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Member Willingness to Invest in Agricultural Cooperatives in Shaanxi Province, China[1]

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Abstract

This study analyzes some fundamental factors that influence member willingness to invest in an agricultural cooperative. The relationship between the selected factors and willingness to invest (a binary variable) is investigated by probit regression using data from a survey of 122 members in 9 apple-marketing cooperatives in Shaanxi Province in north-central China. The investment regression identifies five factors that have a statistically significant positive effect on members' willingness to invest in the cooperative. These factors are members' perception of self-importance in the cooperative, the subjective evaluation of difficulties faced in farming operations and sales, the evaluation of the cooperative's economic performance, the evaluation of the cooperative's ability to deliver services, and the availability of government support to the cooperative.

Keywords: marketing cooperatives, China, investment, performance, willingness to invest

Introduction

The development of China's agricultural cooperatives can be traced back to the period of the People's communes and collective farms (1949-1978), which was followed by the emergence of Farmers Specialized Associations[4] that eventually transformed into local cooperative organizations (1980-2006). Since the adoption of the law on agricultural cooperatives of People's Republic of China in 2007, the number of registered agricultural cooperatives increased dramatically from about 100,000 in 2008 to 689,000 at the end of 2012; the total capital of registered cooperatives reached US $175 billion in 2012,[5] an increase of 52% from 2011 (State Administration for Industry & Commerce, 2013).

The rapid development of agricultural cooperatives in China was coupled with serious difficulties in the process of institutional innovation during the last decade. The difficulties included non-standard governance structure, inefficient operations and credit management, weak member identification with the cooperative, high internal and external transaction costs of cooperatives, and inability to compete with other businesses. All these difficulties are usually regarded as barriers to sustainable development (Machethe, 1990).

There is no information on the failure and breakup of cooperatives in China. Our field discussions with the directors of the local Bureaus of Fruit Industry in Shaanxi Province revealed that cooperatives often break up within 2 or 3 years of operation. Their breakup can attributed to high operating costs, poor managerial knowledge and lack of management experience, lack of capital needed for sustainable development, etc. Moreover, it turned out that some local fruit cooperatives were actually established in order to benefit from government funding, receive support from commercial financial institutions, and avoid taxation. These considerations led to the emergence of so-called pseudo-cooperatives, which mainly benefit the owner-founders, not the user-members. This phenomenon is not unique to China. Centner (1988) notes that financial problems challenge the viability and the existence of agricultural cooperatives, while according to Huizer (1985) many cooperatives in developing countries are not really cooperatives but in fact pseudo-cooperatives.

Cooperatives in developed countries are mainly financed by equity investment from members. Their access to debt and other sources of investment is limited because of cooperative-specific organizational factors. The development of cooperatives accordingly relies on boosting returns to farmer-members with the

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4   Farmers Specialized Association is an organization managed by farmers for farmers' benefit.
5   $1=6.2855 yuan (source: the People's Bank of China, December 31, 2012).

objective of sustaining continued contributions to equity (Gray and Kraenzle, 2002). Yet, the experience with the development of Chinese agricultural cooperatives suggests that government support and regulation also play a key role in cooperative development.

The aim of this survey-based article is to examine the factors that influence a member's willingness to invest in the cooperative and thus contribute to its sustainability. The next section describes the sampling procedure and the methodology. Then we present descriptive results on member demographics, farm characteristics, difficulties that farmers face, attitudes to cooperatives, and evaluation of cooperative performance and government support. Results of the probit regression of the investment decision model follow. Concluding remarks and implications are given in the final section.

Data and methodology

The data for this research were collected during April-August 2011 in a field survey covering 122 members in 9 apple agricultural cooperatives from six apple-growing counties in Shaanxi Province[6] (Table 1). Shaanxi Province in north-central China (Figure 1) is the largest apple producing province, with apple production of 9 million tons in 2011 (25% of China's total apple production; see National Bureau of Statistics, 2012).

The nine apple cooperatives in our sample are all not-for-profit organizations and seven of them were created in 2008, i.e., one year after the adoption of the 2007 law on agricultural cooperatives (Table 2). The number of members in the sample cooperatives ranges from 80 to 280; the registered capital ranges from 110 thousand yuan to 300 thousand yuan (about $20,000-$50,000); the total apple farm area in these cooperatives varies from 120 mu to 300 mu (8-20 hectares); and the annual apple production of the members in a cooperative ranges from 230 tons to 550 tons. Four of the cooperatives have their own registered apple brand (Table 2).

