Why Nicaraguan Peasants Stay in Agricultural Production Cooperatives

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Persisting cooperatives

The cooperative experience in Nicaragua followed the ebb and flow of domestic politics. During the four decades of the Somoza regime (1936-1979), the structure of agricultural holdings in Nicaragua had an extremely polarized distribution consisting of a small number of extensive private estates and a large number of very small family plots. The political and social failures of the Somoza regime led to the Sandinista revolution in 1979 where the new ruling party implemented its socialist strategy by expropriating the land of the large estate owners and allocating it to the use of rural landless. However, the peasants were encouraged to join agricultural production cooperatives (APCs) rather than use the allocated plots for individual farming. The Sandinista policies thus led to the creation of large agricultural cooperatives in place of former privately owned estates and did relatively little to enlarge and strengthen the sector of family farms (Baumeister 1998; Everingham 2001). In the best socialist tradition, cooperatives enjoyed generous support under the Sandinista government.

After about a decade, the socialist-oriented Sandinista regime was replaced through democratic elections by a market-oriented government. The new government policies emphasized liberalization of the entire economy and abandoned the former preferential treatment of agricultural cooperatives. The change in government policies and attitudes led to a wave of liquidations of agricultural cooperatives, and many peasants left their cooperatives with a plot of land for individual farming. Yet not all the agricultural production cooperatives were liquidated despite the changes in the political atmosphere, and some continue to exist to the present day.

The persistence of agricultural production cooperatives in Nicaragua raises an interesting research question. Theoretical considerations and empirical evidence suggest that individual farms are more productive and more efficient than agricultural production cooperatives (Hazell 2003). Why is it then that the Nicaraguan cooperatives did not fully split up into individual farms once the government abolished the policy constraints favouring cooperatives? Is it possible to identify the factors that govern the choice of Nicaraguan farmers between staying in a cooperative and exiting to start an individual farm?

A similar change in the policy environment took place in the transition economies in the former Soviet Union and Central Eastern Europe, where government policies dramatically shifted from unquestioning support of collective farming as a mandatory organizational form in agriculture to a more liberal market-oriented attitude that allowed individual farming (Brooks 1993). The initial expectations

were of a rapid break-up of large-scale collective farms[2] and a sweeping transition to individual farming on land withdrawn from the former collectives. Yet these expectations have not materialized so far and large-scale collective structures continue to exist in all former socialist countries (although now they are organized as large-scale corporations that cultivate land not withdrawn for individual farming). The persistence of collective (or corporate) farming in transition countries – contrary to the standard pattern of agriculture in market economies – is an intriguing topic that attracts considerable attention among scholars (Amelina 2000; Deininger 1995). Unfortunately, no satisfactory analytical results are available to explain this phenomenon in transition countries beyond the usual argument that peasants try to avoid new risks by staying under the familiar collective umbrella. Nicaraguan data could shed some light on the reasons for the persistence of cooperative farms in environments where policies purportedly encourage individual farming.

This study is based on a representative survey of 476 landed households in four agro-ecological regions located in the central part of Nicaragua, where agriculture is an important component of rural livelihoods.[3] These macro-regions cover various agro-ecological conditions and farming systems that are typical for the Nicaraguan countryside. The sample was designed to include three distinct groups of respondents: 1) peasants who continued to farm in agricultural production cooperatives, 2) former members of agricultural production cooperatives who decided to take up independent farming, and 3) peasants who had always been engaged in independent farming.[4] The survey was carried out in 2000 and focused on the analysis of underlying differences in farm household characteristics, income level and composition, assets and wealth, and efficiency of production systems as possible reasons for staying in or exiting from the cooperative framework.[5]

The remainder of the article is structured as follows. We provide a short overview of land policies that gave rise to the constitution of agricultural production cooperatives in Nicaragua during the 1980s and subsequent programs for individual land titling during the 1990s. Main factors that influence the socio-economic position of cooperative member's *vis-à-vis* old and newly independent peasants are highlighted. An empirical analysis of the income position and living standards of each of the three groups of peasant households follow this. We address possible differences in production efficiency among the three groups, concluding that these are hardly sufficient to explain any inherent superiority of either individual or cooperative farming. Therefore, we analyze the role of other internal and external factors that influence the decision to stay in the cooperative or to become an independent peasant farmer. Attention is focused on differences in human, physical, and social capital that determine individual preferences regarding the desired institutional arrangements. We conclude with some policy suggestions for removing the constraints that still possibly prevent Nicaraguan peasants from making a free choice between alternative organizational forms of independent farming and cooperative membership. These suggestions are guided by the general view that minimizing the constraints on the activities of economic agents is conducive to economic efficiency.

Rural organization in the Nicaraguan countryside

Nicaragua provides a challenging environment for the analysis of changing patterns of rural organization. During the last decades, the roles and functions performed by state, market and community organizations have been frequently modified. The former Sandinista government (1979-1989) placed great emphasis on the role of state agencies for commerce, credit and extension services. The land reform program favoured – after an initial preference for state farms – the establishment of a large number of production cooperatives in the agrarian sector.[6] The rural cooperative sector in Nicaragua represented in 1989 about 21 per cent of agricultural land use, 20 per cent of the rural population and 24 per cent of agrarian production (San Martin 1992).[7] Subsequent liberal regimes strongly reduced credit support and service delivery to cooperatives and permitted the parcellation of cooperative land, leading to a clear decline in cooperative membership. At the end of 1999 the rural cooperative sector was reduced to no more than 9 per cent of the land and 8 per cent of the rural population (Ruben and Masset 2003). The partial disintegration of the land-reform cooperatives gave rise to a number of diverse pathways of organizational change. Some peasants left the cooperative and took up individual farming, while others decided to remain cooperative members.

