

Influencing factor analysis on fish farmer's future Cooperative finance demand----based on the Panjin municipality pilot area in China

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Abstract. This paper tries to identify those factors which may have potential influence on the fish farmer's cooperative finance demand. In the process, a total of 442 farmer households as well as small-micro farming enterprises were sampled from the villages in Panjin municipality of Liaoning province in China, where the new form of the rural cooperative finance organization (NFRFCFO) experiment was under way. A discrete Logit analysis is used for the parameter estimations. The results show that most assumed factors display statistical significance effect on the fish farmer's willingness to take part in the rural cooperative financing organizations but with different level of sensitivity. The cause and effect are fully discussed following by addressing policy issues related to the rural financing cooperative reforms and environmental protection.

Introduction

The demand of rural cooperative finance has been keeping a positive trending momentum in the Chinese rural areas, which has been playing an essential role in stimulating the Chinese rural economic growth^[1, 2]. Previous studies recognized there are many factors which are able to contribute to the fish farmers' interests of participating in the local finance cooperatives, including fish farmer household characteristics, business types, operation scales, fish farmers' risk attitudes, and the financial service quality^[3]. It's become a social norm for the fish farmers to pursue the money sources from the local financial entities in China, including the rural finance operatives, the mutual fund aid groups, and/or even friends and relatives^[4]. Research has shown that both the shareholding system and the shareholding cooperative system are well received and accepted financial property right system in rural areas and they become main money sources for the fish farmers to get loans^[5]. Among others, the fish farmers' social identity and their perceptions over the finance service quality provided by the finance cooperatives are important factors contributing to the farmers' attitudes toward the cooperative participation^[6, 7]. It's been recognized that, to some extent, the reliable local finance cooperatives are able to provide remedy for some shortages that present in the formal credit system.

Theoretical hypothesis and research method

Based on the forgoing analysis, the relationship between the fish farmers' willingness to participate in the NFRFCFO and those potentially influential factors can be expressed in the following discrete Logit model (Eq.(1)):

$$P_{WTP} = f(X_1, X_2, X_3, X_4) \quad (1)$$

Where P_{WTP} is dependent variable which represents the probability of a fish farmer who chooses to take part in the NFRFCFO, and X_1, X_2, X_3, X_4 are independent variables which represent the four categories of factors, respectively. Eq. (1) can be used in estimating the effect of each specific factor on fish farmer's willingness to taking part in the NFRFCFO. A good characteristic of the discrete Logit model is that it can be used to estimate with a discrete binary data for the dependent variable, and yet there is no need for the assumption on the data distribution such as normal distribution requirement.

Thus, the model is satisfied with our estimation purposes. Now, lets ‘1’ stand for the fish farmer who is the member of the NFRCFO; and ‘0’ for being not a NFRCFO member. Software of SPSS16 is utilized to run the regression model (Eq.(2)):

$$P_{WTP} = \frac{\exp(\beta_0 + \beta_1 X_1 + L + \beta_i X_i)}{1 + \exp(\beta_0 + \beta_1 X_1 + L + \beta_i X_i)} \quad (i = 1, 2, 3, 4) \quad (2)$$

where P_{WTP} is dependent variable, expressing the likelihood a fish farmer who has participated in the NFRCFO. β_0 is a constant, $X_i (i = 1, 2, 3, 4)$ stands for various factors which influence fish farmers’ decision-making on whether to participate in the cooperative or not, β_i is regression coefficients to be estimated, i.e., the marginal contribution to the likelihood for a fish farmer to choose in participating in NFRCFO (P_{WTP}).

Data sources and the variable specifications

Data sources. With the support and accompany of the local government officials, the survey process went through smoothly. The selected framers were gathered at the local township government auditorium where filling out the survey forms was executed after giving an introduction to the survey purposes by the local government officials who are involved. A total of 460 questionnaires were distributed and of which 442 were completed after eliminating 18 invalid questionnaires, which means the ratio of effective questionnaires reaches as high as 96.09%.

Variable specifications. For the three variables to reflect farmer household’s conditions of production/operation, except for the family net income to be ranked in the 5 levels, household production scale is measured by its cultivated land size, and the weight of non-farm income is measured by the percentage of non-farm income which accounts for the total family net income. A complete variable specification is presented in Table 1.

