Analysis on the Influential Factors of Farmer's Willingness to Join Professional Cooperative Behavior in Minority Regions——Based on the Survey Data of Ili Valley Livestock Farmers

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Abstract. Using the survey data of farmers and herdsmen (livestock farmers) in Ili Valley, this paper empirical analyzed their influential behavioral factors to join cooperatives through the binary logistic model. The result shows that, the factors like age, product marketing problem and the understanding level of cooperatives are obviously influenced their behavior willingness, while others like gender, education level, number of family labor forces, production material purchasing problems, financial problems, the economical and benefit variance of breeding, the understanding of government support policy is unobvious.

Investigation method

Selection of survey area. The Ili valley is selected as a key investigation area mainly because of its abundant natural resources with a mild and humid climate and an obvious advantages in developing agriculture and animal husbandry. It is the most important food, oilseeds, livestock, sugar beet, flax, and fruit production base in Xinjiang, and the typical farming and pastoral areas of minority in China. By the end of 2014, the total number of registered cooperatives in Bureau of Agricultural is 1358, relating to many industries like planting, herds and fruit farming. Its rapid development has promoted the industrialization and large-scale of animal husbandry development, pushing the carry out of grassland protection and settlement problems, promoting the optimization of livestock breeds.

General situation of survey. In location influential mode agency, the author use home questionnaire survey. For the farmers and herdsmen whose major income is farming and livestock, here chosen random sampling method, and all the data used in this paper comes from it. A total of 200 questionnaires were sent out and 189 returned, after excluding incomplete questionnaires, 176 valid questionnaires remaining, and an effective rate of 93%. The basic information of respondents is show in Table 1-1.

Table 1-1 Basic information statistics of surveyed farmers and herdsmen

Index	Group	sample number	Proportion (%)
Age	Under 35	43	24.4
	36-45	74	42
	46-55	34	19.3
	Above 55	25	14.2
Education	Primary and lower	112	63.6

level	Junior high school	45	25.6
	High school and higher	19	10.8
Ethic	Han	46	26.1
	Hui (including Dongxiang)	33	18.8
	Other ethics (Uighur, Kazak)	96	54.5
Number of family labor	two person	136	77.3
	More than two person	40	22.7
Scale of farming (in Standard livestock)	Within 50	76	43.2
	51-100	37	21
	101-150	11	6.3
	151-200	9	5.1
	More than 200	43	24.4

Farmers and herdsmen' views on the development of professional cooperatives

Farmers and herdsmen's understanding level of cooperative behavior. Though started late, the farmer professional cooperatives in Ili valley is developing rapidly in recent years. When asked whether it is necessary to establish farmer and livestock professional cooperatives, nearly half of them hold a negative answer which is related with the degree of awareness of cooperatives. Their understanding degree is not ideal, one fifth of the farmers and herdsmen state they never heard it, 43.57% of them said they had heard but do not know how to operate, only 9.09% understand how it operates, which proves that most local farmers and herdsmen's understanding of professional cooperatives is still in the initial stage.

The degree of farmers and herdsmen's satisfaction on local service organizations' services. The survey results shows that the problems of rural credit cooperatives is the largest and most dissatisfied one, which may cause by insufficient lending support, while not so satisfied for the services of other service organizations (as Table 2-1).

Table 2-1 the satisfaction degree on the service provided by service organizations

	No problem	Fewer problem	Few problem	Big problem	Bigger problem
Local breeding station	18.18%	24.43%	36.93%	10.80%	9.66%
Enterprises	26.14%	22.16%	31.82%	11.93%	7.95%
Village economic organizations	10.80%	15.91%	60.80%	7.95%	5.11%
famer professional cooperatives	5.11%	26.14%	42.05%	13.07%	13.07%
Rural credit cooperatives	5.11%	21.02%	10.80%	28.98%	34.09%
Local livestock sector	36.93%	26.14%	7.95%	13.07%	15.91%

Farmers and herdsmen' understanding level on government's policy to support cooperatives. By analyzing the survey data, we realize that more than half farmers and herdsmen don't understand government's supporting policy on farmer professional cooperatives. It can be seen, although government vigorously promotes the development of professional cooperatives, few of them really understand its implications, and require the government to do more.

An empirical analysis of the influential factors of farmers and herdsmen's willingness to join in farmer professional cooperatives

Because we need to found a mode to evaluate the impact factors, in which the results are only two

cases, willing and unwilling or participate and non-participate, the mode must meet the value of variable 0 or 1, that is to say the dependent variable in the mode is a discrete variable. The question studied in this paper is the influential factors of farmers to join in cooperatives and no order between them, which means it is a disorder of multiple choices problems. Therefore, this paper uses the general multivariate logistic model to analyze the factors.

