WHO COOPERATES?
A Study of Membership in Peasant Cooperatives

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Abstract:

This paper analyzes both theoretically and empirically the factors conducive to peasants' decisions to join a producer organization. The theoretical results state that the fraction of organized peasants in the village will be higher if (i) the higher the gains of cooperation, (ii) the higher the probability of survival of the organization, (iii) the higher the probability of eviction by landlords, and (iv) the lower the peasants' subjective costs of cooperation. These results are statistically tested based on two surveys carried out in rural Paraguay: one at the household level that includes 261 peasant households, and the other at the community level that provides aggregate information about the 49 villages in which these households are located. The explanatory variables in the regressions are a set of proxies of the gains from cooperation as well as proxies of the probability of survival of the committee, the probability of eviction, and the subjective costs of cooperation. The most important findings of this econometric analysis are that the likelihood that a peasant household will join a peasant organization is an inverse function of its outside options, participation in other comunitarian institutions, possession of a land title, and average integration of its area of location; and a positive function of its income and the performance level of the peasant committee in its community.

1. Introduction

In the transition to democracy and economic liberalization, many developing countries are presented with expanding opportunities for the private sector and diminishing capacities for government action. Within the private sector, there is a dynamic new development force in addition to the market: organized civil society or what I call the collective action sector. The new dynamism of civil society is due to both (i) the democratization process that allows the collective action sector, which includes peasant organizations, federations of urban informal enterprises, and NGOs, to operate more freely; and (ii) the diminished capacity of governments after stabilization and structural adjustment programs that were targeted at reducing government expenditures.

This new scenario challenges the received wisdom of development economics that has traditionally focused on what governments and markets can and cannot do to improve welfare in developing countries. There are many economic problems such as the internalization of ecological externalities, the provision of local public goods, and credit to the poor that neither the market nor the state can reliably solve. The collective action sector may play an important role in solving such economic problems. This is perhaps why an active area of current research has been the understanding of conditions that make the collective action sector work for development purposes (e.g, Baland and Platteau 1996, Bardhan 1993, Ostrom 1990, Putnam 1993, Wade 1987).

This paper focuses on peasant organizations within the collective action sector. Peasant organizations can be instrumental in improving the welfare of the rural poor by providing access to credit through rotating loan funds, decreasing transaction costs in commercial activities, and improving education and health among other benefits. If policy makers decide to attack rural poverty by catalyzing peasant organizations, they need answers to questions such as: (i) what are the characteristics of the peasants more likely to join such organizations?, and (ii) what are the key factors policy makers can affect? This paper contributes to the process of answering these questions.

This paper analyzes both theoretically and empirically the factors conducive to peasants' decisions to join a producer organization. The theoretical results state that the fraction of organized peasants in the village will be higher: the higher the gains of cooperation, the higher the probability of survival of the organization, the higher the probability of eviction by landlords, and the lower the peasants' subjective costs of cooperation. These results are statistically tested based on two surveys carried out in 1995 in rural Paraguay: one survey is at the household level including 261 peasant households, and the other at the community level, providing aggregate information about the 49 villages in which these households are located. By combining these two surveys, this study is able to simultaneously control for household, organization, and village-specific characteristics.

The explanatory variables in the regressions are a set of proxies of the gains from cooperation as well as proxies of the probability of survival of the committee, the probability of eviction, and the subjective costs of cooperation. The most important findings of this econometric analysis are that the likelihood that a peasant household will join a peasant organization is an inverse function of its outside options, subjective costs of cooperation, possession of a land title, and average integration of its area of location; and a positive function of its income and the performance level of the peasant committee in its community.

The organization of this paper is as follows: section 2 presents the analytical model and section 3 discusses the empirical results. Section 3.1 presents the data to be used in the econometric analysis, section 3.2 the regression results and section 3.3 discusses the determinants of peasants' decisions to join producers' organizations. Finally, section 4 presents some concluding remarks.

2. A Model of Membership in Peasant Cooperatives

We consider a peasant's decision on whether or not to join a cooperative in an economy in which there are three groups of peasants: (i) members of successful cooperatives, (ii) members of failed ones, and (iii) the

non-organized. Peasants receive a given amount of income y in each of an infinite number of discrete time periods. Let y^s, y^f and y^n be the expected income per period of members of a successful and failed cooperative, and the non-organized peasant respectively. In this economy, $y^s > y^n > y^f$. The rent per period generated by a successful cooperative over the non-organized expected income (y^s - y^n) is b. Consider further that landlords cannot evict members of a successful organization. Members of a failed organization are evicted with certainty and non-organized peasants are evicted with probability e. The probability of survival of the organization to the next period is s. Evicted peasants work forever for a wage w. Expected wage $w = y^f$. The loss of income per period over the non-organized peasant expected income due to eviction (y^n - w) is l. In this economy, peasants are risk-neutral, discount future incomes at the positive rate r and have heterogeneous subjective costs of cooperation c. These costs c are either the dis-utility or the utility associated with participation.[1] In c, utility is handled as a negative subjective cost. The costs c_i are assumed to be uniformly distributed over the interval $[c_{min}, c^{max}]$ with the cumulative density $c(f)$, where f is the fraction of organized peasants and $c_f > 0$. The equilibrium f is reached when there is not net joining or leaving in the cooperative. This is the same as stating that in equilibrium the marginal peasant who remains in the cooperative is indifferent to membership in the organization.

We should note two things regarding justifications of the plausibility of the assumptions stated above. First, successful organizations can offer the benefits of economies of scope in administrative, market research, and bargaining tasks whereas peasants who joined failed organizations may be punished by landlord/merchants to discourage other peasants from joining such organizations (e.g, Bebbington 1996, Breslin 1981, Deere et. al. 1985).[2] Second, successful peasant organizations can provide an effective defense against eviction, and eviction has non-negligible costs (e.g, Campos and Borda 1992, Fogel 1986).