6   Shaanxi Province is the largest apple producing province, with apple production of 9 million tons in 2011 (25% of China's total apple production; see National Bureau of Statistics, 2012).

Table 1: Location of sample sites and sample size

| City[a]	County[b]	Number of townships[c]	Number of villages[c]	Number of cooperative members in the sample
Wei Nan	Fu Ping	3	5	44
Bao Ji	Qian Yang	3	3	24
	Feng Xiang	2	4	35
Xian Yang	Qian	1	3	13
	Chang Wu	2	4	6
Total	5	11	19	122

a   City is a large administrative division in Mainland China, usually divided into counties. A formal definition of city in China provided by the Chinese government is that of an urbanized area with a minimum non-agricultural population of 100,000. Yet cities also include farming areas and agricultural population.

b   "County" is the translation of the Chinese term *xian*. In Mainland China, counties are the third level of local government, coming under the province level and the prefecture level.

c   Townships and villages selected at random in the respective counties.

The major services that the cooperatives provide to their members include technology dissemination, input purchasing at reduced prices, stabilization of members' apple sales, apple storage, packaging, processing, access to market information, pest and insect control, and standardization of apple orchard management (Table 2).

The main sources of capital for the Shaanxi cooperatives are private funds, local government grants, and member investment. Discussions with the cooperative managers have revealed that private funds and local government grants are important as startup capital, but it is member investments that are essential for sustainable future operation or running of the cooperative. One of the biggest problems of sustainable cooperative operation to date is lack of member financing, as reflected in low willingness of members to invest in their cooperative.

A structured survey questionnaire was designed to collect a range of information divided into several modules (Table 3):

Figure 1: Location of Shaanxi Province in China. The similarly spelled Shanxi Province is the neighboring province immediately to the right of the shaded Shanxi Province in the map.
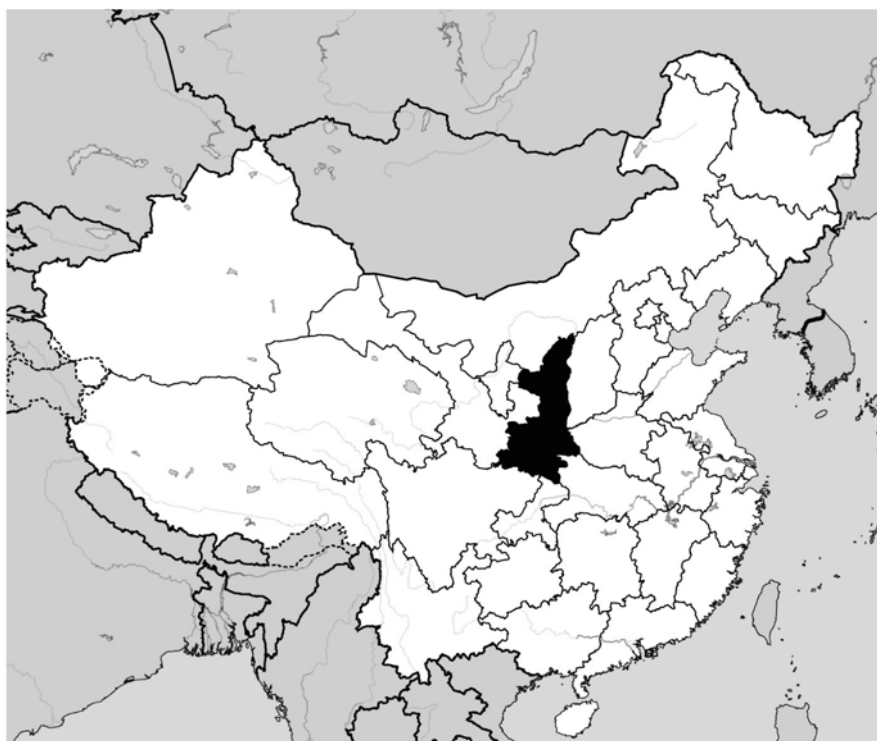
Source: Wikipedia – the Free Encyclopedia [http://en.wikipedia.org/wiki/Shanxi]

1) farmer demographics and farm characteristics (age, educational attainment, labor use, farm area, apple production and income, etc.);
2) member attitudes toward the cooperative, including the member's perception of self-importance in the cooperative, the share of members' trading volume with the cooperative, and trust in the cooperative;
3) difficulties faced by members in the production cycle, including difficulties with transportation, the sales process, access to market information, and availability of agricultural credit;

