	-0.217	-2.94
Percentage of households affected by peace and order problems since 1984	0.000	0.13	0.006	2.40	-0.002	-1.17
<i>Programs operating in barangay, 2000-2001</i>						
Cooperatives	-0.831	-3.59	-0.110	-0.39	-0.774	-1.98
NGO programs	0.166	0.76	-0.432	-1.53	-0.111	-0.52

Table 8— Household membership in at least one group, production and credit groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

Government programs	0.256	1.70	0.138	0.83	0.475	1.65
Constant	4.422	0.94	8.219	1.70	-5.455	-0.95
Number of observations	509		509		509	
Censored observations	198		198		198	
Uncensored observations	311		311		311	
Wald test (chi-square)	72.47		80.06		59.49	
p-value	0.00		0.00		0.00	
Wald test of independent equations (chi-square)	5.04		0.00		0.41	
p-value	0.02		0.97		0.52	

z-statistics in bold are significant at 10% or better

Selection correction includes age and age squared of household head in 1984, years of schooling of the head in 1984, asset quartiles in 1984, proportion of assets held in land, productive assets, and livestock, share of household members in various demographic categories, household distance from village center, sugar mill, travel time in minutes to the nearest hospital percentage of other households interviewed in the village in 1984/85 and 2003, and the percentage increase in the number of households in the village, 1980-2000.

Table 9— Household membership in burial, religious, and civic groups:

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	Burial group		Religious group		Civic group	
	Coeff	z	Coeff	z	Coeff	z
Age of head in 2003	-0.122	-0.83	-0.004	-0.03	-0.200	-1.02
Age of head in 2003, squared	0.001	0.81	0.000	0.20	0.002	1.06
Elementary education: Head has 6 years of schooling or more	-0.029	-0.12	-0.208	-1.04	0.033	0.15
High school education: head has 10 years of schooling or more	-0.367	-1.02	0.499	0.61	0.507	1.27
Household size in 2003	0.101	1.78	0.035	0.48	0.034	0.69
<i>Percentage of household members in 2003:</i>						
Aged 0 to 14	0.632	0.83	0.426	0.48	0.041	0.06
Aged 15 to 19	-0.099	-0.11	-0.339	-0.44	-2.032	-1.28
Aged 35 to 54	1.672	1.85	1.134	0.71	-0.554	-0.75
Aged 55 and over	1.291	1.43	-0.103	-0.11	-0.389	-0.44
<i>Asset quartile (in 1984; highest quartile excluded)</i>						

Table 9— Household membership in burial, religious, and civic groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	Burial group		Religious group		Civic group	
	Coeff	z	Coeff	z	Coeff	z
Lowest asset quartile	-0.621	-1.24	-0.218	-0.21	0.184	0.28
Second asset quartile	-0.728	-1.95	0.219	0.52	0.533	1.67
Third asset quartile	-0.495	-1.61	-0.143	-0.28	-0.537	-0.98
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>						
Land	-0.009	-1.79	-0.006	-0.67	0.003	0.59
Productive assets	-0.029	-2.59	0.002	0.09	0.002	0.28
Livestock	-0.004	-0.47	-0.022	-2.78	-0.013	-1.44
<i>Dummies for type of household in 2003</i>						
Sugar producing household	-0.268	-0.98	0.246	0.84	-0.384	-1.16
Agricultural producer household	0.411	1.56	-0.248	-1.10	0.240	1.06
Nonagricultural producer household	-0.572	-2.41	0.048	0.24	-0.029	-0.14
<i>Other household characteristics</i>						
Household head is Catholic	1.543	3.49	0.287	0.79	-0.554	-0.94
Years present in community	-0.006	-0.44	-0.001	-0.11	0.005	0.43

Table 9— Household membership in burial, religious, and civic groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	Burial group		Religious group		Civic group	
	Coeff	z	Coeff	z	Coeff	z
Number of shocks	-0.084	-1.13	0.068	0.87	-0.047	-0.50
<i>Distance from household</i>						
Distance to town center (kilometers)	-0.075	-1.83	-0.113	-2.48	-0.103	-2.19
Travel time to nearest hospital in 1984 (minutes)	0.002	0.68	-0.003	-1.60	-0.006	-1.63
Distance to nearest sugar mill (kilometers)	0.006	0.39	0.013	0.65	-0.016	-1.02
<i>Indices of barangay heterogeneity</i>						
Region of origin of the household head	4.076	3.28	-0.418	-0.38	-1.351	-0.83
Asset heterogeneity (1984 household assets)	0.000	-0.66	0.000	-0.83	0.000	0.68
Ethnicity of the household head	-3.074	-4.87	-0.817	-0.51	1.270	1.20
Education of the household head	-0.086	-1.18	0.196	0.76	-0.054	-0.81
Percentage of households affected by peace and order problems since 1984	0.008	3.23	0.003	0.92	0.000	0.11
<i>Programs operating in barangay, 2000-2001</i>						
Cooperatives	-0.931	-3.24	0.001	0.00	-0.532	-1.11
NGO programs	0.111	0.53	-0.095	-0.37	-0.436	-1.39

Table 9— Household membership in burial, religious, and civic groups (continued):

probit regressions with selection correction for the probability of being reinterviewed in 2003

Specification with sampling weights and robust standard errors

Dependent variable: Household has at least one person who is a member of a group

	Burial group		Religious group		Civic group	
	Coeff	z	Coeff	z	Coeff	z
Government programs	0.080	0.47	-0.006	-0.03	-0.038	-0.21
Constant	1.967	0.43	-1.028	0.19	7.513	1.13
Number of observations	509		509		509	
Censored observations	198		198		198	
Uncensored observations	311		311		311	
Wald test (chi-square)	114.99		67.98		43.77	
p-value	0.00		0.00		0.08	
Wald test of independent equations (chi-square)	1.38		0.06		0.73	
p-value	0.24		0.81		0.39	

z-statistics in bold are significant at 10% or better

Selection correction includes age and age squared of household head in 1984, years of schooling of the head in 1984, asset quartiles in 1984, proportion of assets held in land, productive assets, and livestock, share of household members in various demographic categories, household distance from village center, sugar mill, travel time in minutes to the nearest hospital percentage of other households interviewed in the village in 1984/85 and 2003, and the percentage increase in the number of households in the village, 1980-2000

The selectivity correction controls for sample attrition between 1984 and 2003, while the probits were estimated with robust standard errors and sampling weights to take into account survey design. As the Wald tests for independence of equations indicate, correction for selection bias was necessary for estimating the determinants of membership in at least one group but not when estimating the determinants of membership in a specific type of group. The results highlight the differences in the impact of asset and heterogeneity measures on membership in different types of groups.

Membership in production groups

Life cycle effects are significant determinants of participation in production groups. Households with more human capital--households with a head having completed at least 10 years of schooling-- are more likely to take part in productive groups. After controlling for productive activity and portfolio composition, wealthier households are more likely to take part in productive groups, as reflected by the negative sign of the three first asset quartiles in the third column of Table 8. There are alternative explanations for this result. Better-educated and wealthier households may have a higher demand for group membership because they can more easily benefit from their positive externalities. A less optimistic interpretation would be the existence of barriers to participation of the asset- and education-poor households. However, portfolio composition has no impact on membership in productive groups. Not surprisingly, households engaged in agricultural or non agricultural production are more likely to be members of productive groups and the impact of being an agricultural producer is larger. Being a sugar producer increases the probability of membership in production groups, reflecting the organization of the sugar industry in Bukidnon.

Interestingly, village level heterogeneity in terms of the origin of the household head has a positive impact on membership in productive groups. Production techniques might vary in different parts of the Philippines and there might be more incentive to join production groups in villages where there is “more to learn” from other members. Political unrest also had a positive impact on membership in productive groups.

Membership in credit groups

The household’s demographics, its productive activity, position in the asset distribution, and portfolio composition are not relevant in explaining the household’s membership in credit groups. Indeed, distance to the town center is the only significant household-level variable in this regression. Since markets and commercial establishments are located in the town center, it is the main place where goods are exchanged and is therefore more monetized. The lack of significance of other household characteristics indicates that credit transactions are not limited to well-off households, owing to the existence of an active informal credit market. Indeed, 69 percent of the survey households incurred at least one loan during the year preceding the survey (Godquin and Sharma 2004). Village asset heterogeneity has a positive impact on membership in credit groups, reflecting the conjunction of households being able to lend out money and households interested in borrowing money. Educational heterogeneity of the village has a negative impact on membership in credit groups; it is possible that having a similar level of education is a precondition for being able to rely on other group members to manage money together. While one could hypothesize that households would be more likely to participate in groups in villages with more cooperatives, owing to the higher chances of a cooperative corresponding to the needs of the household, we

find the opposite effect. Perhaps the high number of cooperatives operating in the village is a signal of coordination difficulties for households in cooperating and forming large groups. It could also indicate that cooperatives are being formed for political purposes, as the cooperatives movement in the Philippines has risen and fallen depending on support from elected officials.¹⁵ Further qualitative research should be conducted to understand this negative impact of the number of cooperatives operating in the village.