To analyze the factors determining peasants' decisions to join a cooperative, consider that the expected value of not joining the organization of a peasant i in period t is

(1) $$V_i^N(t) = \frac{y^n + (1-e)V_i^N(t) + eZ}{(1+r)}$$

Where Z is the fallback position in case of eviction which is:

(2) $$Z = \frac{w}{r}$$

Stationarity implies that $V_i(t) = V_i$ for all t. From (1) and (2) the value of a non-joining strategy is

(3) $$V_i^N = \frac{l}{(r+e)} + \frac{w}{r}$$

which is just the present value of future incomes of non-organized peasants.
The expected value of joining the organization for peasant i in period t is

(4) $$V_i^J(t) = \frac{y^n + b - c_i + sV_i^J(t) + (1-s)Z}{(1+r)}$$

The expected present value of the joining strategy is

(5) $$V_i^J = \frac{l + b - c_i}{r + (1-s)} + \frac{w}{r}$$

A peasant chooses to join the organization when $V^J > V^N$. From (3) and (5) this is identical to the inequality

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[1] For some peasants, for example, participating in a two-hour meeting may be a source of dis-utility, whereas for other peasants it may be a source of utility.
[2] Peasant organizations' activities threaten the landlord/merchants' rates of profits by trying, for example, to avoid intermediation chains and find cheaper credit. Commercial intermediation and usury is assumed to be central to landlord/merchants rates of profits.

(6) $$b - l\left(\frac{(1-s)-e}{r+e}\right) > c_i$$

Equation (6) establishes the conditions for a peasant to join a rural organization. The left-hand side of (6) is the expected monetary gain of joining the peasant organization, the first term is the expected rent produced by a successful organization for their members and the second term the expected loss of future income over the reservation position V^n due to eviction. Those peasants with cost c_i lower than the expected money gain of joining the organization, join the cooperative.

Since those peasants with lower c join the cooperative first (i.e. $c_f > 0$), in equilibrium

(7) $$c_{last} = b - l\left(\frac{(1-s)-e}{r+e}\right)$$

where c_{last} is the subjective cost of cooperation of the last peasant to join the cooperative. Given that c_i is uniformly distributed, in equilibrium

(8) $$c_{last} = c_{min} + \boldsymbol{d}\, f^e \qquad ,where\ \boldsymbol{d} > 0\ and\ \ 0 \le f^e \le 1$$

From (7) and (8) we know that the equilibrium fraction of peasants who choose to join the cooperative is

(9) $$f^e = \frac{1}{\boldsymbol{d}}\left(b - l\left(\frac{(1-s)-e}{r+e}\right) - c_{min}\right)$$

The main predictions of the model are summarized in three propositions whose proofs are straightforward by differentiating (9):

Proposition 1. *The equilibrium fraction of organized peasants f^e will be higher:*
a) the higher the monetary gain of joining a successful organization for a non-organized peasant $\boldsymbol{b}$
b) the higher the probability of survival of the organization to the next period $\boldsymbol{s}$
c) the higher the probability of eviction $\boldsymbol{e}$, and
d) the lower peasants' subjective costs of cooperation $\boldsymbol{c}$

Proposition 2. *If joining the organization increases the probability of being evicted [(1-s)>e], the equilibrium fraction of organized peasants will be higher:*
a) the lower the loss of income per period over y^n due to eviction $\boldsymbol{l}$, and
c) the higher the discount rate $\boldsymbol{r}$

Proposition 3. *If joining the organization decreases the probability of being evicted [(1-s)<e], the equilibrium fraction of organized peasants will be higher:*
a) the higher the loss of income per period over y^n due to eviction, and
c) the lower the discount rate

The economic intuition behind proposition 1 is clear: more peasants will join cooperative organizations the higher the monetary benefits of joining a successful organization, the fewer subjective constraints they have for engaging in collective endeavors, and the higher the scope for protection against eviction given by the ratio of the probabilities of eviction of the non-organized to the organized: $e/(1-s)$.

The intuition behind propositions 2 and 3 is that peasants try to minimize losses from eviction. If joining the organization increases the probability of being evicted, the likelihood of a peasant joining it will be inversely related to the expected losses from eviction. Proposition 2 states this inverse relationship. The expected losses from eviction depends positively on the loss per period l and negatively on the discount rate r. If joining the

organization decreases the probability of being evicted, the likelihood of a peasant joining it will be directly related to the expected losses from eviction since avoiding such losses by joining the organization will be an incentive for peasants to join. This is stated in proposition 3.

3. The Empirical Study

3.1 The Data

This paper uses two surveys: one of 374 peasant households and the other of the leadership of 104 peasant committees among cotton producers in the Paraguayan departments of *Concepcion, San Pedro,* and *Caaguazu* carried out in 1995. The household survey was carried out by the *Centro Paraguayo de Estudios Sociológicos* (CPES) and contains detailed information on the demographic characteristics of the household, production, income and asset data, housing and sanitary conditions of the households, and information regarding membership in peasant organizations. The leadership survey contains information on the activities, membership, degree of members' participation, and history of the committee as well as aggregate data on the village. The leadership survey was carried out simultaneously with the CPES household survey in most of the villages.

The leadership survey provides information on peasants' committees that attempt to reduce rural poverty. Table 1 presents a summary of the committees' activities. All peasant committees in our sample belong to a higher level organization (HLO).