Table 2: Characteristics of surveyed cooperatives

City	County	Name of cooperative	Year of registration	Number of members	Registered capital (thousand yuan)	Apple production area (mu)	Members' apple production (ton)	Registered apple brand [a]	Major services [b]
Wei Nan	Fuping	Lin Ying	2010	108	120	130	230	-	1,2,3
		Jin Lai	2011	180	300	280	500	-	1,2,3,4
	Qianyang	Hong Fu	2008	180	130	136	350	"Zhu Fugui"	2,3,7
		Xin Sheng	2008	200	150	200	400	-	1,2,3
Bao Ji		Nan Wu	2008	240	105	160	320	"Yong Zhou"	1,3,4,8
	Feng-xiang	Fu Min	2008	220	250	300	550	-	1,2,3,8
		Nan Yang	2008	280	300	120	360	"Qin Zhen"	1,2,3,6,8
Xian Yang	Qian	Yong Sheng	2008	150	200	300	480	-	1,5,7,8
	Changwu	An Li	2008	80	110	260	350	"Chun Guhong"	1 2,3,8

Note:

a: "-" represent "no apple brand in the cooperatives"

b: Major services provided by cooperatives include: 1=training, 2=low prices of agricultural input purchases, 3= stabilizing apple prices, 4=apple storage, package, process, 5=financial support, 6=access to market information, 7=pest and insect control, 8=standardizing apple orchard management.

4) satisfaction with cooperative services, broken down into a list of ten typical cooperative activities, such as training, financial support, pest and disease control, etc.;

5) evaluation of cooperative performance, separated into financial performance as measured by profitability, liquidity, leverage, and asset efficiency;[7] economic performance linked to development potential, scale of operations, and the cooperative's competitive ability;[8] and social performance associated with the cooperative's ability to deliver services and its impact on the development of local economy;[9]

6) availability of government support, used as a proxy for the external policy environment.[10]

Table 3: Description of survey variables

Variable	Variable name	Variable scale
Dependent variables		
Investment decision	INC	0=not invest in cooperatives, 1=invest in cooperative
Independent variables		
Farmer demographics and farm characteristics		
Age of farmer	AGE	Years
Educational attainment	EDU	Years
Apple farm experience of household head	AFE	Years
Apple farm area	APS	Mu (1 mu=0.0667 hectare)
Apple income	API	Thousand Yuan

7 These are the variables used by Lerman and Parliament (1990) in their analysis of financial performance of agricultural cooperatives compared to investor-owned firms.

8 Competitive ability is formally defined as the "sustained ability to profitability gain and maintain market share" (Martin et al., 1991:1456).

9 For a discussion of the social aims of cooperatives see, e.g., Osterberg et al. (2009).

10 Karami and Rezaei-Moghaddam (2005) have shown that government support (grants, tax exemptions, subsidies) positively affects cooperative performance.

Table 3 continued

Variable	Variable name	Variable scale
Member attitude toward cooperatives		
Self-importance in cooperative	IMP	1=Very unimportant 2= Unimportant 3=Moderate 4= Important 5= Very important
Share of total apple production traded through the cooperative	SEL	Percentage (%)
Trust in cooperative	TRU	1= Highly untrusted 2= Untrusted 3=Moderately trusted 4= Trusted 5= Highly trusted
Difficulties faced by farmers		
Transportation	TRA	1=Very easy 2= Easy 3=Moderately difficult 4= Difficult 5=Very difficult
Sales process	SPR	
Access to market information	OMI	
Access to agricultural loans	OAL	
Overall evaluation of difficulties	DIF	
Satisfaction with cooperatives services		
Technology dissemination	TET	1=Very dissatisfied 2= Dissatisfied 3=Moderate 4= Satisfied 5= Very satisfied
Reduced prices of agricultural inputs	LPI	
Stabilization of apple prices	SAP	
Apple storage, packing, processing	AST	
Financial support for members	FSP	
Access to market information	MIO	
Pest and disease control	IDC	
Standardizing apple orchard management	SPM	
Patronage dividend	PDI	
Facilitating members' access to credit	FAC	
Overall satisfaction with cooperative services	OVS	