Membership in burial groups

Larger households are more likely to participate in burial groups. Since the contribution to these groups is not based on the number of household members, households with more members to insure find it more advantageous to join. Households with more members above 35 are also more likely to join burial groups, because the probability of death increases with age. The productive activity of the household influences significantly membership in burial groups. Households engaged in agricultural activities are more likely to be members of burial groups whereas households engaged in non agricultural business are less likely to join such groups.¹⁶ Membership in burial groups mitigates lumpy expenditures in case of death. This type of insurance might be more valuable for households with seasonal income, such as those engaged in agriculture. Households that own a larger share of their assets in land or productive assets (livestock excluded) are less likely to participate in burial

¹⁵ Cooperatives were encouraged during the Marcos regime, for example, especially for agrarian reform beneficiaries. Many of these cooperatives fell into disarray in subsequent years. The cooperatives movement paled in comparison to the rise of NGOs during the Aquino administration, but seems to have recovered with support from the Ramos administration.

¹⁶ Households can be engaged in both agricultural production and non agricultural business (64 of the 311 survey households) and can also be engaged in neither of them when none of its household member is self employed (57 households).

groups. Catholics are more likely to take part in burial groups. Death is also a religious event and it is easier for households from the major religious group (92 percent are Catholic) to find a large number of other households of the same religion that participate or could participate in a burial group. Distance from the household to the village center reduces the probability of joining a burial group. Remote households may incur higher costs in participating in burial groups if such groups are closely related to churches, which are usually situated in the village center.

Village origin heterogeneity positively influences the participation in burial groups; villages with higher origin heterogeneity are villages with more migrants from outside Bukidnon who may have smaller family networks within the village or within Bukidnon itself. If family networks are an important source of support (both financial and labor) when a death occurs, origin heterogeneity will increase the number of households interested in taking part in burial groups. Village ethnic heterogeneity has the opposite effect, probably because it is difficult for households from different ethnic groups to cooperate together. Burial groups and cooperatives seem to be partial substitutes: where a lot of cooperatives operate, membership in burial groups is less likely, perhaps because some cooperatives offer the same services as burial groups (some cooperatives have death benefits, for example). A higher incidence of peace and order problems increases the likelihood of joining burial groups. Even if peace and order problems do not directly affect the mortality rate of the village, they can increase residents' preoccupation with death and their desire to insure against adverse events.

Membership in religious and civic groups

Compared to production, credit or burial groups, religious and civic groups do not focus on economic motives, which may account for the low significance of our explanatory variables. Distance to the town center, which also proxies distance to church and civic oriented activities, is negatively associated with membership in both religious and civic groups. Households that own a larger share of their assets in livestock are less likely to join religious groups. Households from the second asset quartile are more likely to join civic groups.

Membership in any group

More than three-quarters of the households (76 percent) are members of at least one group. However, this relatively high figure is not driven by membership in a specific type of group: membership in religious groups is the most frequent type of membership, with 33 percent of the households being members of such a group. Examining the determinants of participation in any group helps us understand the households who are not connected to any group—and who might therefore be “socially excluded” from group activity. Education plays an important role in group membership, with better-educated households having a higher probability of joining groups. It is however unclear whether households with higher education benefit more from group membership and are therefore more willing to participate in groups, or whether households have the same willingness to participate in groups, but less educated households face more difficulties in joining these groups. Except for youth groups (here included in civic groups) and religious groups, the household head and spouse or other adults in the household are the household members who participate in groups. This can

explain why households with a higher share of adults over 35 are more likely to participate in groups. Households farther away from the town center are less likely to be members of groups, which might be related to the greater difficulty of attending meetings (54 percent of the groups mentioned in the survey hold meetings at least once a month). The number of cooperatives operating in the village has a negative impact on membership in any group, while the number of government programs operating in the village has the opposite effect. This effect seems to be driven by the positive impact of government programs on membership in credit and production groups.

How does gender affect group membership?

While households belong to groups, the activities associated with group membership are the responsibility of specific household members. When group membership is considered on an individual basis, the household head and spouse account for 94 percent of group members. In order to investigate whether gender matters for group membership, we focus our analysis on group membership of household heads and spouses.¹⁷

Participation in various groups, by sex

Table 10 reports the proportion of household heads and spouses participating in the different type of groups, by sex. Tests of equality of means of group membership by sex

¹⁷ We therefore have two observations per household, one for the male head and one for the female head or spouse. However when no male (or alternatively female) head is present in the household (because of death for example), only one observation per household was retained for the corresponding households (34 households had no male head or spouse; eight households had no female head or spouse).

indicate that group membership significantly differs by gender for production, burial and civic groups.

Table 10— Membership in groups, by sex

	% of males participating in groups	% of females participating in groups	Level of significance of the difference
Membership in any group	63.2%	58.7%	not significant
Production group	22.4%	14.5%	1%
Credit group	11.2%	14.2%	not significant
Burial group	31.4%	23.4%	5%
Religious group	29.6%	31.0%	not significant
Civic group	4.3%	10.6%	1%

Males have a higher probability of participating in production groups than females (31 percent compared to 23 percent); males are also more likely to join burial groups (31 percent vs. 23 percent). In contrast, 11 percent of female heads or spouses are members of civic groups, compared to 4 percent for males. This is because most civic groups in the study area (55 percent) are women's groups and there are no exclusively male groups.

In order to investigate whether these differences in means persist once we control for individual, household, and village level factors, we estimate—at the level of household head and spouse—the probit model presented in section 3 with the addition of a sex dummy. Results show that there is no overall difference in male or female propensity to participate in

groups, but the differences show up in the type of groups to which husbands and wives belong (Table 11).

Table 11— Impact of sex on group membership

	Coefficient	z	p-value for selection correction
<i>Probability of participating in groups (Heckman selection model)</i>			
All groups	-0.144	-0.97	0.05
Production	-0.420	-2.31	0.96
Credit	0.230	1.32	0.37
Burial	-0.284	-1.61	0.38
Religious	0.167	1.08	0.72
Civic	0.477	2.06	0.28
<i>Number of groups</i>			
Tobit	-0.025	-0.18	
Ordered probit	-0.026	-0.27	

z-statistics in bold are significant at 10% or better

Concluding that men and women participate equally in groups, without distinguishing among types of groups, would mask gender differences in group participation. For example, males are more likely to be members of production groups, while females are more likely to participate in civic groups. This may indicate a division of labor within the household, or separate spheres of decision making. Men are indeed more involved in groups related to income generation and the public sphere whereas women are more involved in home and

child related groups corresponding to the private sphere. In addition to differences in the groups men and women join, further gender differences that we did not capture might exist in the roles men and women assume in groups.

Factors explaining membership in groups

Individual, household, and village characteristics also affect men's and women's group membership in different ways. Tables 12 and 13 present the regression results of the probability of participating in different types of groups by sex.¹⁸

¹⁸ We did not report the results of membership in civic groups for males as there were too few males (12 out of 277) participating in such groups to produce relevant results. We will therefore compare female membership results to household membership for civic groups.

Table 12— Determinants of individual membership in at least one group, production and credit groups: probit regressions with sample selection

Selection equation for the probability of being reinterviewed in 2003 not reported