The CPES survey included 374 peasant households; however, only 267 households are located in communities where the leadership survey was carried out and six had missing variables. Of these 261 households, 149 are organized peasant farms and 112 households are non-organized. Individual households were selected according to the following procedure: (i) a community inventory listing each household in the community and the amount of land it controls was obtained by interviewing community leaders; (ii) peasant farms were grouped in five land-size categories; and (iii) individual households were selected by a stratified random sampling procedure. The five categories in which an individual peasant farm could fall were the following: group 1: less than 1 hectare of land; group 2: from 1 to 5 hectares; group 3: from 5.1 to 9 hectares, group 4: from 9.1 to 13 hectares, and group 5: more than 13.1 hectares. The household survey includes peasant farms from groups 2 to 4. Farms that fell in groups 1 and 5 were excluded from the sample *a priori*.[3] The stratification criteria were such to ensure representation of members of specific organizations that were either beneficiaries or have applied to be beneficiaries of a specific project funded by the IFAD/government. Once the "target" households were identified, "control" households were selected in the surrounding area. The control households included either members of a non-beneficiary organization or non-organized peasants. The sample distribution among the different land-size categories of target households was similar to the distribution of control households: Group 2 (19.1% in target and 23.7% in control households), Group 3: 32.2% in both groups, and Group 4: (48.7% in target and 44.1% in control households). Specific households to be surveyed were selected randomly.

3.2 Explaining the Household Decision to Join a Peasant Organization

This section presents an econometric analysis of the determinants of joining peasant organizations based on the results of the theoretical model above stated in proposition 1. Due to data limitations,[4] (i) we are unable to compare the relative sources of eviction and (ii) we will focus on explaining the decision of individual households to join peasant organizations as opposed to the fraction of organized peasants in the village. Our

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[3] Among the 374 households surveyed, there were four belonging to group 5; i.e., three peasant farms with 15 hectares and 1 with 20 hectares. I included these four observations in the analysis. These four observations reflect small discrepancies between the information about land distribution in the community given by a community leader and the actual distribution. The actual farm size was found out during the household survey.

[4] We do not have data representative of the whole village.

dependent variable will be a dummy that takes on the value of 1 if the household belongs to a peasant organization and 0 otherwise.[5] The explanatory variables in the logit regressions will be proxies of the gains from cooperation, the probability of survival of the committee, the probability of eviction, and the subjective costs of cooperation.

The gains from cooperation for members b in these peasant organizations are expected to be inversely related to the outside options (outside of the organization) the peasant household has in generating income. Outside options to increase net income compete with the options offered by the peasant organization. Therefore, the higher the relative returns of outside options, the lower the potential gain from cooperation for a given peasant household.

The gains from cooperation are also expected to be inversely related to the degree of integration of the area where the peasant household is located. The more isolated the area, the greater the likelihood that peasants will face monopoly and monopsony power in the buying of their inputs and in the selling of their output respectively since competition to local merchants will be restricted by the difficulty of gaining access to the area. The higher the monopoly (monopsony) rent obtained by the merchant/landlord , the higher the commercial mark-up peasants will get when avoiding the local intermediation by jointly commercializing their output and buying collectively their inputs through community stores.[6]

Additionally, the gains from cooperation for members may be positively related to the scope for improving the community infrastructure, providing a certain degree of excludability of the benefits generated by the improved infrastructure. Peasant committees can be instrumental in providing the missing infrastructure in the community. However, the provision of infrastructure will increase the rent for members b as long as it is possible to exclude non-members from equally sharing the benefits of the improved infrastructure.[7] Excludability is easier with certain components of the community infrastructure than with others. For example, a community health center may charge differentiated fees to members and non-members. On the other hand, improving the local public roads makes it more difficult to exclude non-participants. Therefore, given a certain degree of excludability, the poorer the infrastructure in the peasant village, the greater the potential gains from the committee's actions towards improving and/or providing community infrastructure. The excludability conditionality forces us to control to some extent the degree of excludability of the peasant activities.[8]

The probability of survival of the committee s is expected to be positively related to the committee's level of successful performance. In measuring performance, the indicators of success are taken to be: i) members' participation in the activities of the committee and articulation of local peasants in wider networks, ii) the perception of being a successful committee by their members and leaders, iii) a larger number of activities targeted at reducing rural poverty,[9] and iv) the degree of emulation of the organizational experience in the surrounding areas. After all, if the committee is successful, peasants from the region will attempt to copy the

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[5] An organized household means that at least the household head participates in a peasant organization. In many cases, more than one family member actively participates. Unfortunately, information on individual participation by household members is not available.

[6] Commercial activities are subject to economies of scope. The indivisibilities of some commercial tasks make unfeasible attempts to avoid commercialization chains by an individual peasant household alone.

[7] If committees provide pure public goods, they will not increase directly the rent generated by a successful organization b but they will increase the expected income of the non-organized y^n.

[8] Economists might be prone to ask why these committees would provide non-excludable goods at all. Two things should be noted related to the provision of more difficult-to-exclude services by these peasant committees in Paraguay. First, in such cases the peasant organizations tend to act as catalyzers of the community since often the provision of the public good is conditional on a level of participation of non-members; in this case free-riding incentives is reduced. Second, the provision of public-good-type infrastructure may often be a necessary condition for other activities that allows increased rents for members. For example, improved roads may facilitate attempts at joint commercialization, and getting electricity in the community allows the collective processing in the village among committee members of some agricultural products.

[9] A successful peasant committee may cover a wide range of activities such as those described in Table 1.

committee's experience. Obviously, a committee working properly has a greater chance to survive to the next period than a committee incapable of motivating its members to participate and/or catalyzing their actions towards providing collective goods.

Table 2 presents the variables used to measure organizational performance based on the criteria discussed above. Successful performance is not measurable by a single indicator but by a construct that is achieved by measuring directly observable variables such as those described in Table 2. We integrate these variables into a construct of successful performance by using principal component analysis.[10]

The first factor to emerge from the principal component analysis explains 50 % of the total common variance among the six indicators in our sample. Since we are concerned with identifying the construct of successful performance, only one factor was extracted in the principal component analysis. Finally, factor scores for each observation were estimated using regression procedures. The factor score for each observation is the summary index of performance for that particular peasant committee. Table 4 shows how each indicator is correlated with this summary index of performance.