The Nicaraguan process of land reform during the Sandinista regime favoured the creation of agricultural production cooperatives as an alternative for poor and often landless households to get access to land, credit and extension services. Collective ownership was initially favoured as a device to maintain rural stability and to allow effective delivery of public services. Peasant organizations also readily embraced the cooperative mode due to the perceived advantages of economies of scale and as a means to reinforce their negotiating position *vis-à-vis* the government. However, internal organization of newly established APCs is largely based on close interaction between peasant households that maintain strong family ties (Carter et al. 1993). Collective fields are usually reserved for cash crop production while members maintain individually operated subsidiary plots to satisfy their home consumption demands. Labour services supplied to operations in collective fields are paid on a weekly or monthly basis and represent an advance payment to the harvest. Most Nicaraguan APCs therefore had to rely on bank credit for the purchase of inputs and to finance the payments for members' labour.

Peasants' willingness to engage in cooperative production has traditionally been attributed to motives of income generation and risk sharing. Several internal and external problems make farmers averse to full participation in collective resource management. Free-riding behaviour and non-compliance are frequently mentioned as motives for leaving the cooperative. In addition, policies towards market liberalization, financial reforms and new legislation regarding ownership encourage the parcellation of land-reform cooperatives. Legal uncertainties regarding land ownership, unclear entitlements of individual members to collectively owned assets, and difficulties with the resolution of outstanding debts inhibit in practice any straightforward subdivision. Therefore, a wide range of institutional arrangements have emerged, including peasants who stick to APC membership and others who prefer independent production or seek loose arrangements that still guarantee access to some services.

The disadvantages of large-scale, capital-intensive cooperative farms are generally acknowledged. Well-known problems of under-investment, labour shirking, productivity decline, and membership desertion affect cooperative performance.[8] If access to bank credit is substantially reduced, cooperatives that cannot raise equity or private loans – required to maintain wage payments to members engaged in collectively performed activities – are likely to disintegrate. The promulgation of a new legal framework that encourages the issuing of individual titles or ownership certificates further reinforces this tendency towards parcellation.

Modern approaches to rural organization focus on aspects of risk sharing, access to information, and reduction of transaction costs as potential reasons to maintain cooperative relations (Hoff et al. 1993; Bardhan 1989). Common-property resource management is also seen as a device to control natural resource depletion (Bromley 1992; Wilson and Thompson 1993). It has been demonstrated that resource-use efficiency on collective parcels is not necessarily inferior to that on private parcels (Ruben, 1999). The importance of cooperative ties for securing peasants' livelihoods in rural Nicaragua is widely acknowledged (Jonakin 1992; Carter et al. 1993). Medium-size agricultural cooperatives that rely on linkages between semi-independent family plots could therefore still be attractive to peasant households (Carter 1987; Putterman 1981; Hussi et al. 1993).

Earlier research on agrarian cooperatives is related to large-scale (mechanized) farms under socialist-oriented political regimes. In Nicaragua, most APCs are medium-size enterprises with labour-intensive production systems. These cooperatives were originally established during the land reform process, and it is interesting to analyze their behaviour when market-oriented policies are put in place. Contrary to expectations triggered by the theoretical disadvantages of cooperative organization, APC members proved fairly reluctant to proceed towards full parcellation of land to individuals. The decision regarding continuation of APC membership or switching to independent farming can be viewed as an endogenous process where various internal and external factors interact. Indeed, Nicaraguan peasants have to face institutional choices at two distinct levels: 1) the decision whether to stay in the cooperative or switch to independent farming, and 2) the decision whether to rely on the cooperative as a channel for getting access to credit, services and information or to put their trust in individual engagement with external agents. The first aspect refers to the existing opportunities for improving the members' socio-economic position through reallocation of available human and physical capital, while the second aspect relates to the possibilities for reliance on social capital as a device for guaranteeing access to inputs and output markets in order to improve household welfare. Even if independent farming enables peasants to improve resource management, limited access to markets and institutions may easily reduce this potential advantage to nil.

Endowments, incomes and productivity

We analyzed the socio-economic situation of peasants who had always been independent producers (group I, labelled as 'private'), peasants who had recently left the cooperative to take up independent farming (group II, labelled as 'parcella-

Table 1. Profiles of farm households in the survey (averages per household)