Table 3 continued

Variable	Variable name	Variable scale
Financial performance		
Profitability	TET	
Liquidity	LPI	1=Very bad 2= Bad 3=Moderate
Leverage	SAP	4=Good 5=Very good
Asset efficiency	AST	
Overall evaluation of financial performance	AFP	
Economic performance		
Development potential	DEP	
Scale of cooperative operations	SCL	1=Very bad 2= Bad 3=Moderate
Competitive ability	CPA	4=Good 5=Very good
Overall evaluation of economic performance	AEP	
Social performance		
Ability to deliver services	SEV	1=Very bad 2= Bad 3=Moderate 4=Good 5=Very good
Impact on the development of local economy	ILE	1=Very small 2= Small 3=Moderate 4=Large 5=Very large
External environment		
Government support	GOS	1=Very bad 2= Bad 3=Moderate 4=Good 5=Very good

Most of the variables in the survey required qualitative attitudinal responses (quantitative responses were obtained only for the block with farmer demographics/farm characteristics and the question about the trading share with the cooperative; see Table 3). The qualitative responses were expressed on a five-point Likert scale, which is a common approach when measuring the degree of a person's feelings or attitudes toward objects (Frey et al., 2000). For each question, members were presented with a series of choices ranging from "highly untrusted" to "highly trusted", "very easy" to "very difficult", "very dissatisfied/unimportant" to "very satisfied/important"; cooperative performance was evaluated by choices ranging from "very bad" to "very good" (see Table 3 for details of scoring scales).[11]

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11 For presentation purposes, the five Likert-scale columns are combined in some of the tables into three columns, by pooling the two highest and the two lowest response categories. The analysis, however, is always based on five-point scales.

To reduce the number of degrees of freedom for our relatively small sample and to avoid multicollinearity between variables within different blocks, the four variables representing the block of difficulties faced by farmers and the ten variables representing the block of satisfaction with cooperative services were aggregated into one variable for each block. The aggregation was performed by adding up the scores of the component variables and averaging the total. The same aggregation procedure was applied to the four variables in the financial performance block and the three variables in the economic performance block. Aggregation details and the means of the aggregated variables are presented in Table 4.

Table 4: Aggregation of variables used in the investment model

Aggregated variable	Definition	Measurement	Mean	St. Dev
Difficulties faced by members	$DIF = \sum_{i=1}^{4} X_i \big/ 4$	X_i = Difficulty scores in 4 areas(Table 3)	3.3	0.8313
Overall satisfaction with cooperative services	$OVS = \sum_{i=1}^{10} X_i \big/ 10$	X_i = Satisfaction scores for 10 cooperative services (Table 3)	2.8	0.6385
Financial performance	$AFP = \sum_{i=1}^{4} X_i \big/ 4$	X_i = Evaluation scores for 4 financial factors (Table 3)	2.2	0.6618
Economic performance	$AEP = \sum_{i=1}^{3} X_i \big/ 3$	X_i = Evaluation scores for 3 factors (Table 3)	2.9	0.7459

The survey variables were first analyzed by univariate techniques to assess the differences, by each variable, between members who are willing to invest and those who are unwilling to invest in the cooperative. These variables were then applied in probit regression analysis to identify factors that potentially affect the members' willingness to invest in the cooperative.

The member's investment decision is a binary variable with values 0 (not willing to invest in the cooperative) and 1 (willing to invest). The corresponding values were collected from the respondents in the survey questionnaire. The binary investment decision is modeled as a function of groups of factors collected in the survey, including farm characteristics, member attitude toward cooperatives,

evaluation of cooperative performance with regard to financial, economic, social aspects, and the evaluation of government support. The binary nature of the dependent variable suggested using probit regression, which is a standard econometric technique for estimating the effect of observed factors (independent or explanatory variables) on a binary dependent variable (Bliss, 1934; Aldrich and Nelson, 1984; Bertschek and Lechner, 1998). The estimated probit coefficients express the effect of changes in each independent variable on the probability that the dependent variable takes the value 1 (willing to invest in a cooperative). Below, the probit regression analysis follows the univariate analysis of differences between the two groups of members.