The probability of eviction e is expected to be related to the legal status of land occupancy by the peasant household. Peasants whose land occupancy is based on verbal or customary agreements are subject to eviction more easily than those with registered land titles. Therefore, the possession of land titles is assumed to be inversely related to the probability of eviction.

Participation in cooperative informal labor exchange arrangements and other community organizations signals the "willingness to cooperate" of a particular peasant. These signals are used as a proxy for the subjective costs of cooperation of each individual household c_i.

We should be aware of one, often unavoidable, limitation of this type of econometric analysis that uses field data. Often one proxy may not reflect *only* the theoretical variable it is supposed to measure. For example, the possession of land titles may be inversely related to both the probability of eviction and the gains from cooperation *via* higher outside options. A land title can be used as collateral for getting a bank loan that may compete with the rotating loan funds offered by the peasant organization. Similarly, the level of successful performance may be related directly to both the probability of survival and the gains from cooperation for members. Nevertheless, despite this limitation, this type of exercise is still worth doing at least for two reasons: (i) although not exclusively, the proxy still measures the theoretical variable it is supposed to measure and (ii) the relationship of more than one theoretical variables to a given empirical proxy helps to specify the causal mechanisms through which the proxy affects the dependent variable.

Logit models were used to analyze the determinants of peasants' decisions to join a peasant organization.

Table 5 describes the variables to be used in this analysis, Table 6 provides the descriptive statistics, and Table 7 the correlation matrix. The regressions are presented in Table 8. The baseline model is described in specification (1) in Table 8. It predicts that the likelihood of a peasant household being organized is an inverse function of its outside options, subjective costs of cooperation, possession of a land title, average adult literacy in the household, and the degree of integration of the area where the household is located; and a positive function of its income and the performance level of the committee in its community. These results are obtained controlling for other specific household characteristics such as land size, size of the family labor force, and gender composition of the household; the model also controls for the average welfare level of the community, and the degree of excludability of the activities the committee performs.

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[10] Since all variables are supposed to be a function of performance, a fair degree of correlation among them is expected. The correlation matrix for the variables in Table 2 is shown in Table 3. This matrix shows that more than half of the coefficients are greater than 0.4 in absolute value. The fifteen bivariate correlations among the six indicators average $r=$ .379. All of them have the expected signs, and all but one of these correlations are statistically significant at the 5 % level.

In analyzing the impact of income on the household decision whether to be organized, we could anticipate endogeneity problems. That is, the income level of the household may be important in explaining the household decision of whether or not to join the organization. However, being a member of a peasant organization may have also an impact on income level. Moreover, a Haussman test indicates that income is an endogenous variable in the specification of the baseline model using income. To avoid this endogeneity problem, two instrumental variables were used to control for the income level of the household. The instruments were obtained as fitted values of income regression (see Tables 9a and 9b). The instruments estimate from two different ways the expected income of the non-organized (y^n).

The baseline model using *Yinstrument1* correctly predicts 69% of the observations in the sample. The percentage of correct predictions is perhaps the more intuitive assessment of the goodness of fit of a logit model. However, a closer examination of this procedure shows the limitations of this assessment measure. That is, a naive model with only ones, for example, would have rightly predicted 56% of the observations of our sample. To complement this percent of correct prediction measure, an additional table to help us assess the goodness of fit of the model is presented in Table 10. This table classifies 259 observations into 7 groups of 37 observations each in a descending order according to their predicted probabilities of being 1.[11] The median of the predicted probability of being one was compared to the percentage of ones in each group. The correspondence of these two categories is remarkable high. Additionally, the model chi-square indicates the rejection of the null hypothesis that all variables in the model have no effect in explaining the peasants' decisions of joining peasant organizations.

Specifications (4)-(7) use *Yinstrument*(2). Specifications (2)-(6) modify the baseline model by using a different measure of education in the household. Specifications (2) and (6), instead of counting only adults of non-schooling age (18 years or older), they consider the family members of working age (12 years or older). Specifications (3)-(5) consider the education level of the household head. Specifications (4)-(6) control for the age and gender of the household head. Specifications (5) and (6) restrict the coefficient associated with the variable *Freeride* to zero, and specification (7) does so with the variable *Hhgender*. Specification (7) uses the dependency ratio instead of family labor. The changes observed are discussed below.

The results obtained are consistent with the predictions of the theoretical model of the previous section and will be discussed below.

In discussing the results of logit regressions, we should note that the coefficients in these regressions do not tell us the marginal change of the dependent variable for a one-unit change in the independent variable, as it is the case with OLS coefficients.[12] To understand the interpretation of the logit coefficients, it is useful to think in terms of odds ratios. Mathematically, a logit regression can be written as

(10) $\Pr(\text{event}) = \exp^{\mathbf{X}} / (1 + \exp^{\mathbf{X}})$

where **x** is a linear combination of the coefficients and the independent variables.

Based on (10), we have that the odds ratio, which in our case is [Pr(organized)/Pr(not organized)], changes by $\exp^{Bj}$ times the previous odds ratio when x_j changes in one unit.

3.3 Discussion of the Determinants of Joining Peasant Organizations

As mentioned above, the gains from cooperation in these peasant organizations are expected to be inversely related to the outside options the peasant household has in generating income and the degree of integration of the area where the household is located, and positively related to the scope for improving the community infrastructure provided a certain degree of excludability.

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[11] The two extreme observations were excluded.

[12] The probability change of y = 1 due to a unit change in the relevant explanatory variable in the logit model is [prob (y=1)][1-prob(y=1)]B, where B is the coefficient associated to the changing explanatory variable. This expression would give misleading estimates of probability changes when an explanatory variable changes by an amount other than infinitesimal.