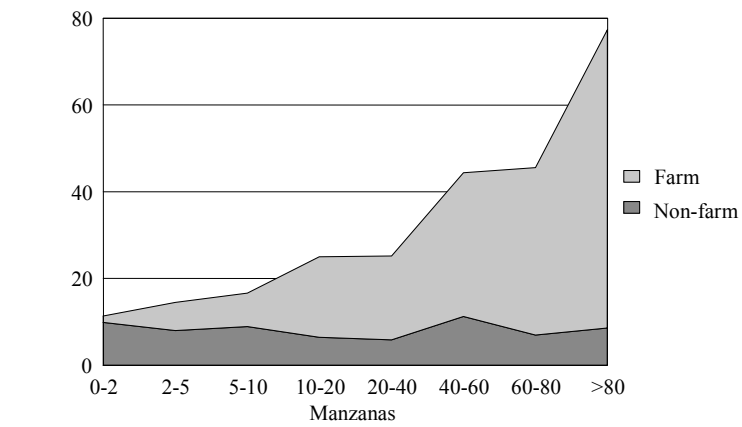
	Whole sample (N=476)	Group I: 'Private' (N=155)	Group II: 'Parcellation' (N=154)	Group III: 'Cooperation' (N=167)	Pairwise differences*
Human capital					
Family size (persons)	6.7	6.3	7.1	7.0	I < II
Children (younger than 8)	1.6	1.4	1.6	1.7	None
Adults (older than 8)	5.2	4.9	5.4	5.2	None
Average household age	33.0	36.0	32.0	31.0	I > II; I > III
Average years of schooling	4.3	4.2	4.4	4.5	None
Physical capital					
Land (manzanas)[1]	21.3	24.7	19.0	20.0	I > II
Livestock (no. of animals)	9.3	12.6	6.5	8.2	I > II; I > III
Farm equipment (pieces)	5.9	6.2	5.8	5.8	None
Income					
Family income (cordobas)[2]	24,148	29,078	21,880	21,664	None
Farm income (cordobas)[2]	16,513	20,635	16,058	13,106	None
Non-farm income (cordobas)[2, 3]	7,636	8,443	5,882	8,558	None
Share of non-farm income[3, 4]	50%	44%	48%	57%	None

[*] The column shows differences that are statistically significant at 10 per cent by the Bonferroni multiple pairwise comparisons test.
[1] Manzana is a unit of land area: 1 manzana = 0.7 hectare.
[2] Income in cordobas (US$1 = 7 cordobas at the time of the survey).
[3] Non-farm income includes wages received from the cooperative.
[4] Simple average of non-farm income shares for each respondent.

tion'), and households that continued cooperative membership (group III, labelled as 'cooperation'). Subdivision of cooperative farms is only expected to be attractive when household income or farm productivity can be increased. Theoretical considerations suggest a prior ranking where private farmers perform better than parcelled farms, whereas the latter outperform cooperative farms (i.e., group I > group II > group III). We used standard ANOVA tools to identify significant differences among the three groups of producers in terms of resource endowments, income profiles, and living standards. In addition, production function estimates were used to analyze differences in factor productivity.

The household profiles presented in Table 1 do not show a consistent pattern of differences across the three groups of peasants. To the extent that pairwise comparisons detect any differences between groups, group I (private farmers who have always remained independent) deviates most from the other two groups. No significant differences by any of the variables are observed between group II ('parcellation' farmers who have left the cooperative to take up independent farming) and group III (farmers who remain cooperative members). An important conclusion from the table is that group I farmers have more land, more livestock, and more equipment than group II farmers (only the differences in land and livestock are statistically significant). The newly independent farmers who have left their cooperative are less endowed with basic physical capital compared to established pri-

Figure 1: Land endowments



vate farmers. These differences in physical capital are reflected in higher levels of total family income, and especially farm income for group I farmers compared to the other two groups. Moreover, the mean farm income for the newly independent farmers in group II seems to be higher than for group III farmers remaining in cooperatives. The farm income results are thus consistent with the hypothesis formulated previously. Unfortunately, these income differences are not statistically significant (due to the high variability in the sample data) and thus cannot be taken as real support for our hypothesis.

While the survey does not reveal statistically significant differences in income across the three groups, the data nevertheless clearly show that the total family income – and especially the farm component of family income – increases with the increase of the amount of land available to the family. This phenomenon is demonstrated in Figure 1. Total family income rises from 11,400 cordobas for families with the smallest land plots (up to 2 manzanas, or 1.4 hectares) to more than 40,000 cordobas for families with 60 manzanas (42 hectares) and up.[9] The non-farm income remains fairly stable in absolute value across all farm-size groups and as a result its share in household income drops from about 85 per cent for families with the smallest plots to about 15 per cent for families with large land endowments. Consistently with the situation in many developing countries, land endowment is a major factor in improving family income and well-being.

The descriptive univariate analysis presented above has been extended to a multivariate production function framework to detect differences in factor productivity across the three groups. Theory suggests that independent farms (groups I and II) are more productive than farms operating in a production cooperative (group III). To test this hypothesis, we estimated a standard Cobb-Douglas production function regressing farm income (in cordobas) as the dependent variable on land, the number of animals, the number of farm workers, and the number of pieces of farm machinery as the explanatory variables. The model also included a dummy variable corresponding to different groups of respondents (groups I, II, and

Table 2. Estimation of production function with group dummy variables (dependent variable: farm income)

Explanatory variables	Parameter estimate	Significance level
Intercept (Group III)	6.621	0.000
Land	0.310	0.001
Animals	0.236	0.002
Labour	-0.165	0.124
Machinery	0.603	0.004
Group I ('private')	-0.062	0.754
II ('parcellation')	0.204	0.305
III ('cooperation')	0.000	--
$R^2 = 0.16$; $F = 11.07$ (0.000)		

III representing established private peasants, peasants who have left the cooperative through parcellation, and peasants who continue to work in a cooperative).

The estimation results are presented in Table 2. All factors (except labour) have significant positive coefficients, with farm machinery displaying the highest elasticity (0.6). The coefficient for labour is not statistically significant and has a negative sign, which may be indicative of excess labour on Nicaraguan farms. Such 'overloading' is a frequently observed phenomenon in rural areas where land quality is poor and off-farm employment options are limited (Kennedy 1983). The main conclusion of the analysis, however, is that there are no clear-cut differences in productivity registered among the three groups: the intercept shifters (for groups I and II relative to group III) are not statistically significant in the sample.