Descriptive results: univariate analysis

This section analyzes the survey data by univariate techniques for two disjoint groups of members: those who are willing to invest in their cooperative (n=87) and those who are unwilling to invest (n=35). The comparisons are presented for each of the five main blocks of data (see Table 3):

- farmer demographics and farm characteristics
- difficulties faced by members in farming operation and the sales process
- member attitude toward the cooperative
- evaluation of cooperative performance (financial, economic, social)
- evaluation of government support

General characteristics of members
Table 5 summarizes the univariate results for the quantitative variables: member demographics, farm characteristics, and the trading share with the cooperative. Members willing to invest show a higher educational attainment and a larger apple farm size than members unwilling to invest, although the differences are not statistically significant (the differences in age and apple farm experience between the two groups are not significant either). Larger apple producing area translates into greater income from apple sales (Table 5; the difference in apple income is statistically significant). The share of members' trading volume with the cooperative is also statistically significantly higher for members showing willingness to invest (80% of production on average compared with 50% of production for those unwilling to invest). Univariate analysis thus suggests that member's apple income and share of sales to the cooperative have positive effect on the probability of investing in a cooperative.

Table 5: Summary of member demographics and farm characteristics
for those willing to invest (n=87) and those unwilling to invest (n=35)

	Unit	Mean (St. Dev)		P-value
		Willing to invest	Unwilling to invest	
Age of member	Years	53.1 (8.8)	55.0 (8.8)	0.2877
Educational attainment	Years of schooling	9.1 (2.7)	8.5 (2.4)	0.2369
Apple farm experience of household head	Years	18.1 (4.1)	18.1(4.2)	0.9452
Apple farm area	Mu [a]	3.9 (2.2)	3.5 (2.0)	0.2042
Apple income	Thousand Yuan	27.0[*] (28.5)	21.7[*] (16.4)	0.0002
Trading share with cooperative	Percentage (%)	0.8[*] (0.2)	0.5[*] (0.2)	0

* Differences between members and non-members statistically significant at *p*=0.05.

[a] 1 mu=0.0667 hectare

Perception of difficulties

The goal of agricultural cooperatives is to provide a range of support services to their members, which include access to market information, assistance with product sales, infrastructure development, and in general access to services that are either unavailable or very costly if obtained from private commercial sources, such as getting an agricultural loan (Maki and Lichty, 2000; Ron, 1989). Difficulties with access to services are thus expected to encourage members to invest in the development and operation of their cooperative. Members were asked to evaluate the difficulties faced by them in four areas: transportation, the sales process, availability of market information, and access to agricultural loans. A five-digit Likert scale ranging from 1=very easy to 5=very difficult was used.

Difficulties with the sales process are regarded as the most important by members willing to invest in the cooperative: 73.6% identified this issue as "very difficult" or "difficult" compared with 37.1% for members unwilling to invest (Table 6). Availability of market information is perceived as the second most important difficulty by members willing to invest (49.4%). Obtaining agricultural loans for farm development is perceived only as the third most important difficulty

by members willing to invest (48.3%, see Table 6), although it comes out as the greatest difficulty for members unwilling to invest (60.0%). Difficulties with transportation appear to be less acute for all respondents.

Table 6: Level of difficulties faced by members
(percent of respondents in each category)[a]

Items of financial performance	Willing to invest (n=87)			Unwilling to invest (n=35)		
	Difficult	Moderately difficult	Easy	Difficult	Moderately difficult	Easy
Sales process	73.6	13.8	12.6	37.1	22.9	40.0
Access to market information	49.4	21.8	28.7	37.1	28.6	34.3
Access to agricultural loans	48.3	24.1	27.6	60.0	20.0	20.0
Transportation	18.4	11.5	70.1	22.9	20.0	57.1
Overall evaluation of difficulties	70.1	8.0	21.8	48.6	8.6	42.9

a   For the purpose of presentation, the five Likert-scale categories were combined into three: "difficult" in this table combines the frequencies of "very difficult" and "difficult" responses; "easy" in this table combines the frequencies of "very easy" and "easy" responses.

An overall difficulty predictor was derived by summing and averaging the scores of all four difficulty areas for each member (see formula in Table 4). The last row in Table 6 shows that a substantially higher percentage of members willing to invest report serious overall difficulties ("very difficult" or "difficult") than those unwilling to invest (70.1% compared with 48.6%). This is an indication that overall difficulties have a positive effect on the probability of members' investment decision.

Member attitude toward cooperatives
Member attitude toward cooperatives is influenced by the following qualitative variables (Table 7):
- the perception of member's self-importance in the cooperative,
- the degree of trust in the cooperative,
- satisfaction with cooperative services.