Probably the best proxy for outside options is the percentage of household income from non-farm-related sources (*Outopts*). Since peasant organizations focus mainly on farm-related activities, the smaller the share of these type of activities in the household income, the higher the dependency on outside options of this particular household. The coefficients for *Outopts* are consistently negative and statistically significant at least at the 5% level for all specifications in Table 8. As the proportion of non-farm-related income, i.e. *Outopts,* increases by one standard deviation, the new odds ratio [Pr(organized)/Pr(not organized)] is the result of multiplying the old odds ratio by 0.67. We should notice, however, that income from non-farm-related sources accounts for only a tiny portion, 3% on average, of the peasant incomes in this sample.[13] Non-farm related income has usually been found to be inversely correlated with farm size (Deere and Wasserstrom, op. cit). This is not the case in this sample. As observed in Table 7, *Landsize* and *Outopts* are barely correlated. A possible explanation of this situation might be the imperfections of the labor market in the region due to lack of sufficient labor demand.[14] To explore this result a little more a regression was performed (see Table 11). The conjecture that labor market imperfections may account for the small share of non-farm-related income is reinforced when one observes that the coefficient for *Farmage, Dcaaguazu, Dspedro,*[15] *and Welfare* are positive; however, only *Farmage* is statistically significant. These variables may be correlated with areas of old colonization as opposed to new colonization (and more isolated) areas where the labor market may be less developed.

The degree of integration of the area where the peasant household is located is captured by the regional dummies *Dcaaguazu* and *Dspedro*. In all specifications in table 8, the coefficients of these regional dummies are consistently negative. In the case of *Dcaaguazu*, the coefficients are statistically significant at the 1% level in all seven equations. Comparing two otherwise identical households, one located at the least integrated department of *Concepción* and the other at *Caaguazú* (the most integrated one), the odds ratio for the household located in *Caaguazú* is the odds ratio for the identical household located in *Concepción* multiplied by 0.10.

The scope for improving the community infrastructure is expected to be inversely related to the actual level of the community infrastructure. As argued above, the variable *Welfare* is expected to capture the differences in infrastructures through differences in average land prices. In the models in Table 8, the coefficients associated with *Welfare* are consistently negative in the seven specifications reported (i.e, poorer communities present a greater incentive to cooperate to improve the communal infrastructure), however, none of them are statistically significant at standard levels of confidence. One might also argue that the level of adult illiteracy is negatively related to the household's access to schools in the proximity of the peasant village. This may explain the negative relationship of adult literacy and the peasant's prospect of joining an organization (see the coefficients of Aduleduc(1) and Headeduc in table 8). That is, adequate access to schools reduces the scope of providing this particular type of community public good. However, the data in this sample are insufficient for us to be very confident about this assertion of the relationship between average adult literacy in the household and the likelihood that that household will participate in peasant organizations.[16]

The variable *Freeride* attempts to control for the degree of excludability of the peasant committees' activities. The coefficients associated with this variable are statistically no different from zero in all five specifications introduced.

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[13] This situation contrasts with the observation made by Deere and Wasserstrom (1981:152) that the share of non-farm related income ranges from 30-60 % for the majority of rural families in Latin America.

[14] A similar explanation for the small relative share of non-farm related income (a range from 1 to 16 percent) for the case of García Rovira, Colombia, is offered in Deere and Wasserstrom (op. cit.).

[15] The most integrated department in this sample is *Caaguazu* and the least integrated is *Concepcion*.

[16] Additionally, the impact of adult literacy proves to be sensitive to how it is measured. A different measure of adult literacy, Adulteduc(2), when introduced, drastically changes the signs and significance levels of the coefficients associated with this variable (see specifications 2 and 6 in table 8).

Additionally, the possession of land title (*title*) is positively related to access to institutionalized credit by the peasant household and, as mentioned above, negatively related to the prospects of eviction from their land. Access to formal financial institutions could be an alternative to the loan funds administered by the peasant organizations. Therefore, having land title is also associated with greater outside options. From our theoretical model, the probability of eviction is expected to be positively related to the prospects of a peasant household joining an organization. Therefore, having land title unambiguously reduces the likelihood of a peasant of being organized through both the increase in outside options and the decrease of the probability of eviction. The coefficient associated with *title* is consistently negative and statistically significant at least at the 5% level in all seven specifications. Changing the legal status of a peasant household from not having land title to having one is estimated to produce a new odds ratio equal to 0.22 multiplied by the old ratio.

The variable *performa*, our proxy for the probability of survival, is consistently positive and statistically significant at the 1% level in all specifications. If we compare two identical peasant households located in identical communities, where the only difference is that in one community the committee performance is one unit higher, the odds ratio for the household located in the better committee performance community will be 1.63 times higher.

The proxy for the subjective costs of cooperation (*Subjcost*) is also consistently negative and statistically significant at least at the 5% level in all seven specifications of Table 8, as expected from the theoretical results stated above. As we move from a peasant household with low subjective costs to another with high ones, *ceteris paribus*, the new odds ratio is the old ratio multiplied by 0.36.

Among small rural producers, the income level has a positive impact on the likelihood of joining a peasant organization. That is, the less poor (among the poor) are the more likely to be organized. The coefficients associated with *Yinstrument* are positive and statistically significant at the 1% level in all specifications in Tables 8. As the household income increases by $100 US /year, the new odds ratio is the result of the old ratio multiplied by a factor of 1.14 in the baseline model. The positive relationship between income levels and broadly defined political participation (e.g., informal community activity, protest, board membership, affiliation with political organization) for the U.S. is well documented (see Verba et. al., 1995). It is striking to notice that this relationship may hold also among poor peasants in rural Paraguay. It might be the case that participating in a producer organization (i.e., a broadly defined political act) may demand some investments that very poor peasants are not able to afford.