The results of these analyses do not fully verify the general theoretical hypothesis that predicts the ranking group I > group II > group III by relevant performance measures.[10] To gain additional evidence for this hypothesis, we relied on more qualitative questions included in the subjective attitude part of the questionnaire. These questions provide information about the perceived standard of living of the respondent families. One particular question asks whether the family has enough food. Other questions attempt to get a more detailed assessment of the standard of living by exploring what they can buy with the available family income. The responses to both questions (see Table 3) indicate that established private farmers experience a higher standard of living: nearly 60 per cent of group I respondents report that they have enough food, compared to less than 50 per cent in the other two groups; for over 20 per cent of group I respondents the family income is sufficient to buy more than just food and basic daily necessities, compared to 12 per cent in the other two groups.

The differences in these percentages between group I (established private farmers) and groups II and III combined (former and present cooperative members) are statistically significant. The differences between groups II and III are not statistically significant. Nevertheless, the answers seem to indicate that group II respondents – the newly independent farmers who have left their cooperative – have the lowest standard of living in the sample, even lower than the respondents who continue to belong to a cooperative. These qualitative results thus suggest that the standard of living ranking is group I > group III ≥ group II rather than group I > group II > group III. A possible explanation for this unexpected pattern can probably be found in the low capital endowments of group II farmers. Former coopera-

Table 3. Perceived adequacy of family income as a measure of standard of living (per cent of respondents by group)

	Group I: 'Private'	Group II: 'Parcellation'	Group III: 'Cooperation'
Food security: does the family have enough food?			
Yes	58	42	48
Standard of living: What does the family income buy?			
Lowest: Not enough even for food	37	42	39
Medium: Just enough for food and basic necessities	43	46	49
Highest: Enough to buy more than just food and basic necessities	21	12	12
Total	100	100	100

tive members somehow do not get a fair deal when they leave the cooperative, receiving little land and relatively few animals (see Table 1). These low capital endowments adversely affect their standard of living as newly independent farmers.

Reasons to stay: The role of human and physical capital

A better standard of living and the higher family incomes of private farmers may usually provide an incentive for switching from cooperative to independent farming. Previous research suggests that the decision to leave an agricultural production cooperative and switch to independent farming is determined by the availability of both human and physical capital in the household (Deininger 1993; Putterman 1985). Human capital includes variables that describe the household's labour pool (for example, the number of adults in the household, age composition, and educational endowment). Physical capital is comprised of land, livestock, farm machinery and buildings, and includes family income, which is a source of funds for both working capital and investment, as well as a safety net for the family under adverse conditions. We would expect that a greater capital stock (both human and physical) should have a positive impact on the decision to leave the cooperative and start farming independently. People with more capital can afford to sacrifice the relative security of a cooperative and opt for the higher risks of independent farming, with its promise of commensurately higher returns.

We performed a logistic regression analysis to identify the impact of human and physical capital variables on the decision to leave the cooperative for independent farming.[11] This impact is expressed by the effect on the probability of switching from cooperative to independent farming. If the impact is positive, an increase of the corresponding variable increases the probability of switching from cooperative to independent farming and we accordingly expect to get a positive coefficient in the estimated logistic model. If the impact is negative, an increase of the corresponding variable decreases the probability of switching from cooperative to independent farming and we accordingly expect to get a negative coefficient in the estimated logistic model.

The logistic model in our analysis includes terms for age squared and years of schooling squared to capture nonlinear human capital effects, which are often discussed in the literature (Lerman et al. 2004). Regarding the effect of age, it is expected that as a person grows older, it becomes more difficult to change established

patterns of behaviour, and older people are therefore less likely to leave the cooperative. However, the age variable spans the whole lifetime and its effect may change over a person's life. Very young people, without proper training and experience, are not ready to leave the cooperative. As young people become more mature and experienced, they may be willing to start a new way of life and are thus expected to exhibit a higher likelihood of leaving the cooperative than very young people. Beyond a certain age conservatism may predominate and the person will be more likely to stay in the cooperative. These two opposing effects are captured by a combination of linear and quadratic terms in the model: the willingness of young people to leave the cooperative is demonstrated by the linear term (with an expected positive sign), while the reluctance of older people to leave is reflected in the quadratic term (with an expected negative sign). The quadratic term becomes dominant as age increases, and, on the whole, age will have a negative impact on the probability of leaving the cooperative. Similar considerations suggest that increases in education at a very basic level (few years of schooling) will not necessarily increase the likelihood of leaving the cooperative, yet as the educational endowment increases beyond a certain basic level, people will become ready to start a new life as independent farmers. This effect is captured by a combination of linear and quadratic terms representing the education variable.

The income variable was separated into two components: farm income and income from non-farm sources. This was done because the theoretical interpretation of the impact of non-farm income is not clear-cut. It can be argued that non-farm income provides a cushion against risk and, similarly to the effect of farm income, increases the probability of leaving the cooperative in favour of independent farming. On the other hand, it can also be argued that non-farm income derives in part from salaries paid by the cooperative and thus encourages the family to stay. If the second interpretation is true, then non-farm income should have a negative impact on the probability of leaving the cooperative. Because of this ambiguity, farm and non-farm income were included as separate explanatory variables in the logistic regression model.