Dependent variable: Probability of participating in a group

	At least one group		Female		Productive groups		Female		Credit groups		Female	
	Male dF/dx	z	dF/dx	z	Male dF/dx	z	dF/dx	z	Male dF/dx	z	dF/dx	z
<i>Individual characteristics</i>												
Age in 2003	-0.116	-0.93	0.113	1.00	-0.523	-3.06	0.319	1.56	0.197	1.03	0.163	0.76
Age in 2003, squared	0.001	1.13	-0.001	-0.57	0.005	3.22	-0.003	-1.58	-0.001	-0.81	-0.001	-0.64
Elementary education: has 6 years of schooling or more	0.058	0.30	0.290	1.15	0.217	0.73	0.461	1.22	-0.253	-0.73	0.005	0.01
High school education: has 10 years of schooling or more	0.834	2.47	1.409	3.29	0.899	2.17	1.623	2.39	0.371	0.91	0.653	1.70
<i>Household characteristics</i>												
Household size in 2003	0.050	0.83	0.054	0.76	-0.144	-1.58	-0.022	-0.30	0.033	0.41	-0.002	-0.04
<i>Percentage of household members in 2003:</i>												
Aged 0 to 14	0.528	0.79	2.207	2.59	0.337	0.34	1.252	1.25	0.197	0.17	2.090	2.21
Aged 15 to 19	-0.902	-1.27	1.562	1.71	-1.528	-1.28	1.517	1.43	-1.577	-1.18	0.667	0.59
Aged 35 to 54	1.054	1.24	1.036	1.10	-0.475	-0.38	-0.889	-0.76	2.173	1.53	1.518	1.38
Aged 55 and over	0.493	0.59	1.352	1.43	-1.555	-1.31	1.191	1.08	0.052	0.05	0.572	0.51
<i>Asset quartile (in 1984; highest quartile excluded)</i>												
Lowest asset quartile	0.442	1.10	-0.008	-0.02	-1.878	-2.28	-0.539	-0.70	0.025	0.03	-0.792	-1.46
Second asset quartile	0.120	0.34	0.830	2.24	-1.350	-2.62	-0.969	-1.94	-0.155	-0.29	-0.053	-0.13
Third asset quartile	-0.238	-0.73	-0.048	-0.16	-1.255	-3.47	-0.912	-2.32	0.025	0.06	0.090	0.26
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>												
Land	0.005	1.04	0.005	0.88	0.000	0.01	0.003	0.42	0.007	1.09	-0.002	-0.28
Productive assets	-0.003	-1.09	0.001	0.10	0.009	0.89	0.006	0.75	-3.414	-1.21	-0.002	-0.17
Livestock	not included		-0.002	-0.29	0.006	0.53	0.003	0.38	-0.981	-1.03	0.005	0.59
<i>Dummies for type of household in 2003</i>												
Sugar producing household	0.400	1.79	0.182	0.72	0.806	2.78	0.716	2.30	0.516	1.38	-0.027	-0.09
Agricultural producer household	-0.049	-0.21	-0.315	-1.16	1.765	3.06	-0.267	-0.83	0.106	0.22	0.123	0.43
Nonagricultural producer household	0.088	0.48	0.182	0.72	0.367	1.27	-0.150	-0.54	-0.712	-2.26	0.130	0.53
<i>Other household characteristics</i>												
Household head is Catholic	-0.078	-0.37	0.379	0.88	-0.045	-0.10	0.913	1.53	1.131	1.69	0.509	1.45
Years present in community	-0.009	-0.98	0.007	0.57	0.006	0.37	-0.018	-1.25	-0.009	-0.48	-0.004	-0.24

Table 12— Determinants of individual membership in at least one group, production and credit groups: probit regressions with sample selection (continued)

Selection equation for the probability of being reinterviewed in 2003 not reported

Dependent variable: Probability of participating in a group

	At least one group				Productive groups				Credit groups			
	Male dF/dx	z	Female dF/dx	z	Male dF/dx	z	Female dF/dx	z	Male dF/dx	z	Female dF/dx	z
Number of shocks	0.114	1.94	0.129	1.63	-0.022	-0.22	0.149	1.69	0.290	2.61	0.153	1.89
<i>Distance from household</i>												
Distance to town center (kilometers)	-0.070	-2.26	-0.213	-5.22	-0.022	-0.46	-0.067	-1.11	-0.061	-0.94	-0.270	-3.94
Travel time to nearest hospital in 1984 (minutes)	-0.001	-0.31	0.003	1.53	-0.002	-0.69	-0.001	-0.43	-0.003	-0.93	0.006	2.31
Distance to nearest sugar mill (kilometers)	0.009	0.85	0.013	0.84	-0.009	-0.48	-0.018	-0.89	-0.088	-2.79	0.020	0.91
<i>Indices of barangay heterogeneity</i>												
Region of origin of the household head	0.818	1.22	1.889	1.63	2.057	1.39	1.548	1.02	5.633	2.77	0.183	0.12
Asset heterogeneity (1984 household assets)	0.000	-0.43	0.000	0.51	0.000	-1.17	0.000	0.48	0.000	0.57	0.000	1.95
Ethnicity of the household head	-1.244	-2.41	-1.695	-2.50	-0.311	-0.40	-1.801	-2.07	-3.667	-3.18	-1.098	-1.44
Education of the household head	-0.063	-1.15	-0.044	-0.54	0.032	0.29	-0.219	-2.27	-0.534	-3.83	-0.150	-1.74

Table 12— Determinants of individual membership in at least one group, production and credit groups: probit regressions with sample selection (continued)

Selection equation for the probability of being reinterviewed in 2003 not reported
Dependent variable: Probability of participating in a group

	At least one group				Productive groups				Credit groups			
	Male dF/dx	z	Female dF/dx	z	Male dF/dx	z	Female dF/dx	z	Male dF/dx	z	Female dF/dx	z
Percentage of households affected by peace and order problems since 1984	0.006	1.88	-0.001	-0.20	0.005	1.71	0.002	0.68	0.003	0.92	-0.011	-3.52
<i>Programs operating in barangay, 2000-2001</i>												
Cooperatives	-0.433	-2.81	-0.963	-4.00	-0.097	-0.31	-0.333	-1.05	-1.327	-3.3	-0.920	-2.87
NGO programs	-0.130	-1.10	0.033	0.17	-0.238	-0.68	-0.297	-1.01	-0.420	-1.09	-0.015	-0.05
Government programs	0.118	1.27	0.232	1.63	0.211	1.04	0.027	0.14	0.497	2.44	0.589	3.04
Constant	3.626	0.95	-5.635	-1.69	11.947	2.28	-7.883	-1.29	-5.212	-0.82	-6.392	-1.03
Number of observations	509		508		509		508		509		508	
Censored observations	232		205		232		205		232		205	
Uncensored observations	277		303		277		303		277		303	
Wald test (chi-square)	not computed		88.10		58.57		61.62		68.55		66.17	
p-value	not computed		0.00		0.00		0.00		0.00		0.00	
Wald test of independent equations (chi-square)	46.18		0.28		0.08		0.09		0.00		1.68	
p-value	0.00		0.59		0.78		0.77		0.94		0.20	

z-statistics in bold are significant at 10% or better

**Table 13— Determinants of individual membership in burial groups, religious groups, and civic groups:
probit regressions with sample selection**

Selection equation for the probability of being reinterviewed in 2003 not reported

Dependent variable: Probability of participating in a group

	Burial groups		Female		Religious groups		Female		Civic groups	
	Male dF/dx	z	dF/dx	z	Male dF/dx	z	dF/dx	z	Female dF/dx	z
<i>Individual characteristics</i>										
Age in 2003	-0.066	-0.44	0.116	0.57	-0.030	-0.26	-0.051	-0.47	0.322	1.30
Age in 2003, squared	0.001	0.45	-0.001	-0.33	0.001	0.54	0.001	0.74	-0.003	-1.37
Elementary education: has 6 years of schooling or more	-0.147	-0.61	0.378	1.40	-0.091	-0.60	0.115	0.44	0.212	0.54
High school education: has 10 years of schooling or more	-0.430	-1.12	1.224	2.80	0.468	1.53	1.137	2.83	1.400	2.75
<i>Household characteristics</i>										
Household size in 2003	0.126	1.96	0.057	0.77	0.013	0.28	0.009	0.13	0.019	0.34
<i>Percentage of household members in 2003:</i>										
Aged 0 to 14	1.267	1.50	1.578	1.72	0.279	0.47	0.901	1.17	1.061	1.31
Aged 15 to 19	-0.235	-0.24	-0.161	-0.15	-0.951	-1.42	-0.204	-0.22	-1.408	-1.01
Aged 35 to 54	1.884	1.79	1.932	1.56	0.561	0.76	0.749	0.81	-0.644	-0.60
Aged 55 and over	1.637	1.69	0.358	0.33	-0.640	-1.01	-0.158	-0.17	-0.082	-0.08
<i>Asset quartile (in 1984; highest quartile excluded)</i>										
Lowest asset quartile	-0.849	-1.48	-0.733	-1.54	0.160	0.45	-0.331	-0.58	-0.292	-0.49
Second asset quartile	-0.820	-1.94	-0.335	-0.84	0.272	0.89	0.512	1.32	0.021	0.05
Third asset quartile	-0.644	-1.93	-0.590	-1.65	-0.088	-0.33	-0.078	-0.25	-0.684	-1.55
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>										
Land	-0.013	-2.32	0.001	0.13	0.002	0.41	0.000	0.02	0.006	0.85
Productive assets	-0.027	-2.26	-0.017	-1.67	0.006	1.27	0.003	0.30	-0.004	-0.35
Livestock	-0.008	-1.10	0.007	0.79	-0.019	-2.94	-0.018	-1.99	0.003	0.23
<i>Dummies for type of household in 2003</i>										
Sugar producing household	-0.252	-0.87	-0.267	-0.87	0.265	1.41	0.193	0.75	-0.537	-1.50
Agricultural producer household	0.212	0.79	0.331	1.14	-0.175	-0.89	-0.092	-0.36	0.218	0.67

Table 13— Determinants of individual membership in burial groups, religious groups, and civic groups: probit regressions with sample selection (continued)

Selection equation for the probability of being reinterviewed in 2003 not reported