The variable *HHgender* was used to test the effect of the gender composition of the household on the likelihood of the household being organized. It has been argued that women are more cooperative than men, and there is some experimental evidence pointing in this direction (see: Folbre 1994, Eckel and Grossman 1996). It has been reported elsewhere that an index of women's effective participation has strong explanatory power in predicting the level of success of a given peasant committee in Paraguay (Molinas 1998). Moreover, a higher percentage of females in the household might explain the individual participation of women *as* members if daughters replace mothers in domestic work. We expected a positive relationship between the percentage of women in the household and the likelihood of that household being organized. However, the results of the logit models in specifications 4-6 in Table 8 are not consistent with this hypothesis. One limitation of this analysis, it can be argued, is that we are unable to control for women's bargaining power inside the household.[17]

Our analysis also controls for demographic characteristics of the household such as the size of the family labor force and the dependency ratio, characteristics of the household head such as age and gender, and the land size. None of these control variables shows a statistically significant effect.

4. Concluding Remarks

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[17] Additionally, differences in education level across gender were checked with the data of our sample, and no significant differences were found.

Using logit regressions, this paper has shown that a given peasant household is more likely to join a producer organization:

(i)   the higher the gains from joining the organization as proxied by a higher share of farm-related income in total household income, and the wider the scope for the peasant committee to avoid the monopolistic power peasants may face in more isolated communities;

(ii)   the higher the probability of survival proxied by the performance of the organization in the community in which the household is located;

(iii)   The higher the probability of eviction proxied by the lack of a registered land title; and

(iv)   The lower the subjective costs of cooperation as proxied by the more cooperative arrangements (formal or informal) the peasant household has been engaged in.

This results were obtained while controlling for specific household characteristics such as income level, demographic composition, and education level. The econometric results are consistent with the predictions of the theoretical model presented in the paper.

Table 1 - Committees' Activities
(104 Committees)

* Demonstrations for Better Agricultural Policies	62 committees
(i.e. Land Reform, subsidized credits)	
* Joint Commercialization of their Production	54 committees
* Collective Production (in addition of individual production)	42 committees
* Rotating Loan Funds	36 committees
* Improving the Local School	30 committees
* Improving Local Roads	22 committees
* Creation and Administration of a Local Health Center	20 committees
* Community Stores	20 committees
* Activities towards getting Electricity for the Community	6 committees
* Recreational Fair	3 committees
* Social Insurance	3 committees
* Sharing of Productive Equipment	1 committee
* Training Courses on Handcrafting	1 committee
* Child Care Center	1 committee
* Community Newsletter	1 committee

Source: Survey of 104 Paraguayan Peasant Commitees in the Departments of Concepcion, San Pedro and Caaguazu.

Table 2 - Variable Names and Descriptions.

VARIABLE	DESCRIPTION

ACTIVITIES   This variable accounts for the poverty-alleviation related activities undertaken by the committee. A score of one is assigned to each of these activities. These activities include CPR management, local public goods, and rent-seeking activities. There are cases where the committee does not provide the public good by itself but serves as a catalyst in the community. In such cases, only half a point is assigned.

ATTENDANCE   Measures the average share of committee members who attended the last four meetings of the committee.

ATTENDORG   Measures the attendance at the last three meetings of the higher level organization by the committee's delegates.

EVALEADER   The local leader's evaluation of the committee's organizational performance. The scale ranges from 1=in very serious difficulties to 4=excellent.

EVAMEMBERS   Measures members' satisfaction with the overall performance of the committee. The scale ranges from 1=very unsatisfied to 5=very satisfied. This variable is the average evaluation of 3 members who were selected randomly.

EMULATION   This is a dummy variable, taking on the value of 1 if the organizational experience of the committee was copied in the area, and 0 otherwise.

Table 3 - Correlation Coefficients

(Coefficient / (Cases) / 2-tailed Significance)

	ACTIVITIES	ATTENDANCE	ATTENORG	EMULATION	EVALEADER	EVAMEM.
ACTIVITIES	1.0000 (104)					
ATTENDANCE	.5928 (104) P= .00	1.0000 (104)				
ATTENORG	.4566 (104) P= .00	.4551 (104) P= .000	1.0000 (104)			
EMULATION	.3972 (104) P= .00	.1860 (104) P= .05	.2378 (104) P= .01	1.0000 (104)		
EVALEADER	.5116 (104) P= .000	.4379 (104) P= .000	.3370 (104) P= .000	.1599 (104) P= .10	1.0000 (104)	
EVAMEMBERS	.5336 (104) P= .000	.4958 (104) P= .000	.2531 (104) P= .01	.1906 (104) P= .05	.4426 (104) P= .000	1.00 (104)

Table 4 - Performance Index

Performance Indicator	Factor Loading
ACTIVITIES	.842
ATTENDANCE AT THE HIGHER LEVEL ORGANIZATION	.654
MEMBERS' ATTENDANCE RATE	.790
LEADERS' EVALUATION OF PERFORMANCE	.710
MEMBERS' EVALUATION OF PERFORMANCE	.714
EMULATION	.461

Table 5 - Variable Names And Descriptions

VARIABLE	DESCRIPTION
ORGANIZED	The dependent variable. A dummy variable taking on the value 1 if the peasant household belongs to a peasant committee, and 0 otherwise.
OUTOPTS	The percentage of the household income coming from non-farm related sources such as wages, remittances, and non-farm related commercial activities.
INCOME	Total net household income in US$/year.
YINSTRUMENT(1)	An instrumental variable for income in US$/year. It estimates the expected income of the non-organized household (y^n) given the characteristics of a particular household. The method of estimation is the following: (i) an income regression is performed using only non-organized households (Table 9A) and (ii) the coefficients of such regression is applied to the whole sample. The income regression contains as predictors: measure of labor, land, proxies for productive infrastructure, household head characterisitics, demographic characteristics of the household, regional indicators, and other exogenous variables.
YINSTRUMENT(2)	An additional instrumental variable for income in US$/year. It also estimates the expected income of the non-organized household (y^n) given the characteristics of a particular household. The method of estimation is the following: (i) an income regression is performed using the complete sample (Table 9B) and (ii) It is adjusted for the impact of the organization by substracting from the estimated income the product of the non-standardized regression coefficient x ORGANIZED.
FAMLABOR	Family labor: the number of household members of working age which according to Paraguayan statistics includes ages from 12 to 65.
DEPRATIO	Dependency ratio. It was calculated based on this formula: (Family size - Family Labor)/Family Labor.
SUBJCOST	A proxy for the subjective costs of cooperation of each individual peasant household. A dummy variable taking on the value 1 if the peasant household either is not engaged or has not engaged in either labor exchange arrangements or other comunitarian organizations (i.e, high subjective costs of cooperation), and 0 otherwise.
TITLE	A dummy variable taking on the value 1 if the peasant household has a land title, and 0 otherwise.
ADULTEDUC1	Average level of education of adult household members measured in years of schooling. An adult person is defined for this variable as a person ≥ 18 years old.
ADULTEDUC2	Average level of education of adult household members measured in years of schooling. An adult person is defined for this variable as a person of working age.
DCAAGUAZU	A dummy variable taking on the value 1 if the peasant household is located in the department of Caaguazu, and 0 otherwise.
DSANPEDRO	A dummy variable taking on the value 1 if the peasant household is located in the department of San Pedro, and 0 otherwise.
PERFORMANCE	It is the summary index of organizational performance described in the text. It was estimated using the complete sample of 104 peasant committees. **Cont.**