The logistic regression results based on the survey data are presented in Table 4. The table compares the signs of the estimated coefficients with the expected signs from the hypotheses discussed above. Overall, the results do not fully support the viewpoints of the human and physical capital approaches. Among the human capital variables, the impact of age is consistent with the prior hypotheses: the linear term has a positive coefficient, while the quadratic term has a negative coefficient, and both coefficients are statistically significant (at 10 per cent). The effect of education is not statistically significant, although the quadratic term has a positive sign as expected. The family's labour pool does not have a significant effect on the decision to switch to individual farming. The results are less ambiguous for the physical capital variables. The coefficients of land and farm income have positive signs that are consistent with our prior hypotheses, but only the coefficient of farm income is statistically significant. The coefficient of non-farm income is negative with marginal statistical significance. Its impact is thus consistent with the second interpretation offered in our discussion of the hypotheses: higher non-farm income makes farming less relevant and therefore encourages the family to remain

Table 4. Individual choice between staying in a cooperative or becoming an independent farmer (Logistic Regression Analysis)

Explanatory variable	Parameter estimate	Significance level	Expected impact on the probability of switching from cooperative to independent farming
Intercept	-3.621	0.042	
Human capital			
Age of head of household	0.151	0.037	Negative when age is sufficiently high; positive for young people
Age squared	-0.001	0.068	
Education of head of household	-0.104	0.332	Positive for high educational endowments; zero at low level of education
Education squared	0.009	0.425	
Number of adults in household	-0.024	0.693	Positive
Physical capital			
Land	0.002	0.787	Positive
Number of animals	-0.041	0.008	Positive as a wealth factor; may be negative if pasture land is constrained
Farm income	9.0E-6	0.058	Positive
Non-farm income	-20E-6	0.102	Positive (higher ability to take risk) or negative (less dependent on farming)

in the cooperative, where they receive lower farming income (see Table 1) but are exposed to less risk. The coefficient of the last physical capital variable – the number of animals – is negative and statistically significant. This is somewhat surprising, since one would expect people with more cattle to prefer independent farming.Yet, the availability of animals makes people less likely to leave the cooperative, despite their greater capital endowment. This can be explained by the fact that membership in the cooperative provides easy access to collective pastures at a relatively low cost. Buying cattle was indeed one of the main strategies for APC members to accumulate individual wealth, making use of free grazing rights at collective rangelands.

Our regression model is based on the underlying assumption that the decision to leave the cooperative in favour of independent farming is mainly determined by the human and physical capital endowments of the household. The results produced by the model suggest, however, that this decision is also influenced by other institutional factors that are not included explicitly in the model specification. The field survey provides some indications regarding the main motives for staying in the cooperative. Table 5 presents the frequency distribution of the reasons given by group III respondents (those who remain in a cooperative). Income earned in the cooperative is given as the main reason by only 5 per cent of the respondents and it is thus a marginal factor in the decision to stay. One third of the respondents attribute their decision to stay to the perceived advantages of cooperation and joint action: 12 per cent indicate that they like working jointly with others and 21 per cent see distinct advantages in the provision of cooperative services. Yet more than 60 per cent of the respondents explain their choice to remain in a cooperative by institutional and organizational constraints dating back to the creation of APCs under the Sandinista regime. Fully 43 per cent of respondents remain in a cooperative

Table 5. Reasons given by respondents for staying in a cooperative

Reasons	Per cent of group III respondents (N=167)
Income in the cooperative	5%
Likes working jointly with others	12%
Access to cooperative services	21%
Uncertainties with land ownership	43%
Lack of mechanisms for resolution of cooperative debt	19%

because of the uncertainty associated with the ownership of land that had been expropriated from the large estates and distributed to the population by the Sandinista government in the 1980s. Another 19 per cent do not leave because of lack of legal arrangements for the resolution of an outstanding debt burden, which was accumulated as a result of the generous credit support available to the cooperatives during the Sandinista era.[12]

While capital endowments may be important for peasants' decisions, it seems from these qualitative questions that two institutional constraints – uncertainty associated with land ownership and difficulties with resolution of cooperative debt – play a dominant role in keeping Nicaraguan peasants in APCs. The respondents are sending a very clear signal that, until these two constraints are resolved, peasants are actually forced to remain in cooperatives. Those who choose to leave under the present circumstances ultimately may face the danger of losing their land when ownership rights are cleared and legalized or may find themselves faced with an insupportable obligation representing their share of cooperative debt.

Reasons to stay: The role of social capital

Access to cooperative services and options for participating in joint activities are frequently mentioned as relevant reasons for remaining a member in a cooperative. This points to the importance of social capital as a mechanism for sharing risks with others and as a device for maintaining access to service provision. Access to services has become a particularly important consideration in Nicaragua, since state support to agriculture has been substantially reduced after the collapse of the Sandinista government. Privatization of the rural banking system and decentralization of extension services (mostly without appropriate budgets) force peasant households to look for alternative institutional relations. Local networks with private agents (traders, moneylenders) and linkages with the voluntary sector (NGOs and externally financed rural development projects) are now of primary importance for the peasantry in guaranteeing access to credit, market outlets, inputs, and information.