Dependent variable: Probability of participating in a group

	Burial groups		Female		Religious groups		Female		Civic groups	
	Male dF/dx	z	dF/dx	z	Male dF/dx	z	dF/dx	z	Female dF/dx	z
Nonagricultural producer household	-0.500	-1.97	-0.818	-2.64	0.160	0.94	0.133	0.56	0.131	0.40
<i>Other household characteristics</i>										
Household head is Catholic	1.538	3.38	2.118	4.17	0.231	0.81	0.185	0.49	-0.436	-0.94
Years present in community	-0.005	-0.31	-0.003	-0.19	-0.015	-1.57	0.000	-0.01	0.043	2.52
Number of shocks	-0.085	-1.08	-0.102	-1.15	0.022	0.39	0.100	1.42	-0.188	-1.65
<i>Distance from household</i>										
Distance to town center (kilometers)	-0.070	-1.70	-0.155	-2.76	-0.076	-2.64	-0.130	-2.73	-0.094	-1.66
Travel time to nearest hospital in 1984 (minutes)	0.001	0.23	0.004	1.37	-0.002	-1.15	0.000	-0.06	-0.003	-0.89
Distance to nearest sugar mill (kilometers)	0.010	0.57	0.046	2.27	0.001	0.06	0.007	0.42	-0.042	-1.70
<i>Indices of barangay heterogeneity</i>										
Region of origin of the household head	4.311	3.16	6.503	3.19	0.423	0.48	0.146	0.13	-0.241	-0.17
Asset heterogeneity (1984 household assets)	0.000	-0.83	0.000	-0.33	0.000	-1.71	0.000	-1.57	0.000	0.89
Ethnicity of the household head	-3.115	-4.55	-3.363	-4.40	-0.953	-1.56	-1.035	-1.62	0.385	0.49
Education of the household head	-0.117	-1.60	-0.042	-0.46	0.133	1.15	0.213	2.82	0.017	0.20
Percentage of households affected by peace and order problems since 1984	0.009	3.10	0.007	2.44	0.004	2.12	0.000	0.11	0.001	0.47
<i>Programs operating in barangay, 2000-2001</i>										
Cooperatives	-0.756	-2.47	-1.007	-2.84	0.069	0.43	-0.347	-1.43	-0.824	-1.86
NGO programs	0.125	0.60	-0.184	-0.34	-0.247	-1.68	-0.210	-0.92	-0.502	-2.03
Government programs	-0.006	-0.04	0.123	0.61	-0.085	-0.62	0.023	0.16	-0.058	-0.29

Table 13— Determinants of individual membership in burial groups, religious groups, and civic groups: probit regressions with sample selection (continued)

Selection equation for the probability of being reinterviewed in 2003 not reported

Dependent variable: Probability of participating in a group

	Burial groups		Female		Religious groups		Female		Civic groups	
	Male dF/dx	z	dF/dx	z	Male dF/dx	z	dF/dx	z	Female dF/dx	z
Constant	0.367	0.08	-10.042	-1.78	0.426	0.12	-1.204	-0.37	-8.927	-1.28
Number of observations	509		508		509		508		508	
Censored observations	232		205		232		205		205	
Uncensored observations	277		303		277		303		303	
Wald test (chi-square)	87.81		129.45		65.60		76.70		78.23	
p-value	0.00		0.00		0.00		0.00		0.00	
Wald test of independent equations (chi-square)	1.72		2.70		1.56		0.00		0.00	
p-value	0.19		0.10		0.21		0.97		0.97	

z-statistics in bold are significant at 10% or better

Regressions on the probability of participating in at least one group, production, and credit groups are found in Table 12; those for burial, religious, and civic groups are in Table 13. As the tables show, some of the factors explaining group membership at the household level such as the presence of cooperatives operating in the village affect male and female group membership in the same way, but others have a differential effect by gender. The following discussion will focus on differences across gender in the impact of the regressors.

The results confirm that high school education is a very important predictor of group membership in at least one group and production groups for both males and females (Table 12). The coefficient of high school education is higher for females; secondary education increases the probability of women being members of credit, burial and religious groups whereas it has no significant impact on men joining such groups. The impact of age on membership in production groups is found only for males. Belonging to the lowest asset quartiles has a negative impact on membership in production and burial groups for both men and women, but the size of this impact is larger for males. Duration of residence in the community seems to affect only female membership in civic groups. Since all of these households have been present in the community since the original survey in 1984, they all have at least 20 years of presence in the community, which might explain the low predictive power of this variable. The higher the number of negative shocks experienced by the household, the more it is likely that female or male heads join credit groups. Credit groups are certainly considered a preferred option to mitigate the impact of adverse shocks in this setting. Shocks also positively influence membership in production groups for females and membership in any groups for males.

Interestingly, shocks have the opposite negative impact on membership in civic groups for females. Stability of the household (lower experience of shocks, longer presence in the community) seems to have an impact only in the case of membership in civic groups. Similar to its effects at the household level, distance to the town center has a significant negative impact on both male and female membership in groups except for production groups. This impact is always higher for females, perhaps because of lower control of transportation resources or because of greater opportunity costs of time for women. Distance to hospital has a positive impact on female membership in credit groups. Political unrest seems to have greater impact on male membership in groups with a positive impact on male membership in any group, in production, burial and religious groups. However, a greater incidence of political unrest had a negative impact on membership in credit groups for women. Similar to its impact at the household level, the presence of cooperatives operating in the village has a negative impact on the participation of men and women in any group, in credit and burial groups. Government programs have a consistent positive impact on membership in credit groups.

Group membership density

While three-fourths of our sample households participate in at least one group, about half (46 percent) belong only to one group. Looking at the results of the estimation of the number of groups with an ordered probit (see Table 14¹⁹) and comparing them with the results of the probit that the household or individual participates in at least one group (Tables 8 and 12, respectively), we can differentiate between factors that have the same impact on both

¹⁹ Estimations using a tobit model yield similar results and are reproduced in Appendix Table 4.

regressions –education, distance to *poblacion*, village level ethnicity heterogeneity, number of cooperatives and government programs operating in the village- and factors that have a different impact, namely assets, religion, shocks, origin and asset heterogeneity and peace and order problems.

Table 14— Determinants of the total number of groups, by individual, ordered probit
 Sample consists of the husband and wife (head and spouse)

	Whole sample Coeff	z	Male Coeff	z	Female Coeff	z
<i>Dependent variable: Total number of groups in which one is a member</i>						
Sex (1 if female)	-0.049	-0.50				
Age of head in 2003	-0.030	-0.49	-0.146	-1.37	0.137	1.27
Age of head in 2003, squared	0.000	0.82	0.002	1.62	-0.001	-1.16
Elementary education: Head has 6 years of schooling or more	0.107	1.00	0.031	0.19	0.206	1.24
High school education: head has 10 years of schooling or more	0.867	5.03	0.602	2.61	1.199	5.06
Household size in 2003	0.044	1.40	0.050	1.18	0.049	1.22
<i>Percentage of household members in 2003:</i>						
Aged 0 to 14	0.407	1.18	0.409	0.79	0.271	0.53
Aged 15 to 19	-0.593	-1.42	-1.484	-2.41	0.018	0.03
Aged 35 to 54	0.609	1.32	0.861	1.27	0.226	0.36
Aged 55 and over	0.212	0.48	0.139	0.22	0.369	0.63
<i>Asset quartile (in 1984; highest quartile excluded)</i>						
Lowest asset quartile	-0.644	-3.00	-0.749	-2.33	-0.598	-1.96
Second asset quartile	-0.293	-1.77	-0.481	-1.91	-0.156	-0.66
Third asset quartile	-0.484	-3.44	-0.601	-2.72	-0.404	-1.88
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>						
Land	0.001	0.49	0.002	0.44	0.002	0.64
Productive assets	0.002	0.53	0.001	0.18	0.003	0.72
Livestock	-0.003	-0.85	-0.004	-0.73	-0.001	-0.27
<i>Dummies for type of household in 2003</i>						
Sugar producing household	0.232	1.88	0.258	1.43	0.191	1.07
Agricultural producer household	-0.140	-1.07	0.047	0.24	-0.328	-1.84
Nonagricultural producer household	0.003	0.02	0.035	0.21	-0.097	-0.63
<i>Other household characteristics</i>						
Household head is Catholic	0.507	2.96	0.534	2.04	0.538	2.03
Years present in community	-0.007	-1.25	-0.014	-1.47	-0.005	-0.57
Number of shocks	0.094	2.64	0.064	1.21	0.125	2.47
<i>Distance from household</i>						
Distance to town center (kilometers)	-0.128	-6.98	-0.102	-3.94	-0.170	-6.21
Travel time to nearest hospital in 1984 (minutes)	0.001	0.74	0.000	0.10	0.002	1.22
Distance to nearest sugar mill (kilometers)	0.016	2.22	0.009	0.84	0.022	2.09
<i>Indices of barangay heterogeneity</i>						
Region of origin of the household head	1.165	2.33	1.973	2.73	0.482	0.71
Asset heterogeneity (1984 household assets)	0.000	-2.09	0.000	-2.72	0.000	-0.49
Ethnicity of the household head	-1.555	-5.04	-1.749	-3.99	-1.476	-3.43
Education of the household head	-0.029	-0.73	-0.024	-0.45	-0.025	-0.46
Percentage of households affected by peace and order problems since 1984	0.003	2.60	0.005	3.11	0.001	0.95