FREERIDE   It attempts to control for the degree of excludability of the peasant committees' activities. It attempts to measure the free-ride temptantion. It was calculated based on this formula: (Number of non-excludable activities – Number of excludable activities)/Number of total activities. This variable ranges from 1 (the highest temptation to free-ride) to –1 (the lowest temptation).

WELFARE   It is a proxy for the level of well-being in the community. This is the adjusted value of the median of the distribution of land possession in the community. To make comparison possible among communities that may differ on average quality of land, quality of location, and so on, the median of the land distribution of each community was adjusted based on the average price of land per hectare in that particular commu nity. It is assumed that differences in land prices capture the differences in land quality, location, infrastructure and so on. Average land prices were obtained from the committee leader as well as from committee members.

LANDSIZE   Land size of the peasant farm in hectares

HHGENDER   Percentage of women ($\geq$12 years old) in the household.

HEADEDUC   Years of schooling of the household head.

HEADGENDER   Gender of the household head.

HEADAGE   Age of the household head.

Additional Variables Used in the Estimation of the Yinstrument Variables

FARMAGE   The age of the peasant farm measured in years.
WATER   Quality of access to water in the household. Scale from 1 to 7 (Higher, worse)
INSTALLATION   A dummy variable taking on the value 1 if the peasant household has equipment to process some agricultural products, and 0 otherwise.
ELECTRICITY A dummy variable taking on the value 1 if the peasant household has electricity, and 0 otherwise.

Table 6 - Variables Statistics

Number of valid observations = 261					
Variable	**Mean**	**Std Dev**	**Minimum**	**Maximum**	
Outopts	0.03	0.08	.00	0.62	
Adulteduc(1)	4.71	1.61	1	11.5	
Performance	-0.25	1.01	-2.55	1.32	
Income	2951	1711	434	11,118	(In US$)[*]
Subjcost		0.26	0.44	0.00	1.00
Title	0.32	0.47	0.00	1.00	
Dcaaguazu	0.34	0.47	0.00	1.00	
Dsampedro	0.50	0.50	0.00	1.00	
Famlabor	3.38	1.71	1.00	9.00	
Headeduc	4.51	2.08	0.00	12.00	
Landsize		7.96	2.84	1.25	20.00
Headage		43.54	11.51	23	78.00
Welfare	7.38	3.56	3	24.00	(In million of *guaranies*)
Water	2.70	1.75	1	7	
Depratio	0.90	0.76	0	4	
Farmage	12.75	9.16	1	45	
Electricity	0.46	0.50	0	1	
Freeride	0.53	0.49	-1	1	
Hhgender	45.22	17.23	0	83.30	

(*) 1 Guarani = 0.0005 U$S

Table 7 - Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Adulteduc (1)	1.00	-0.05	0.14**	-0.06	-0.04	-0.05	-0.15**	0.17***	0.16***	0.04	-0.08	-0.01
2. Outopts		1.00	0.05	0.03	0.12**	0.01	-0.07	0.08	0.11*	0.03	0.09	0.10*
3. Performance			1.00	-0.03	0.17***	-0.09	-0.12***	0.03	0.35***	0.06	-0.39***	0.32***
4 Sujcost				1.00	0.00	-0.08	0.08	0.12	0.11*	-0.03	0.09	-0.01
5. Title					1.00	0.12**	0.08	0.27***	0.11*	0.05	-0.24***	0.20***
6. Landsize						1.00	0.12**	0.12**	-0.19***	0.04	0.15**	-0.23***
7. Famlabor							1.00	0.17***	0.02	0.01	0.01	-0.03
8. Income								1.00	0.18***	-0.08	0.10	0.45
9. Welfare									1.00	0.05	-0.39***	0.35***
10. Headage										1.00	-0.18***	0.15***
11. Dsanpedro											1.00	-0.72***
12. Dcaaguazu												1.00

Statistically significant at: * 10% level; ** 5% level, and *** 1% level

Table 8 - Logistic Regressions. Dependent Variable: Organized

(Wald-statistic in parenthesis)