To analyze the importance of social capital, we considered the role of cooperative relationships as a factor contributing to household expenditures or enabling access to rural financial markets. The survey database was used to determine whether peasants who are more involved in cooperative activities are actually better off in terms of welfare and borrowing options. We decided to use a broad definition of cooperation, including participation in various types of social and institutional networks. Attention has therefore been given to community ties, various types of exchange relations (joint input provision and marketing), and group production and service delivery as indicators of the available social capital. Even

when peasants decide to withdraw their land from the cooperative, they can still maintain some involvement in other networks with former members, thus building on earlier cooperative experience.

The empirical analysis addresses the significance of social capital for the welfare of peasant households. Attention is given to the direct contribution of social capital to the level of household expenditures and the indirect role of social capital as (additional) collateral for borrowing. We used OLS and Probit regression analysis to identify the impact of physical, human and social capital on household expenditures and access to credit. All three groups of farmers were included in the expenditure regression, while for the Probit regression regarding credit access a balanced sample of farmers with and without access to financial services was randomly constructed to guarantee normality. Household expenditures include food, clothes, education, transport, medicines, and electricity. Monthly expenditures are a reliable indicator for a household's permanent income. Social capital, physical capital, and institutional networks are used as major explanatory variables for variations in expenditure, together with relevant individual and household characteristics (age, gender, education and family size).

Access to credit is registered as the possibility of using financial services provided by formal (bank) or semi-formal agencies (NGOs, moneylenders). Access may be less than actual use, since some peasants may prefer not to borrow, either due to risk aversion or because internal financial resources are available. About two-thirds of the peasants in our sample declared to have access to credit, whereas only 45 per cent actually took loans. Most credit was provided by NGOs and development programs (35 per cent), followed by banks (27 per cent) and friends and relatives (16 per cent). Households with access to credit reached expenditure levels that were on average about 20 per cent higher than for households without access to credit.

Social and physical capital were constructed as index variables by factor analysis,[13] which enabled us to include relationships between different aspects and find their common underlying dimensions. For social capital, the following variables were used: the number of connections of the household with various institutions (for example, farmers' unions, traders, moneylenders, banks, and village authorities), the level of participation in cooperative organizations, the number of activities coordinated with other peasants (for example, shared input purchase, marketing, joint machinery services), and the percentage of crop output marketed jointly with others. In a similar way, physical capital is calculated as an index variable that includes the number of capital goods (tools, tractors, implements, warehouses), the number of luxury goods (radio, television, motorbike, car), the number of large livestock (cows and horses), and the amount of land owned by the household (in manzanas). In addition, institutional linkages of households with market agents and the voluntary sector were included in the analysis (the state sector was ignored, since only 17 per cent of the sample still maintain connections with this sector). We used a dummy variable to indicate whether the household is primarily oriented towards market agencies (traders, moneylenders, shops) or voluntary sector organizations (NGOs and development projects).

Social, physical, and human capital have a positive and significant impact on household expenditures (Table 6, first two columns). Moreover, expenditures in-

Table 6. Impact of social capital on expenditures and access to credit

	Expenditures (OLS regression)		Access to credit (Probit)	
Explanatory variables	**Parameter estimate**	**Significance level**	**Parameter estimate**	**Significance level**
Constant	7.296	0.000	1.157	0.244
Social capital (index)	0.239	0.000	0.699	0.000
Physical capital (index)	0.180	0.000	-0.162	0.066
Education (years)	0.066	0.000	0.018	0.594
Household size (persons)	0.093	0.000	0.017	0.647
Age (years)	0.035	0.017	-0.042	0.266
Age squared	-0.001	0.054	0.000	0.286
Gender (0=male; 1= female)	0.069	0.527	0.720	0.471
Distance to market (km)	-0.002	0.510	0.027	0.023
Sector (0= voluntary; 1=market)	-0.031	0.579	-0.545	0.006
	N=475		N=302	
R^2	0.38		0.21	

crease with age, but tend to decrease at higher ages, illustrating the nonlinear effect discussed before. The relation between household size and expenditure is also positive, indicating that additional family members offer a positive contribution to household income. Social capital is particularly important for increasing the probability of access to credit for rural households, while physical capital appears with a negative sign (see Table 6, last two columns). The latter result is surprising because one would expect that physical capital serves as collateral for borrowing. A possible explanation can be found in the highly insecure legal environment in Nicaragua, where registration of property rights is inadequate and many conflicting claims exist (Strasma 1998). As a result, the main component of physical property – land and buildings – is seldom used as collateral, since it cannot be sold in case of default. Therefore, social capital tends to be the preferred collateral, enabling group members to assume joint responsibility for the credit contract.

Distance appears to have an unusual positive impact on access to credit. This could be explained by the fact that most farmers nowadays obtain credit though local NGOs and rural development projects. Donors generally prefer geographical targeting to poor people that are likely to be located in more remote and marginal regions. This is consistent with the fact that access to credit improves when a household maintains primarily relations with voluntary sector agencies. No indications were found for gender bias in credit provision. Most credit programs give a high weight to poverty targeting and the existence of local organizations, but tend to disregard the strong male dominance in traditional societies (Deere and Leon 2001).

The social capital analysis reveals the positive effect of participation in social networks on household welfare and access to finance. The direct benefits of cooperative membership as a device for reducing transaction costs may be a reason for the slow transition towards independent farming. In addition, cooperative members also maintain some degree of coordination of activities in order to capture the benefits of international cooperation projects and programs. The latter strategy is reinforced by the prevailing preference of foreign agencies to finance collective activities and the neglect of national agencies to provide substantial support for the development of independent farming in more remote areas.