Table 14— Determinants of the total number of groups, by individual, ordered probit (continued)
 Sample consists of the husband and wife (head and spouse)

	Whole sample Coeff	z	Male Coeff	z	Female Coeff	z
<i>Programs operating in barangay, 2000-2001</i>						
Cooperatives	-0.488	-4.76	-0.418	-2.53	-0.577	-3.56
NGO programs	-0.058	-0.54	-0.208	-1.21	0.032	0.20
Government programs	0.146	2.00	0.114	1.02	0.185	1.77
Number of observations	580		277		303	
Wald test (chi-square)	232.08		131.62		144.98	
p-value	0.000		0.00		0.00	
Pseudo R-squared	0.15		0.17		0.17	

z-statistics in bold are significant at 10% or better

It is indeed noticeable that households with better educated heads participate in more groups, as do households living closer to town centers. The household age composition as well as the household head or spouse age has no impact on the number of groups to which the household belongs. Asset ownership has a significant impact on group membership density with richer households joining more groups. Catholic households also tend to participate in more groups but this finding is driven by their higher participation in religious groups. Catholic households do not significantly participate in more groups when religious groups are excluded (results not reported here). As 92 percent of the households are Catholics, it is easier to join existing or to create new religious groups for Catholic households: 35 percent of the Catholic households participated in at least one religious group whereas only 15 percent of the non-Catholic households participated in such a group.

Group membership is lower in villages with higher ethnic diversity. As discussed above, it is unclear whether this results from greater difficulty in group creation or in management. Village level origin heterogeneity has a positive impact on the number of

groups households and men participate in, whereas asset heterogeneity has a negative impact on both, but both of these effects are not significant for women. Households that experienced more negative shocks in the past are more likely to participate in more groups but this result seems to be driven by females participating in more groups as the number of past shocks increases. Whether women are more risk-averse, or are designated by the family to act as insurers, needs further investigation. Finally, political unrest has a positive impact on the number of groups the household belongs to but this effect is not significant for women.

NETWORK DENSITY AND SOCIAL CAPITAL

Do groups contribute to trust-based networks

We use a very similar specification to examine the determinants of network density. We define network density as the number of persons that a household can turn to for help; this is defined in relation to specific circumstances (see descriptives). Household network density can be modeled as a function of household characteristics and village-level attributes. Household characteristics include the age and education level of the household head, household size, household demographic composition, asset position, and the number of shocks experienced since 1984. Because personal relationships may affect network formation more than economic considerations (Fafchamps and Gubert 2004), we include measures of kinship relationships within and outside the village: the number of sons and daughters living inside and outside the village. We also include the measures of village-level heterogeneity described above. Means and standard deviations of variables used in the network regressions are found in Appendix Table 3.

An underlying question we wish to address is whether participation in groups increases network-based social capital. We treat participation in groups as endogenous, using as instruments producer status dummies (agricultural producer only, non agricultural producer only, both agricultural and non agricultural producer), whether the household head is Catholic, distance from the sugar mill and 1984 per capita expenditures on church and groups. Table 15 presents ordinary least squares and two-stage least squares estimates of the determinants of the sum of all networks.

Table 15—Determinants of network density, sum of all networks

OLS and 2SLS estimates

Dependent variable:	Sum of all networks				
	OLS estimates			2SLS estimates	
	Coeff	t	Coeff	z	
Number of groups a household belongs to in 2003	0.017	0.07	-0.236	-0.28	
Age of head in 2003	0.125	1.46	0.130	1.63	
Education level of the household head in 1984	0.383	2.40	0.417	2.31	
Household size in 2003	-0.094	-0.38	-0.077	-0.37	
Percentage of household members in 2003:					
Aged 0 to 14	1.287	0.40	1.199	0.43	
Aged 15 to 19	-0.263	-0.09	-0.684	-0.19	
Aged 55 and over	2.393	0.95	2.347	0.94	
Total asset value in 1984	0.008	2.31	0.008	2.35	
Other household characteristics					
Number of shocks, 1985-2003	0.511	1.91	0.565	1.61	
Indices of barangay heterogeneity					
Region of origin of the household head	1.842	0.55	2.372	0.64	
Asset heterogeneity (1984 household assets)	0.000	0.62	0.000	0.89	
Ethnicity of the household head	-2.334	-1.09	-2.643	-1.10	
Education of the household head	0.110	0.31	0.110	0.36	
<i>Location of children living outside the household</i>					
Number of daughters living outside the village	-0.558	-1.75	-0.552	-1.67	
Number of daughters living in the village	-0.016	-0.03	-0.044	-0.07	
Number of sons living outside the village	-0.226	-0.70	-0.198	-0.52	
Number of sons living in the village	1.026	1.54	1.032	1.78	
Constant	2.479	0.42	2.119	0.39	
Number of observations	310		310		
F test	2.21		2.4		
p-value	0.00		0.00		
Over-id test (Sargan statistic)			9.48		
p-value			0.22		
Test of exogeneity (p value)					
Wu-Hausman F test			0.09	0.76	
Durbin-Wu-Hausman chi-square test			0.10	0.75	
Sample	All households				

t or z-statistics in bold are significant at 10% or better. t-values are based on robust standard errors
 Instruments for group membership are: producer status dummies (agricultural producer only, nonagricultural business only, both agricultural producer and nonagricultural business), whether household head was Catholic in 1984, distance from the sugar mill, per capita expenditures on church activities in 1984, and per capita expenditures on groups in 1984

Surprisingly, the total number of groups to which a household belongs does not affect the density of its networks. The number of groups reduces the number of persons that one can rely on in case of significant economic loss. It is possible that formal membership in groups reduces the need to use personal connections as insurance against significant economic loss.

We also find that education of the household head increases network density across all types of socially-oriented networks, but only increases the number of individuals in the economic network related to price information. Households with higher asset values in 1984 have higher network density in general, and more individuals they can turn to in case of economic loss. It thus seems that the asset-rich are also able to use networks to insure against economic losses. Households that have experienced more shocks since 1984 also have higher network density in general, and higher density of networks related to taking care of the house, insurance from economic losses, and obtaining price information.

Sons and daughters perform different functions in social and economic networks—a finding that can be traced to the different roles of men and women in Filipino society. Daughters are trained to be responsible and often play the role of insurers, migrating to towns and cities and then sending remittances to their origin households (Lauby and Stark 1988). The number of daughters living outside the village weakly reduces the number of networks a household belongs to in general, and the number of people in price-information and technology-adoption networks. The number of daughters living in the village reduces the number of persons in one's economic loss networks, perhaps because daughters can be relied upon to help the parents in times of economic loss. In contrast, the number of sons living in the village affects only one type of network: it increases the number of persons one can ask to look after one's house.

It is possible that the total number of groups does not capture differences in group objectives, which could affect network density depending on the type of network. Table 16 presents ordinary least squares and two-stage least squares regressions of the impact of group membership on network density for family problems, economic loss and price information, using various definitions of the household's group membership.

Table 16—Impact of group membership on networks for family problems, economic loss, and price information

Coefficient of the effect of the probability of being a member on different types of groups on network density
 OLS and 2SLS estimates

Family problems	OLS estimates		2SLS estimates		Overid test		Tests of exogeneity			
	Coefficient		Coefficient		Sargan statistic chi-square	-value	Wu-Hausman p-value	Durbin-Wu-Hausman chi-square	p-value	
Sum of all groups	0.140		0.430		1.91					
		.57		.49		.97	.11	0.29	1.18	0.28
Probability of participating in groups:										
Any group	1.067		1.291		3.25			0.85	0.04	0.85
		.26		.05		.86	.03	0.97	0.00	0.97
Production	0.224		0.182		4.20			0.97	0.00	0.97
		.67		.16		.76	.00	0.80	0.07	0.79
Credit	1.101		1.607		3.64			0.80	0.07	0.79
		.21		.83		.82	.07	0.30	1.16	0.28
Burial	0.007		1.515		2.90			0.30	1.16	0.28
		.02		.02		.89	.10	0.30	1.14	0.29
Religious	0.119		1.056		2.84			0.30	1.14	0.29
		.46		.12		.90	.07	0.29	1.21	0.27
Civic	0.052		2.119		2.76			0.29	1.21	0.27
		.12		.06		.91	.14			
Economic loss	OLS estimates		2SLS estimates		Overid test		Tests of exogeneity			
	Coefficient		Coefficient		Sargan statistic chi-square		Wu-Hausman p-value			
Sum of all groups	-0.178		-0.739		4.17			0.11	2.74	0.10
		1.97		1.98		.76	.59			