Table 7: Member attitudes toward the cooperative
(percent of respondents in each category) [a]

	Willing to invest (n=87)			Unwilling to invest (n=35)		
	Important /Trusted /Satisfied	Moderately important /trusted /satisfied	Unimportant /Untrusted /Dissatisfied	Important /Trusted /Satisfied	Moderately important /trusted /satisfied	Unimportant /Untrusted /Dissatisfied
Self-importance in cooperative	31.0	44.8	24.1	0	14.3	85.7
Trust in cooperative	81.6	16.1	2.3	60.0	34.3	2.9
Overall satisfaction with cooperative services	37.9	3.4	58.6	11.4	2.9	85.7

a For the purpose of presentation, the five Likert-scale categories were combined into
   three: "important/trusted/satisfied" in this table combines the frequencies of
   "very/highly important/trusted/satisfied" and "important/trusted/satisfied" responses;
   "unimportant/untrusted/dissatisfied" in this table combines the frequencies of
   "very/highly unimportant/untrusted/dissatisfied" and
   "unimportant/untrusted/dissatisfied" responses.

Member's perception of self-importance in the cooperative is hypothesized to be a positive factor affecting the investment decision. It is expected that the higher the perceived self-importance, the greater is the probability to invest in the cooperative. The results in Table 7 confirm this expectation: 75.8% of members willing to invest regard themselves as playing an important or moderately important role in the cooperative compared with merely 14.3% of members unwilling to invest.

The extent to which members trust the cooperative may also affect their willingness to invest. While members generally show a high degree of trust in the cooperative, with less than 3% of respondents reporting distrust, the percentage of respondents who trust their cooperative is higher among members willing to invest:

81.6% of members willing to invest said they "highly trust" or "trust" their cooperative compare with 60.0% of members unwilling to invest (Table 7).

Members were asked to evaluate their satisfaction with each of the 10 cooperative services listed in Table 3. The degree of satisfaction with the services was assessed on a five-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied).The overall satisfaction index was constructed by summing and averaging the scores of the 10 services for each member (see definition in Table 4). Overall, 37.9% of members willing to invest indicated that they were very satisfied or satisfied with the services provided by the cooperative compared with only 11.4% of members unwilling to invest (Table 7).

In addition to these qualitative variables, the share of total apple production traded with the cooperative – a quantitative variable analyzed in Table 5 – may be regarded as a measure of members' attitude: the higher the traded share, the more positive is the member's attitude toward the cooperative and, in particular, the greater is the member's trust in the cooperative. All this should translate into higher willingness to invest in the cooperative. Indeed, we have seen in Table 5 that members willing to invest in the cooperative trade 80% of their apple production with the cooperative, compared with only 50% for members unwilling to invest (the difference is statistically significant).

Cooperative performance evaluation

The evaluation of cooperative performance can be regarded as another factor that positively affects the members' willingness to invest. The survey data were used to evaluate separately three types of performance: financial performance, economic performance, and social performance. Performance components were evaluated on a five-point Likert scale ranging from 1=very good to 5=very bad. The evaluations are presented in Tables 8-10.

Members evaluated financial performance of their cooperatives by four indicators: profitability, leverage, liquidity, and asset efficiency (Table 8). The gap in financial performance evaluations between the two groups is very noticeable. The overall financial performance score obtained by summing and averaging the scores of the four indicators for each member (see definition in Table 4) was rated as "good" or "very good" by 13.8% of members willing to invest and none of the members unwilling to invest (Table 8, last row).

Member evaluations of the economic performance of their cooperative were also quite different for the two groups (Table 9). The respondents in the willing-to-invest group rated highly the cooperative development potential (71.3%), the scale

of operations (43.7%), and the competitive ability (14.9%). On the other hand, most members in the unwilling-to-invest category evaluated the cooperative's development potential and competitiveness as "very bad" or "bad" (74.3% and 85.7%, respectively). More than half the members willing to invest in the cooperative evaluated the overall economic performance (average sum of scores over the three indicators; see Table 4) as "very good" or "good", while none of the members unwilling to invest gave this evaluation to cooperative economic performance.

Table 8: Evaluation of financial performance
(percent of respondents in each category)[a]

Items	Willing to invest (n=87)			Unwilling to invest (n=35)		
	Good	Moderately good	Bad	Good	Moderately good	Bad
Profitability	20.7	35.6	43.7	0	17.1	82.9
Leverage	20.7	20.7	58.6	5.7	5.7	88.6
Liquidity	9.2	39.1	51.7	0	0	100.0
Asset efficiency	13.8	39.1	47.1	2.9	2.9	91.4
Overall evaluation of financial performance	13.8	10.3	75.9	0	0	100

a   For the purpose of presentation, the five Likert-scale categories were combined into three: in this table "good" combines the frequencies of "very good" and "good" responses; "bad" combines the frequencies of "very bad" and "bad" responses.