Concluding remarks

Production cooperatives were established in Nicaragua during the Sandinista land reform process of the 1980s. Landless families were encouraged to join cooperatives rather than request a plot of land for individual farming. After about a decade, the socialist-oriented Sandinista regime was replaced through elections by a market-oriented government. Liberalization of the economy implied that former preferential treatment of agricultural cooperatives would be abandoned. Whereas some of the cooperatives split up into individual farms, not all peasants abandoned cooperative membership.

We analyzed differences in income position, resource use, and living standards between former cooperative members, peasants who continued their cooperative membership, and individual peasants who were already engaged in independent farming before land reform. Rural families that left the cooperative usually retained limited land and capital resources. Peasants who stayed in the cooperative did so because of major uncertainties regarding land ownership and outstanding debts. In addition, they benefited from better access to services and used their social capital to gain access to credit. Nicaraguan policies towards privatisation of land ownership has been ambiguous in the sense that no additional conditions have been created to enable farmers who decided to leave the cooperatives to overcome accumulation barriers.

One of the main conclusions of this study is a reaffirmation of a fact that has been frequently observed in many developing and transition economies: access to land is the main determinant of well-being in rural communities. Giving rural people more land is the surest way of alleviating rural poverty, increasing incomes, and improving family welfare. It is therefore particularly important to eliminate the existing constraints to effective distribution of land to individuals in rural Nicaragua. People who leave the cooperative should be given their full and fair share of the land as a precondition for starting successful independent farming. The survey seems to indicate that former cooperative members are 'short-changed' when they leave the cooperative: they get less than their fair share of land and assets and are thus handicapped from the outset in the new and risky endeavour of private farming.

To enable peasants to make a free choice between cooperative membership and individual farming, the government must deal with two institutional factors that have been clearly identified by the respondents as major obstacles to exit from cooperatives. First, it is essential to resolve the uncertainty regarding land ownership. APC members must be assured that the land they have been using for more than two decades will remain theirs regardless of the ownership antecedents. Where compensation is a relevant issue, former owners should be compensated by the state with money or monetary instruments, not through restitution. It is inconceivable from considerations of social justice that, after more than twenty years, the poverty-stricken peasants in Nicaragua should face the danger of losing their land – the main source of livelihood – through restitution to former estate owners.

In the same vein, it is necessary to eliminate the uncertainty and opacity concerning the disposition of old debts accumulated by the cooperatives during the Sandinista period. The cooperative members cannot be held responsible for the creation of this debt: it was thrust upon them by government policies and it should

now be lifted again by government decision. As in many other countries, writing off this old debt is probably the only socially just option if the government wishes to enable the rural population to make their own choice between remaining cooperative members or starting up independent farming.

Finally, the Nicaraguan government and (inter)national organizations could contribute substantially to creating a more equitable environment for the peasantry through the provision of legal assistance in settling land conflicts and the delivery of rural financial services – including credit, savings, and insurance – to enable farmers to improve their efficiency and to consolidate their landholdings. Especially in remote regions, where markets are less integrated and traditional patron-client relations still prevail, leaving the cooperative to take up individual farming involves severe institutional constraints. In this setting, there is undoubtedly room for further supportive measures aimed at reducing the transaction costs and the risks of independent farming.

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Notes

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2. Socialist agriculture included both collective and state farms, but it is collective farms (or cooperatives, as they were called in Central Eastern Europe) that dominated the rural space in the entire region. With the start of market reforms in the early 1990s, all state farms in the former Soviet Union were transformed into collective farms and their land and assets were privatized to the employees and the pensioners. In Central Eastern Europe, state farms were generally sold as going concern to outside investors or allowed to go bankrupt. Therefore, in our context, the relevant issue is the persistence of the large contingent of collective farms, which were quickly transformed after 1990 into membership-based corporate structures in all transition countries. For details on differences between collective and state farms and their restructuring procedures see Lerman et al. (2004).
3. Random sampling took place in four different agro-ecological zones defined according to major cropping systems. Data for the analysis have been collected by a two-stage (village/farmer) sampling procedure. The sampling frame used for the random selection of villages and farmers was made available from MAG (Ministry of Agriculture and Livestock) and FENACOOP (National Cooperative Federation) listings. Fieldwork concentrated on the semi-arid *León-Chinandega* with traditional agro-export crops (cotton and sugar production), the semi-humid southern region comprising the *Carazo* mountains (coffee) and the *Masaya-Granada* plain area (horticulture crops and rice production), the mountainous interior area of *Boaco* and *Chontales* (livestock and cereal production) and the northern region of *Matagalpa-Estelí* (coffee production). In each of these four macro-regions, a random sample of 120 farm households (valid cases) was used, including equal proportions of members of agricultural production cooperatives, former members who are now engaged in independent farming, and small and medium-size independent peasants.
4. We selected independent farmers with a farm size up to 40 manzanas (28 hectares) as a base for comparison, in line with the average plot size of cooperative members.
5. This paper only analyses the peasant decisions to exit the cooperative and continue farming independently. The other alternative of leaving agriculture altogether and switching to a non-farming occupation (including migration to the city) is not included in this analysis. This is analysed by Barham and Childress (1992). Sale and breakdown of land reform cooperatives in Honduras is analysed by Ruben and Funez (1993).
6. State farms were operational in Nicaragua until the mid 1980s but were strongly reduced at the end of this decade. The Sandinista government originally favoured state production, but had to leave this policy after fierce peasant resistance. At the moment of our survey, state farms represented less than 4 per cent of land use (Strasma 1998).
7. This also includes a small number of 'traditional' cooperatives already created before the Sandinsta era.
8. For a concise overview of these issues see Deininger (1993).
9. 1 manzana = 0.7 hectare; US$ 1= 7 cordobas.
10. The low explanatory power of the model (R^2 = 0.16, see Table 2) is due to large noise in the data and omitted variables in the model.
11. The survey questions explicitly distinguished between farm assets owned by the cooperative farmer as an individual and by the cooperative as an organization.
12. Credit to agriculture (as a share of agricultural GDP) has declined from from 43 per cent in the early 1990s to only 14 per cent by the end of 2001 (World Bank 2003).
13. Detailed results of the factor analysis can be obtained from the authors.