Table 1– Variable specifications and their value coding

Variable	Specification and value coding	Anticipated direction
Willing to participate in the finance cooperative?	Yes=1; No=0	
Family characteristics		
Age of family head (Age)	years	+
Education received by the family head (Edu)	Primary school=1; middle school=2; high school=3; college=4; B.S.=5; M.S. or above=6	+
Number of labor in the family (Labor)	Person(s)	+/-
Status of production		
Production scale (Land)	Land size: <=10Mu=1; 11~30Mu=2; 31~50Mu=3; 51~100Mu=4; >=100Mu=5	+
Annual family net income (Inc)	0~¥10,000=1; 10,000~20,000=2; 20,000~30,000=3; 30,000~40,000=4; 40,000~50,000=5; >=50,000=6	-
Portion of non-agr. Income (Spe)	<=10%=1; 10%~30%=2; 30%~50%=3; 50%~80%=4; >=80%=5	-
Perception on the finance cooperatives		
Family head social identity (Ide)	Ordinary =0; with a social identity=1	+
Frequency of money borrowed (Freq)	Never borrowing money=1; borrowing money occasionally=2; borrowing money sometimes=3;	+

	borrowing money very often=4; always borrowing money=5	
Importance of the cooperatives (Imp)	Not important=1; less important =2; important=3 ; relative important=4; very important=5;	+
Opportunity cost of money borrowing (Cred)	Not known any local loan teller=0; known a local loan teller=1	+
Cost from informal money sources (Cost)	w/o cost=0; with cost=1	-
Risk preferences (Risk)	Risk averse=1; risk neutral=2; risk lover=3	-

Model Results and Influencing factor analysis

Model Results. As shown in Table 2, the estimated value for the log maximum likelihood is 1,365.89 , the likelihood of Chi square statistic is 66.74, implies that model reaches a 0.01 level of statistical significance. Overall, the model fits the date well.

Table 2– Estimated Logit regression model results

Variable	β	Std. error	Wald Statistic	Df.	Sig.
Constant	-22.390	7.805	7.995	1	0.005
<i>Age</i>	0.381***	0.202	8.127	1	0.005
<i>Edu</i>	3.749***	1.136	8.905	1	0.004
<i>Labor</i>	-0.747	0.682	1.163	1	0.252
<i>Land</i>	0.398***	0.161	6.585	1	0.009
<i>Inc</i>	0.531	0.219	2.290	1	0.107
<i>Spe</i>	-0.146***	0.052	6.943	1	0.007
<i>Ide</i>	1.101*	0.628	3.165	1	0.093
<i>Freq</i>	2.790***	0.877	10.098	1	0.000
<i>Imp</i>	6.990***	2.603	8.013	1	0.005
<i>Cred</i>	0.304	0.321	1.390	1	0.308
<i>Cost</i>	-0.120	0.438	0.061	1	0.191
<i>Risk</i>	0.151*	0.074	0.865	1	0.087

Influential factor analyses. As indicated in Table 2, the family sources of income generated will gradually change from migrating work to farming and home businesses. When this happens, the farmer will be more interested in participating in the rural cooperative financial organization. Among the three variables used to describe the fish farmer family production situation, both production scale and the weight of the non-fish income reach the 0.01 level of statistical significance, respectively. As the survey data indicates that the fish farmer household with the fishpond size of over 50 Mu, about 70% of them have chosen participating in the NFRFCFO. The three variables designed to reflect the fish farmer perception over the NFRFCFO all exhibit positive effects on the fish farmers NFRFCFO participation, which is consistent with our expectation. But the frequency of money borrowing and fish farmer's perception on the NFRFCFO attain the 0.01 level of statistical significance, whereas the variable for the fish farmer family head's social identity reaches the 0.1 level of statistical significance. According to the EXP (β), as the frequency of the fish farmer whose money borrowing activity increases by one more higher level, his willingness to participate in the NFRFCFO will rise by 14 times. There are three variables used to reflect the opportunity cost for farmer who takes part in the rural financing cooperative. Of the three factors chosen to reflect the opportunity costs imposed on the fish farmers as they participate in the NFRFCFO, the credit channel does not exhibit any significant influence on the fish farmers' willfulness in participating in the NFRFCFO. Data analysis reveals that the vast majority of farmers believe they are either risk neutral or risk lover whereas the

proportion of risk averse to farmers is less than 30%. Furthermore, the risk love farmers are willing to pay a high cost in participating in the cooperative.

Conclusions and policy implications

First, with regard to the farmer household characteristics, both the farm size and number of labor presented in a farmer family have a negative effect on the farmer's willingness to participate in the rural financing cooperative organization. Second, as to the establishing the new type of financing organization system, at present, it is now under the stage of uneven development. The internal guarantee system of governance structure and property division need to be further improved; related policy propaganda, law and regulations employed in standardizing financing channels need to be improved. Third, in the national level, at present the rural financing reform and environmental protection should be more focused on the aspect of letting market play a critical role in allocating financial resources for the rural economy. Various new types of the rural cooperative financing organizations should be encouraged.

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