Table 16—Impact of group membership on networks for family problems, economic loss, and price information

Coefficient of the effect of the probability of being a member on different types of groups on network density
 OLS and 2SLS estimates

	Coefficient	Coefficient	Sargan statistic	Wu-Hausman	Durbin-Wu-Hausman
Probability of participating in groups:					
Any group	0.562	-1.611	6.98	0.17	2.05
	.61	0.98	.43	.94	
Production	0.262	-0.854	8.03	0.42	0.68
	.56	0.60	.33	.64	0.41
Credit	0.136	-2.138	7.20	0.37	0.87
	.30	0.82	.41	.81	0.35
Burial	-0.472	-3.941	3.17	0.06	3.86
	1.12	1.96	.87	.67	0.05
Religious	-0.380	-1.529	6.73	0.32	1.07
	1.03	1.28	.46	.01	0.30
Civic	-0.687	-3.087	6.54	0.33	1.02
	1.65	1.23	.48	.96	0.31
Price information					
	OLS estimates	2SLS estimates	Overid test	Tests of exogeneity	
	Coefficient	Coefficient	Sargan statistic	Wu-Hausman	Durbin-Wu-Hausman
-	-		chi-square	p-value	chi-square
			-value	-test	p-value
Sum of all groups	-0.044	-0.055	16.61	0.97	0.00
	0.45	0.21	.02	.00	0.96
Probability of participating in groups:					
Any group	0.525	0.942	16.07	0.72	0.13
	.81	.79	.02	.12	0.71
Production	-0.348	-0.465	16.62	0.94	0.01
	1.03	0.31	.02	.01	0.94
Credit	0.571	5.115	6.29	0.03	4.86
	.28	.86	.51	.58	0.03
Burial	-0.235	-0.361	16.57	0.91	0.01
	0.69	0.31	.02	.01	0.91

Table 16—Impact of group membership on networks for family problems, economic loss, and price information

Coefficient of the effect of the probability of being a member on different types of groups on network density

OLS and 2SLS estimates

	Coefficient		Coefficient		Sargan statistic	Wu-Hausman	Durbin-Wu-Hausman		
Religious	-0.459		0.125		16.54		0.56	0.37	0.54
		1.53		.12		.02	.34		
Civic	0.375		-1.280		15.03		0.30	1.16	0.28
		.68		0.78		.04	.08		

Regressors and excluded instruments are identical to the previous table

Z statistics and p-values in bold are significant at 10% or better

We find that the number of groups, as well as membership in burial groups, reduces the total number of persons a household can seek assistance from. Death of a household member, especially an income earner, is one of the most frequent cases of income loss. It is therefore interesting to find that membership in burial groups tends to compensate the need for a large network of support in times of economic loss. Participation in groups does not seem to affect the size of the network related to family problems after instrumentation. However, participation in a credit group significantly increases the number of persons that can provide information on prices or places to sell products.

Impact on household welfare: Is it capital?

The previous section could not establish a clear link between group membership and the density of the household's social network. Here we investigate whether group membership can be considered as "capital": that is, whether it generates economic returns, such as a positive impact on per capita expenditures (Narayan and Pritchett 1999; Haddad and Maluccio 2003). Household expenditures were computed as the sum of expenditures on food consumption (purchased, produced, exchanged and received as a gift) and nonfood consumption (both purchased and received as a gift). Both per capita and per adult equivalent expenditures were computed. As in the preceding section, we investigate whether the number of groups to which the household belongs as well as whether the household was a member of at least one social group has an impact on per capita expenditures.²⁰ We regress per capita

²⁰ Results using expenditures per adult equivalent yield similar results that are not reported here; we discuss per capita expenditures for comparability with other studies.

expenditures on human capital of the household head (age and age squared in 2003, whether the household head completed primary education, whether he completed secondary education), household demographics (household size and proportion of household members in various age groups), asset value in 1984, dummies for productive status and the distance from the household to the town center.

We use 2SLS to estimate the impact of group membership on per capita expenditures to control for potential endogeneity of group membership. The set of instruments includes, aside from regressors of per capita expenditures, variables explaining various forms of group membership that do not directly affect per capita expenditure, namely: village-level measures of heterogeneity (origin, ethnicity, asset and education), distance to the closest sugar mill, a dummy for Catholic household heads and the level of household per capita expenditures on groups in 1984.

The results on the effect of the participation of groups on per capita expenditures are reported in Table 17.

Table 17— Impact of group membership and network density on per capita expenditures
 OLS and 2LS regressions; coefficient reported is that of the type of group or network

	OLS estimates		2SLS estimates				Tests of exogeneity			
	Coefficient	t	Coefficient	z	Sargan overid test		Wu-Hausman		Durbin-Wu-Hausman	
					chi-square	p-value	F-test	p-value	chi-square	p-value
<i>Sum of all groups</i>	14.080	0.35	-24.301	-0.27	14.69	0.02	0.19	0.66	0.20	0.65
<i>Probability of participating in groups:</i>										
Any group	-32.907	-0.24	-654.664	-1.63	10.39	0.11	2.78	0.10	2.92	0.09
Production	-48.724	-0.38	-343.517	-0.45	14.21	0.03	0.15	0.70	0.16	0.69
Credit	-108.581	-0.99	-500.465	-0.98	13.19	0.04	0.62	0.43	0.65	0.42
Burial	42.823	0.51	-155.020	-0.78	14.00	0.03	1.18	0.28	1.24	0.26
Religious	116.198	1.62	-236.309	-0.86	13.49	0.04	1.69	0.19	1.78	0.18
Civic	86.291	0.64	1754.612	1.96	4.97	0.55	5.81	0.02	6.03	0.01
<i>Size of all networks</i>	3.096	0.58	62.207	1.30	9.02	0.17	2.03	0.16	2.13	0.14
<i>Network density</i>										
Care of house	12.738	0.49	-555.875	-1.51	4.74	0.58	4.94	0.03	5.14	0.02
Family problems	34.394	2.59	267.594	2.28	3.81	0.70	6.59	0.01	6.81	0.01

Table 17— Impact of group membership and network density on per capita expenditures (continued)
 OLS and 2LS regressions; coefficient reported is that of the type of group or network

	OLS estimates		2SLS estimates		Tests of exogeneity					
	Coefficient	t	Coefficient	z	Sargan overid test		Wu-Hausman		Durbin-Wu-Hausman	
					chi-square	p-value	F-test	p-value	chi-square	p-value
Child care	-62.200	-1.55	-394.035	-1.03	5.48	0.48	0.83	0.36	0.89	0.34
Economic loss	-6.214	-0.28	58.919	0.80	12.98	0.04	0.82	0.36	0.87	0.35
Price information	17.337	1.28	72.710	0.74	10.14	0.12	0.32	0.57	0.34	0.56
Technology	43.527	1.12	227.213	1.24	8.01	0.24	1.07	0.30	1.15	0.28

Regressors include: age and age squared of the household head, dummies for elementary and secondary schooling and over, household size, proportion in age categories (0-13, 15-19, 35-54, and over 55), total value of assets in 1984, dummies for productive status, and distance to the poblacion (town center). Specific instruments are indices of village heterogeneity (region of origin of the household head, ethnicity of the household head, education of the household head and asset), dummies for productive status, distance from the village center to the nearest sugar mill, dummy for Catholic household head in 1984 and per capita expenditures in groups in 1984.

Neither the number of groups to which the household belongs nor participation in at least one group has a significant impact on household per capita expenditures. Membership in all of the reported groups can produce social externalities such as information sharing, copying or insurance but the groups differ as some are directly geared toward production, credit and insurance (burial groups) and others, such as religious and civic groups, are not economically motivated. Since participation in economic oriented groups might have a higher impact on per capita expenditures, we present alternative specifications where group membership reflects group membership in production, credit, burial, religious and civic groups, respectively. Only membership in civic groups significantly increases per capita expenditures, although this result may be sensitive to the set of instruments we use. In the second part of Table 17, we present the impact of the density of various informal networks on per capita expenditures. The size of all informal networks as well as the size of most specific networks has no impact on per capita expenditures. The only network that significantly increases per capita expenditures is the one related to family problems. Since women take a more active role in maintaining the family's social connections in Filipino culture, the composition of this network is probably dominated by women who comprise the wife's social networks. This effect may be similar to the positive impact of civic groups on per capita expenditures, as these groups are mostly women's groups. Our results therefore suggest that women's formal and informal networks might be more effective at increasing per capita expenditures.

CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

This paper has found that asset-rich and better-educated households are more likely to participate in groups and to have larger social and economic assistance networks. This may reflect higher returns to social capital for the wealthy, or greater barriers to participation for the poor. Disentangling self-selection and barriers to membership could not be addressed in this study but would provide very interesting information on the process of group participation. Group membership is also affected by type of productive activity and distance to facilities; as expected, distance from the town center reduces the probability of joining groups, owing to higher transactions costs of group membership. Different aspects of village-level heterogeneity have different impacts on group membership: ethnic heterogeneity reduces the probability that households participate in at least one group and in burial groups, but origin heterogeneity increases participation in production groups and burial groups. Education heterogeneity reduces participation in credit groups, but asset heterogeneity increases it. The persistent negative effect of ethnic heterogeneity, even in the individual regressions, points to long-standing differences between ethnic groups that are not conducive to social cohesion. Greater exposure to shocks and a higher incidence of peace and order problems increase group membership, probably owing to insurance motives. Men and women have equal propensities to participate in groups and do not differ significantly in the number of groups they join. However, there are clear gender differences in the types of groups to which men and women belong. Men are more likely to join productive and burial

groups; women, civic groups. This may reflect a gender division of labor within the household or separate spheres of decision-making.

Our findings suggest that the delivery of services through existing groups by development agencies is likely to leave vulnerable households behind. For example, using production groups as conduits for service delivery will be less likely to reach women, the asset and education poor, as well as households living in remote places. Moreover, some environments are less conducive for group membership and external agencies should take into account *barangay* level heterogeneity in their attempts at group formation.

In contrast, very few economic variables affect the size of the household's assistance networks. Network density does increase with education and assets, again showing that the rich are better able to invest in informal social capital. Kinship variables are also significant determinants of the size of one's networks. Households may invest less in mutual assistance networks if relatives (particularly daughters, in the Philippine context) can act as insurers. The number of sons living in the village increases the number of persons one can ask to look after one's house but has no effect on other type of networks, especially the economic support network.

We also find that group membership does not, in general, increase network density, although it may affect the formation of specific types of assistance networks. Households belonging to more groups have smaller networks that insure against economic loss, possibly because formal groups perform this insurance function. Finally, we do not find evidence of positive returns to group membership in terms of increased per capita expenditures.

Why does group membership not yield direct economic benefits in terms of increased per capita expenditures to households? If group membership yields minimal economic

benefits, why do people join groups? A statement by the municipal officer for agrarian reform in one of our survey sites (Kitaotao) highlighted that group membership could also facilitate the acquisition of political power: “Most of our leaders in the agrarian reform committee come from religious groups”. It is also possible that the social and political environment may not be conducive to capturing the economic benefits of group membership. Maluccio et al. (2000), for example, find that in South Africa, social capital had no apparent return to households in 1993, but substantial returns in 1998 after apartheid had been abolished. Access to financial resources and insurance provided by groups (credit groups, burial groups) are economic benefits per se. However, the economic returns households derive from these might vary among different types of households, with some households benefiting a lot from group membership and others faring worse. The distribution of returns to group membership might also differ across gender, which we cannot investigate with our data. The lack of network-based returns to group membership is an issue that also deserves further investigation in future qualitative work.

A related issue is the extent to which investment in “migration capital” complements or substitutes for “local” social capital. Migration is an important livelihood strategy in the Philippines—in 1991, twenty-six percent of urban households and 13 percent of rural households received remittances from migrant parents or children (Cox and Jimenez 1995). In our study sample, close to half—47 percent—of children 15 and older are migrants to rural, peri-urban and urban areas in the Philippines, as well as overseas. Similar to the national pattern, a higher proportion of migrants is female. Do households with migrant children invest less in local social capital because they can rely on transfers from their migrant

children? Or do households with more migrant members participate more in social networks to compensate for lack of interaction with distant family members?

Qualitative methods may be better suited to probing some of the unanswered questions raised by this initial quantitative analysis. In particular, qualitative methods may be better able to uncover the motives behind network formation and group membership. The evaluation of the benefits and drawbacks of group membership might be strengthened by a differentiation of quality and type of participation and from the evaluation of power and gender relations within these networks. Qualitative methods may also be better suited to explore the roles and types of informal networks more deeply. Questions on the number of people that the person would turn to in a given situation could be expanded to consider the nature of the relationship with this person, and to include a mapping of networks through case studies. Another issue to consider is whether and how these networks are 'gendered' in terms of their composition and their linkages to specific individuals within the household.

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Table A1—Means and standard deviations of variables used in the group membership regressions

Number of observations=311

Variables	Mean	SD
<i>Dependent variables</i>		
Number of groups per household	1.56	1.52
Membership in all groups (dummy variable)		
All groups	0.76	0.43
Production group	0.27	0.44
Credit group	0.22	0.41
Burial group	0.32	0.47
Religious group	0.33	0.47
Civic group	0.22	0.41
<i>Regressors</i>		
Dummy: 1 for female head or spouse	0.51	0.50
Age of head	36.32	8.23
Age of head squared	1386.47	623.11
Elementary education: Head has 6 years of schooling or more	0.38	0.49
High school education: head has 10 years of schooling or more	0.15	0.36
Household size	5.72	2.49
Percentage of household members aged 0 to 14	0.22	0.18
Percentage of household members aged 15 to 49	0.13	0.14
Percentage of household members aged 35 to 54	0.23	0.20
Percentage of household members aged 55 and over	0.19	0.25
<i>Asset quartile (in 1984; highest quartile excluded)</i>		

Table A1—Means and standard deviations of variables used in the group membership regressions (continued)

Number of observations=311

Variables	Mean	SD
Lowest asset quartile	0.16	0.37
Second asset quartile	0.26	0.44
Third asset quartile	0.28	0.45
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>		
Land	18.21	25.49
Productive assets	16.74	17.23
Livestock	14.34	16.72
<i>Dummies for type of household</i>		
Sugar producing household	0.36	0.48
Agricultural producer household	0.72	0.45
Nonagricultural producer household	0.31	0.46
Household head is Catholic	0.92	0.28
Number of years the household has been present in the community	41.81	8.55
Number of negative shocks reported by the household from 1984 until 2001	1.98	1.37
<i>Distance from household</i>		
Distance to town center (kilometers)	5.37	3.59
Travel time to nearest hospital in 1984 (minutes)	60.54	46.24
Distance to nearest sugar mill (kilometers)	22.58	9.43
<i>Indices of barangay heterogeneity</i>		
Region of origin of the household head	0.55	0.14
Asset heterogeneity (based on 1984 assets)	695.52	859.45
Ethnicity of the household head	0.47	0.19

Table A1—Means and standard deviations of variables used in the group membership regressions (continued)

Number of observations=311

Variables	Mean	SD
Education of the household head	6.74	1.35
Percentage of households affected by peace and order problems since 1984	16.59	49.44
<i>Programs operating in barangay, 2000-2001</i>		
Cooperatives	0.34	0.49
NGO programs	0.19	0.50
Government programs	0.45	0.75

Table A2—Means and standard deviations of variables used in attrition analysis

Number of observations=510

Variables	Mean	SD
<i>Dependent variable</i>		
Probability of being in the sample in 2003	0.61	0.49
<i>Regressors</i>		
Age of the household head in 1984	35.68	8.38
Age of the household head in 1984, squared	1342.81	631.84
Years of schooling of the household head in 1984	5.63	3.04
<i>Asset quartile (in 1984; highest quartile excluded)</i>		
Lowest asset quartile	0.25	0.43
Second asset quartile	0.25	0.43
Third asset quartile	0.25	0.43
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>		
Land	17.37	26.52
Productive assets	19.35	21.91
Livestock	12.92	16.77
<i>Share of household members age 15-65</i>		
Share aged 55-64	0.01	0.07
Share aged 45 to 54	0.06	0.14
Share aged 35 to 45	0.30	0.32
Share aged 25 to 34	0.74	0.29
Share of female working age household members	0.48	0.10
Number of household working age members	2.70	1.16
Distance from the household to the village center (kilometers)	5.18	3.56

**Table A2—Means and standard deviations of variables used in attrition analysis
(continued)**

Number of observations=510

Variables	Mean	SD
Travel time from household to nearest hospital in 1984 (minutes)	59.27	43.93
Distance from the village center to Busco sugar mill (kilometers)	31.69	14.30
Percentage of other households interviewed in the village in both 1984/85 and 2003	0.88	0.09
Percentage increase in the number of households in the village, 1980-2000	0.74	0.42

Table A3—Means and standard deviations of variables used in the network analysis

Variables	Mean	SD
<i>Dependent variables</i>		
Number of persons in all the household's networks, N=310	13.30	7.48
Number of persons that can help in case of important economic loss, N=310	0.75	0.43
Number of persons that can help look after the house in an emergency, N=311	1.82	1.29
Number of persons that can help with prices or places to sell products, N=254 (1)	2.41	2.23
Number of persons that can look after the household's young children in an emergency, N=215 (2)	1.66	0.91
Number of persons the household would confine with in case of family problems, N=311	0.58	0.49
Number of persons the household would follow if they adopted a new technology, N=222 (3)	1.80	1.21
<i>Regressors</i>		
Age of the household head in 2003	54.76	7.74
Years of schooling of the household head in 1984	5.70	3.12
Household size	5.72	2.49
Share of household members		
Share aged 0-14	0.22	0.18
Share aged 15-19	0.13	0.14
Share aged 35-54	0.23	0.20
Share aged 55 and over	0.19	0.25
Number of years the household has been present in the community	41.81	8.55
Number of negative shocks reported by the household from 1984 until 2001	1.98	1.37
<i>Indices of barangay heterogeneity</i>		
Region of origin of the household head	0.55	0.14