Bibliography

Amelina, M. (2000) 'Why Russian Peasants Remain in Collective Farms: a Household Perspective on Agricultural Restructuring', *Post-Soviet Geography and Economics* Vol. 41, pp. 483-511.

Baumeister, E. (1998) *Estructura y Reforma Agraria en Nicaragua 1979-1989*. Managua: CDR-ULA.

Bardhan, P. Ed. (1989) *The Economic Theory of Agrarian Institutions*. Oxford: Clarendon Press.

Barham, B. and M. Childress (1992) 'Membership Desertion as an Adjustment Process of Honduran Agricultural Reform Enterprises', *Economic Development and Cultural Change,* Vol. 40, pp. 587-614.

Bromley, D. (1992) *Making the Commons Work: Theory, Practice and Policy*. San Francisco: ICS Press.

Brooks, K.M. (1993) *Decollectivization and the Agricultural Transition in Eastern and Central Europa.* Working Paper WPS 993. Washington D.C.: World Bank.

Carter, M.; J. Melmed-Sanjak and K.A. Luz (1993) 'Can Production Cooperatives resolve the Conundrum of Exclusionary Growth? An Econometric Evaluation of Land Reform Cooperatives in Honduras and Nicaragua', in: C. Csaki and Y. Kislev (eds) *Agricultural Cooperatives in Transition*. Boulder Co.: Westview Press.

Carter, M. (1987) 'Risk Sharing and Incentives in the Decollectivization of Agriculture', *Oxford Economic Papers,* Vol. 39, pp. 577-95.

Deere, C.D. and M. Leon (2001) *Empowering Women: Land and Property Rights in Latin America*. Pittsburg: University of Pittsburg Press, pp. 62-106.

Deininger, K. (1995) 'Collective Agricultural Production: A Solution for Transition Countries?', *World Development,* Vol. 23, pp. 1317-34.

Deininger, K. (1993) *Cooperatives and the Breakup of Large Mechanized Farms: Theoretical Perspectives and Empirical Evidence*. Discussion Paper No. 218. Washington D.C.: World Bank.

Everingham, M. (2001) 'Agricultural Property Rights and Political Change in Nicaragua', *Latin American Politics and Society*, Vol. 43, pp. 61-93.

Hazell, P. (2003) '*Ensuring a Future for Small Farms in the Developing World'*. Keynote Address 25th International Conference of Agricultural Economists, Durban, August 2003.

Hoff, K.; A. Braverman and J.E. Stiglitz (eds) (1993) *The Economics of Rural Organization.* Oxford: Oxford University Press.

Jonakin, J. (1992) *Nicaraguan Collective Co-operatives: A Study of Choice, Efficiency and Performance*. Doctoral dissertation, University of Tennessee.

Kennedy, L. (1983) *The Economic Theory of Co-operative Enterprises*. Oxford, Plunkett Foundation for Co-operative Studies.

Lerman, Z.; C. Csaki, and G. Feder (2004). *Agriculture in Transition: Land Policies and Evolving Farm Structures in Post-Soviet Countries*. Lanham MD: Lexington Books.

Putterman, L. (1981) 'On Optimality in Collective Institutional Choice', *Journal of Comparative Economics,* Vol. 5, pp. 392-403.

—— (1985) 'Extrinsic and Intrinsic Problems of Agricultural Co-operation: Anti-incentivism in Tanzania and China', *Journal of Development Studies,* Vol. 21, pp. 175-204.

Ruben, R. (1999) *Making Co-operatives Work: Resource Management and Contract Choice within Agrarian Reform Co-operatives in Honduras*. Amsterdam: CEDLA Latin America Studies no. 83.

Ruben, R. and F. Funez (1993) *La Compra-Venta de Tierras de la Reforma Agraria.* Tegucigalpa, Honduras: Guaymuras.

Ruben, R. and E. Masset (2003) 'Land Markets, Risk and Distress Sales in Nicaragua: the Impact of Income Shocks on Rural Differentiation', *Journal of Agrarian Change*, Vol. 3, No. 4, pp. 481-499.

San Martin, O. (1992) *El co-operativismo Centroamericano en Cifras*. San José, Costa Rica: CCC-CA.

Strasma, J. (1998) Land Tenure in Nicaragua: Analysis and Future Perspectives. Rome: FAO Land Tenure Service.

Wilson, P. and G. Thompson (1993) 'Common Property and Uncertainty: Competing Coalitions by Mexico's Pastoral Ejiditarios', *Economic Development and Cultural Change,* Vol. 41, pp. 299-317.

World Bank (2003) Agriculture in Nicaragua: Promoting Competitiveness and Stimulating Broad-Based Growth. Washington D.C.: The World Bank.