Table 9: Evaluation of economic performance
(percent of respondents in each category)[a]

Items	Willing to invest (n=87)			Unwilling to invest (n=35)		
	Good	Moderately good	Bad	Good	Moderately good	Bad
Development potential	71.3	25.3	3.4	0	25.7	74.3
Scale of cooperative operations	43.7	36.8	19.5	25.7	51.4	22.9
Competitive ability	14.9	40.2	33.3	0	14.3	85.7
Overall evaluation of economic performance	50.6	21.8	27.6	0	14.3	85.7

a   For the purpose of presentation, the five Likert-scale categories were combined into three: in this table "good" combines the frequencies of "very good" and "good" responses; "bad" combines the frequencies of "very bad" and "bad" responses.

Table 10: Evaluation of social performance and external policy environment
(percent of respondents in each category)[a]

	Willing to invest (n=87)			Unwilling to invest (n=35)		
	Good /Large	Moderately good/large	Bad Small	Good /Large	Moderately good/large	Good /Large
Social performance						
Service ability	5.7	21.8	72.4	5.7	20.0	74.3
Impact on the development of local economy	43.7	36.8	19.5	25.7	51.4	22.9
External environment						
Government support	16.1	46.0	37.9	0	11.4	88.6

a   For the purpose of presentation, the five Likert-scale categories were combined into three: in this table "good/large" combines the frequencies of "very good/large" and "good/large" responses; "bad/small" combines the frequencies of "very bad/small" and "bad/small" responses.

The differences in financial and economic performance evaluation between the two groups of members clearly show that high evaluations of financial and economic indicators lead to higher likelihood of investment in the cooperative.

Contrary to the clear differentiation of the two groups of members by financial and economic performance, the evaluation of social performance by two indicators – ability to deliver services, and impact on the local economy – was roughly the same for the two groups (Table 10). Thus, the effect of social performance on willingness to invest – whether positive or negative – is uncertain.

The effect of external policy environment: evaluation of government support

Finally, government support used in our study as an indicator of external policy environment was evaluated as "large" or "very large" by 16.1% of members willing to invest and none of the members from the unwilling-to-invest group (Table 10). The univariate analysis thus suggests that higher evaluation of the degree of government support received by cooperatives increases the likelihood of investing in the cooperative. This is consistent with the previous findings of Karami and Rezaei-Moghaddam (2005), who have shown that government support has a positive effect on cooperative performance, which in turn increases members' willingness to invest.

Investment regression

Overall, 71.3% of members are willing to invest in their cooperative. Member's willingness to invest is a binary variable with values 0 (not willing to invest) and 1 (willing to invest). The factors affecting member's willingness to invest were accordingly analyzed by probit regression. Willingness to invest was explained by 11 variables, conceptually grouped in six blocks (Table 11). Four of the 11 variables were aggregates constructed according to Table 4 from the detailed survey variables: overall evaluation of difficulties (aggregate of 4 variables), overall satisfaction with cooperative services (aggregate of 10 variables), financial performance (aggregate of 4 variables), and economic performance (aggregate of 3 variables). The other seven variables were represented by direct survey questions (compare Table 3). Apple income was the only variable from the block of farmer demographics and farm characteristics that showed significant differences between the two willingness-to-invest groups (see Table 5). It was accordingly the only variable from this block to be included in the probit regression.

Table 11: Investment regression results (dependent variable INC)

Independent variables	Variable codes	Coefficient	Std. Error	z-Statistic
Farm characteristics				
Apple income	API	0.1064	0.0731	1.4567
Member attitude toward cooperatives				
Self-importance in cooperative	IMP	1.1614	0.5630	2.0630**
Trading share with cooperative	SEL	4.3397	3.3017	1.3144
Trust in cooperative	TRU	2.0852	1.3353	1.5615
Overall evaluation of difficulties	DIF	1.3872	0.7997	1.7348*
Overall satisfaction with cooperative services	OVS	1.7374	1.3008	1.3356
Financial performance				
Overall evaluation of financial performance	AFP	3.9600	2.5949	1.5261
Economic performance				
Overall evaluation of economic performance	AEP	2.5157	1.4669	1.7150*
Social performance				
Ability to deliver services	SEV	1.6218	0.8491	1.9100*
Impact on the development of local economy	ILE	0.0096	0.9857	0.0097
External environment				
Government support	GOS	2.0830	1.0930	1.9059*
Constant	C	-45.7028	21.8505	-2.0916
McFadden R-squared		0.8756		
Observations with INC=0 (not willing to invest)		35	Total obs.	122
Observations with INC=1 (willing to invest)		87		

Note: * significant at $p = 0.10$; ** significant at $p = 0.05$ level.