Table A3—Means and standard deviations of variables used in the network analysis (continued)

Variables	Mean	SD
Asset heterogeneity (based on 1984 assets)	695.52	859.45
Ethnicity of the household head	0.47	0.19
Education of the household head	6.74	1.35
<i>Children's location</i>		
Number of daughters living outside the parents' village	2.03	1.68
Number of daughters living in the parents' village	0.48	0.83
Number of sons living outside the parents' village	1.62	1.46
Number of sons living in the parents' village	0.50	0.87

(1) The sample is defined over households operating a non agricultural business and households engaged in agricultural production

(2) The sample is defined over households with at least one child under 15

(3) The sample is defined over households engaged in agricultural production

Table A4--Determinants of the total number of groups, by individual, tobit model

Specification with sampling weights
Sample consists of the husband and wife (head and spouse)

	Whole sample		Male		Female	
	Coeff	z	Coeff	z	Coeff	Z
<i>Dependent variable: Total number of groups in which one is a member</i>						
Sex (1 if female)	-0.058	-0.41				
Age of head in 2003	-0.029	-0.31	-0.190	-1.39	0.221	1.39
Age of head in 2003, squared	0.001	0.61	0.002	1.62	-0.002	-1.27
Elementary education: Head has 6 years of schooling or more	0.120	0.76	0.002	0.01	0.278	1.15
High school education: head has 10 years of schooling or more	1.207	5.39	0.742	2.50	1.745	5.12
Household size in 2003	0.067	1.64	0.071	1.29	0.073	1.24
<i>Percentage of household members in 2003:</i>						
Aged 0 to 14	0.598	1.18	0.591	0.88	0.391	0.52
Aged 15 to 19	-0.761	-1.27	-1.966	-2.47	0.159	0.18
Aged 35 to 54	0.836	1.29	1.060	1.21	0.292	0.31
Aged 55 and over	0.299	0.49	0.127	0.15	0.565	0.66
<i>Asset quartile (in 1984; highest quartile excluded)</i>						
Lowest asset quartile	-0.906	-2.92	-0.913	-2.20	-0.887	-2.00
Second asset quartile	-0.370	-1.54	-0.548	-1.68	-0.199	-0.58

Table A4--Determinants of the total number of groups, by individual, tobit model (continued)

Specification with sampling weights
 Sample consists of the husband and wife (head and spouse)

	Whole Sample		Male		Female	
	Coeff	z	Coeff	z	Coeff	z
Third asset quartile	-0.667	-3.10	-0.722	-2.53	-0.596	-1.91
<i>Proportion of asset in total asset value in 1984 x 100; housing and consumer durables excluded</i>						
Land	0.002	0.47	0.003	0.66	0.003	0.53
Productive assets	0.003	0.62	0.001	0.19	0.005	0.76
Livestock	-0.005	-0.91	-0.005	-0.76	-0.003	-0.34
<i>Dummies for type of household in 2003</i>						
Sugar producing household	0.376	2.11	0.390	1.67	0.323	1.23
Agricultural producer household	-0.206	-1.11	0.019	0.07	-0.465	-1.77
Nonagricultural producer household	0.010	0.07	0.056	0.27	-0.131	-0.58
<i>Other household characteristics</i>						
Household head is Catholic	0.732	2.81	0.647	1.92	0.843	2.17
Years present in community	-0.010	-1.10	-0.018	-1.50	-0.007	-0.51
Number of shocks	0.148	2.86	0.093	1.35	0.198	2.68
<i>Distance from household</i>						
Distance to town center (kilometers)	-0.176	-6.84	-0.125	-3.80	-0.244	-6.19

Table A4--Determinants of the total number of groups, by individual, tobit model (continued)

Specification with sampling weights
Sample consists of the husband and wife (head and spouse)

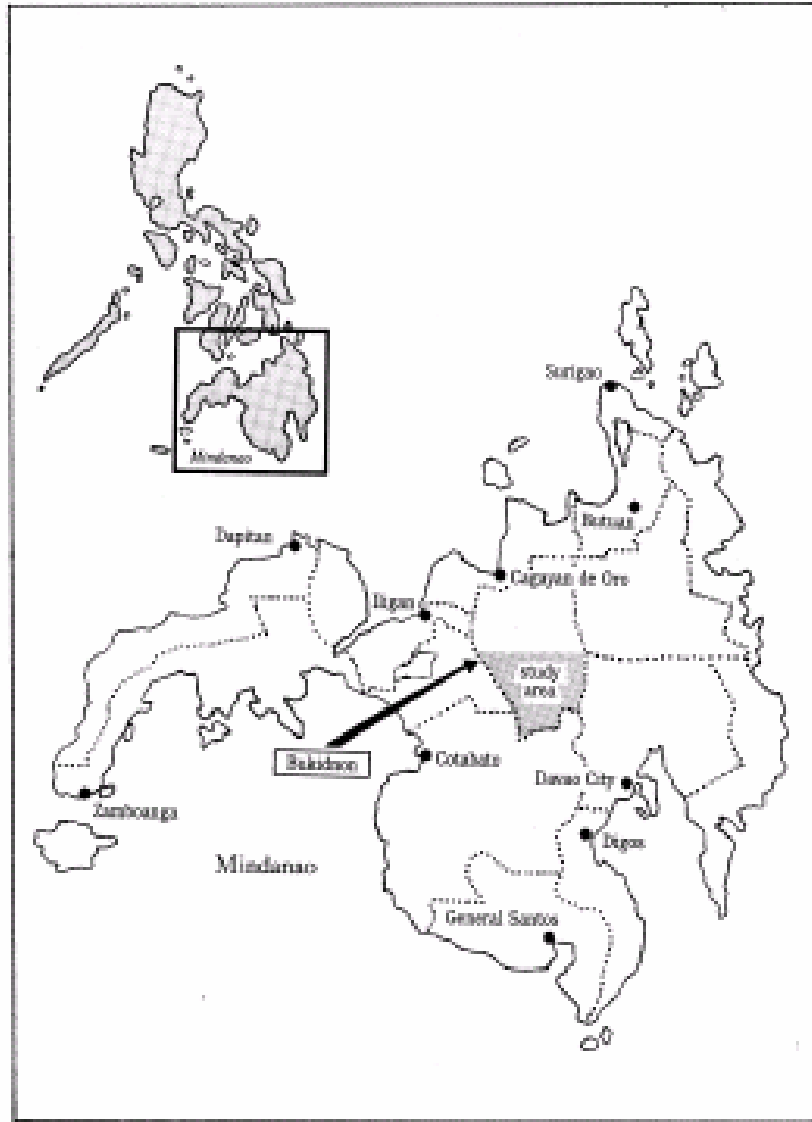
	Whole Sample		Male		Female	
	Coeff	z	Coeff	z	Coeff	z
Travel time to nearest hospital in 1984 (minutes)	0.001	0.58	0.000	0.03	0.003	1.17
Distance to nearest sugar mill (kilometers)	0.020	1.89	0.010	0.71	0.030	1.95
<i>Indices of barangay heterogeneity</i>						
Region of origin of the household head	1.680	2.43	2.528	2.72	0.787	0.79
Asset heterogeneity (1984 household assets)	0.000	-1.96	0.000	-2.76	0.000	-0.38
Ethnicity of the household head	-2.174	-5.02	-2.247	-3.97	-2.102	-3.33
Education of the household head	-0.055	-1.03	-0.051	-0.72	-0.044	-0.56
Percentage of households affected by peace and order problems since 1984	0.004	2.87	0.006	3.29	0.002	0.93
<i>Programs operating in barangay, 2000-2001</i>						
Cooperatives	-0.678	-4.20	-0.523	-2.45	-0.829	-3.52
NGO programs	-0.058	-0.36	-0.249	-1.12	0.064	0.28
Government programs	0.208	1.93	0.159	1.10	0.258	1.68
Constant	0.784	0.28	5.601	1.29	-5.541	-1.26
Number of obs	580		277		303	

Table A4--Determinants of the total number of groups, by individual, tobit model (continued)

Specification with sampling weights
 Sample consists of the husband and wife (head and spouse)

	Whole sample		Male		Female	
	Coeff	z	Coeff	z	Coeff	z
LR chi2(33)	237.14		126.92		141.92	
Prob > chi2	0.00		0.00		0.00	
Pseudo R2	0.13		0.15		0.15	
Censored observations	227		102		125	
Uncensored observations	353		175		178	
z-statistics in bold are significant at 10% or better						

Figure A1--Map of the Philippines, indicating study area



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