Independent. Variables	Baseline(1)	(2)	(3)	(4)	(5)	(6)	(7)
Outopts	-4.97*** (6.32)	-4.00** (4.56)	-4.06** (4.69)	-4.18** (4.74)	-4.12** (4.67)	-4.00** (4.34)	-4.38** (5.22)
Performance	0.49*** (7.60)	0.52*** (8.41)	0.54*** (9.07)	0.66*** (13.06)	0.62*** (13.34)	0.61*** (13.31)	0.71*** (14.93)
Title	-1.52*** (11.32)	-1.11*** (7.77)	-1.01*** (6.37)	-1.01*** (6.07)	-1.04** (5.81)	-1.20*** (8.07)	-1.41*** (10.23)
Subjcost	-1.03*** (8.27)	-0.81** (5.76)	-0.75** (4.95)	-0.71** (4.47)	-0.70** (4.30)	-0.74** (4.93)	-0.84*** (6.13)
Dcaaguazu	-2.32*** (15.58)	-1.79*** (12.00)	-1.77*** (11.80)	-1.93*** (11.73)	-1.99*** (12.92)	-2.10*** (14.59)	-2.32*** (15.53)
Dspedro	-1.74** (5.34)	-0.94 (2.20)	-0.79 (1.53)	-0.59 (1.08)	-0.68 (1.54)	-0.78 (2.02)	-0.89 (2.35)
Welfare	-0.0001 (1.12)	-0.00009 (0.70)	-0.00005 (0.22)	-0.00006 (0.22)	-0.00005 (0.18)	-0.0001 (1.34)	-0.0001 (1.44)
Yinstrument (1)	0.0013*** (11.54)	0.0008*** (7.92)	0.0007** (4.78)				
Yinstrument (2)				0.0005* (3.36)	0.0005* (3.27)	0.008*** (7.48)	0.0009*** (9.80)
Adulteduc(1)	-0.23** (3.98)						-0.18* (2.81)
Adulteduc(2)		0.01 (0.015)				0.01 (0.00)	
Headeduc			-0.11 (2.24)	-0.22** (5.75)	-0.22** (5.82)		
Headage				-0.02 (2.46)	-0.02 (2.52)	-0.002 (0.02)	
Headgender				0.10 (0.00)	0.14 (0.01)	-0.31 (0.04)	
Hhgender	0.01 (2.07)	0.01 (1.67)	0.01 (1.86)	0.01 (2.10)	0.01 (2.03)	0.01 (2.05)	
Freeride	0.26 (0.59)	0.28 (0.70)	0.26 (0.62)	0.21 (0.41)			0.17 (0.26)
Landsize	-0.04 (0.43)	-0.001 (0.00)	0.01 (0.05)	0.04 (0.39)	-0.04 (0.47)	-0.01 (0.04)	-0.01 (0.04)
Famlabor	-0.05 (0.28)	0.01 (0.01)	0.03 (0.11)	0.02 (0.02)	-0.01 (0.02)	-0.04 (0.67)	
Depratio							-0.004 (0.0005)
Constant	0.75 (0.60)	-0.29 (0.10)	0.22 (0.07)	1.99 (1.07)	1.88 (0.95)	0.54 (0.07)	1.49* (2.63)
-2 Log Likelihood	306.47	310.50	308.23	303.28	303.71	309.77	308.45
χ^2	50.09	46.06	48.33	53.27	52.85	46.78	47.81
% of Right Predictions	68.97	71.65	70.50	68.97	69.35	68.97	68.58
N=	261	261	261		261	261	261

Statistically significant at: * 10% level; ** 5% level, and *** 1% level

Table 9A - Regression Results For Generating The *Yinstrument(1)* Variable (Estimated with non-organized households only)

(Standardized Coefficients)

Variable	Beta	T
WATER	-.008	.079
HEADGENDER	.060	.648
DCAAGUAZU	.267*	1.73
DSANPEDRO	.457***	2.8
FARMAGE	.060	.556
ADULTEDUC(1)	.270***	3.03
ELECTRICITY	.002	.021
FAMLABOR	.113	1.19
HEADAGE	-.271**	-2.378
HEADEDUC	-.273**	-2.355
INSTALLATION	-.023	-.240
OUTOPTS	.067	.760
PERFORMANCE	.059	.621
SUBJCOST	.122	1.381
LANDSIZE	.182*	1.671
HHGENDER	-.030	-.345
WELFARE	.161	1.529
TITLE	.242***	2.547
N		111
R^2		.37
Adjusted R^2		.31
F		2.88

Table 9B - Regression Results For Generating The *Yinstrument(2)* Variable (estimated with complete sample)

(Standardized Coefficients)

Variable	Beta	T
WATER	-.068	-1.123
HEADGENDER	.125**	2.358
DCAAGUAZU	.295***	3.540
DSANPEDRO	.330***	3.768
FARMAGE	.068	1.133
ADULTEDUC(1)	.236***	4.272
ELECTRICITY	.069	1.196
FAMLABOR	.145	2.574
HEADAGE	-.160**	-2.398
HEADEDUC	-.172***	-2.552
INSTALLATION	.125**	2.306
OUTOPTS	.062	1.130
PERFORMANCE	-.053	-.844
SUBJCOST	.081	1.480
LANDSIZE	.129**	2.246
ORGANIZED	.091	1.575
HHGENDER	-.049	-.925
WELFARE	.179***	2.805
TITLE	.239***	4.177
N		261
R^2		.341
Adjusted R^2		.289
F		6.57

Table 10 - Additional Assessment Of The Goodness Of Fit

(Observations sorted according their predicted probabilities of being organized in descending order)

GROUPS (Of 37 observations each)	MEDIAN PREDICTED PROBABILITY OF BEING ORGANIZED	PERCENTAGE OF HOUSEHOLDS ORGANIZED
GROUP 1	.85	.78
GROUP 2	.76	.78
GROUP 3	.69	.70
GROUP 4	.60	.59
GROUP 5	.50	.57
GROUP 6	.38	.35
GROUP 7	.25	.22
N		259

Table 11 – OLS Regression Results. Dependent Variable: Outopts

(Standardized Coefficients)

Variable	Beta	T
DSPEDRO	.031	.325
DCAAGUAZU	.052	.556
WELFARE	.067	.961
TITLE	.064	.968
LANDSIZE	.025	.378
FARMAGE	.185***	2.73
ADULTEDUC(1)	-.045	-.711
GINI	.017	.280
INCOME	0.21	.305
N		265
R^2		.065
Adjusted R^2		.032
F		1.97

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