The regression results are presented in Table 11. Five of the eleven explanatory variables have statistically significant estimated coefficients. These variables are

- perception of self-importance in the cooperative
- overall evaluation of difficulties faced by members in farm operations
- overall evaluation of cooperative economic performance
- ability of the cooperative to provide services
- government support received by the cooperative

The scoring of the qualitative explanatory variables is such that, for the five variables with statistically significant estimated coefficients, higher scores correspond to greater perception of self-importance, greater overall evaluation of difficulties, greater evaluation of economic performance, greater ability to deliver services, and better government support (see the scoring scales in Table 3). Since the five estimated coefficients are all positive, this implies that higher scores on all five explanatory variables increase the probability of being willing to invest (i.e., the dependent variable going from 0 to 1).

Summarizing the regression results, we can say that members tend to be more willing to invest in their cooperative as

- the perception of member's self-importance increases from "very unimportant" (1) to "very important" (5);
- overall evaluation of difficulties goes from "very easy" (1) to "very difficult" (5);
- overall evaluation of economic performance goes from "very bad" (1) to "very good" (5);
- the cooperative's ability to deliver services goes from "very bad" (1) to "very good" (5);
- government support goes from "very bad" (1) to "very good" (5).

The regression results are generally consistent with the results of univariate analysis for the corresponding variables in Table 7, 9, and 10. The only exception is the cooperative's ability to deliver services, which is statistically significant in the multivariate regression model, although univariate analysis does not show differences between the two groups of members by this variable (Table 10). The positive effect of economic performance is also consistent with the recent findings of Zdravkovic (2013), who has shown that economic benefits are one of the important investment drivers for farmers.

Member's trust in the cooperative does not have a statistically significant effect on willingness to invest. This is surprising, as previous studies have demonstrated a strong relationship between member's trust and attitudes to the cooperative (Hansen et al., 2002; Osterberg et al., 2009). This result may be attributed to relatively small variability of this factor among members in both groups (those willing to invest and those unwilling to invest; see Table 7).

Contrary to economic performance, financial performance (the aggregate of profitability, liquidity, leverage, and asset efficiency) does not have a significant effect on willingness to invest, despite its positive showing in univariate analysis (Table 8). This may be a reflection of the not-for-profit orientation of cooperatives, where financial indicators are of little importance to members. The significant positive effect of the cooperative's ability to deliver services, on the other hand, is consistent with the service-oriented mission of cooperatives. Members apparently pay less attention to financial performance than to delivery of cooperative services when making the investment decision.

Conclusions

The primary objective of this empirical article is to identify the factors that determine members' willingness-to-invest in the cooperative. A model focusing on the main determinants of members' attitude toward cooperatives and cooperative performance will enable cooperative managers/directors and rural development policy makers to exploit the factors that may enhance members' willingness to invest in their cooperative and thus facilitate sustainable development of rural cooperatives.

Survey evidence suggests that members show higher willingness to invest in cooperatives with better performance rating. In particular, financial performance of cooperatives relating to profitability and leverage and economic performance relating to the development potential and the scale of cooperative operation are strongly correlated with members' willingness to invest. The investment regression results also show a significantly positive relationship between economic performance and members' investment decision. Government support was also among the significant factors influencing members' investment decision: members are more willing to invest in a cooperative that enjoys greater government support. Among other factors, the perception of self-importance is a significant determinant of members' investment decision. If the self-importance as perceived by the members decreases, this may result in lower willingness to invest in the cooperative. Cooperatives should therefore cultivate their member relations,

particularly the relations between members and managers, and encourage members to participate in the governance and the decision-making process of the cooperative. The cooperative's ability to successfully deliver a range of services to its members is also conducive to encouraging members to contribute to cooperative funds, fully in line with the service-oriented mission of cooperatives.

Focusing on these factors as the determinants of the investment decision will help management encourage members to invest in the cooperative and thus improve the sustainability and effectiveness of cooperative operation.

Limitations

Due to limitations of questionnaire design and the budget, we could not collect detailed information on technological, historical, and environmental factors which may also affect members' investment decisions. This is left to future research.

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