The form of logistic functional is show as follow:

$$f(x)=\frac{e^{x}}{1+e^{x}} \tag{1}$$

Because the value of Y can only be 0 or 1, is a discrete variable, which is unsuitable directly used as the dependent variable in the regression model, while $E(y)=p=\beta_0+\beta_1x_1+\beta_2x_2+...+\beta_ix_i$ represents the possibility of events, adding to the equation and get:

$$f(p)=\frac{e^{p}}{1+e^{p}}=\frac{e^{(\beta_0+\beta_1x_1+\beta_2x_2+...+\beta_ix_i)}}{1+e^{(\beta_0+\beta_1x_1+\beta_2x_2+...+\beta_ix_i)}} \tag{2}$$

Since the function $f(p)$ is insensitive on the change of x near $f(p)$=0 or $f(p)$=1, therefore do natural logarithmic transformation, then we get

$$g(p)=\ln(\frac{f(p)}{1-f(p)}) \tag{3}$$

In the case of $f(p)$ and x_i is not a linear relationship, through natural logarithmic transformation, we can get a linear relationship between $g(p)$ and x_i, shown as

$$g(p)=\ln(\frac{f(p)}{1-f(p)})=\beta_0+\beta_1x_1+\beta_2x_2+...+\beta_ix_i+\mu \tag{4}$$

The variable meaning state of farmer's willingness to join in professional cooperatives. From above theoretical and description statistical analysis, this paper through empirical analysis in the model and defining relevant variables as follow, explain the influential factors of farmers and herdsmen to join in cooperatives by logistic regression.

The measurement model results of farmers and herdsmen's willingness to join in professional cooperatives. The paper made regression analysis on 176 questionnaires through statistical software Spass 19.0.

Table 3-2 Model evaluation results 1

Explanatory variables	B	S.E,	Wals	df	Sig.	Exp (B)
x1	0.534	0.627	0.724	1	0.395	1.706
x2	-1.012	0.301	11.267	1	0.001	0.364
x3	0.759	0.598	1.610	1	0.205	2.136
x4	-0.189	0.830	0.052	1	0.820	0.827
x5	0.195	0.627	0.097	1	0.756	1.215

x6	0.377	0.293	1.662	1	0.197	1.458
x7	0-.393	0.274	2.050	1	0.152	0.675
x8	0.019	0.228	0.007	1	0.933	1.019
x9	0.125	0.336	0.139	1	0.710	1.133
x10	0.290	0.248	1.367	1	0.242	1.337
x11	-0.241	0.247	0.949	1	0.330	0.786
x12	-0.111	0.188	0.350	1	0.554	0.895
x13	-0.226	0.229	0.972	1	0.324	0.798
x14	-0.418	0.250	2.792	1	0.095	0.658
x15	0.701	0.379	3.428	1	0.064	2.015
x16	-0.296	0.671	0.194	1	0.659	0.744
x17	0.079	0.683	0.013	1	0.908	1.082
x18	-0.702	0.430	2.658	1	0.103	0.496
x19	-0.598	0.797	0.562	1	0.453	0.550
x20	-2.046	0.870	5.536	1	0.019	0.129
x21	1.125	0.534	4.434	1	0.035	3.081
x22	0.931	0.957	0.945	1	0.331	2.536
Constant	4.805	6.289	0.584	1	0.445	122.110

When the Wald value is bigger or Sig value is smaller, ITS significance is stronger. Gradually excluding the item of less influences and continues the regression analysis, and intercept part of the results get the model evaluation results 2 (Table 3-2)

Table 3-2 Model evaluation results 2

Variable	B	S.E,	Wals	df	Sig.	Exp (B)
x2	-1.171	0.227	26.514	1	0.000	0.310
x14	-0.337	0.160	4.434	1	0.035	0.714
x15	0.074	0.201	0.135	1	0.713	1.077
x18	-0.052	0.160	0.106	1	0.745	0.949
x20	-1.306	0.634	4.237	1	0.040	0.271
x21	1.321	0.438	9.106	1	0.003	3.749
Constant	3.885	1.111	12.235	1	0.000	48.673

And we continue to excluding the item of less influences and doing regression analysis to get the final results. From the analysis result of logistic model, we know that the statistic test value of the influence degree of farmer’s age and product sale problems will be obvious in the level of 1%, and farmer’s understanding on cooperatives is in the level of 5%.

A good model requires a high likelihood ratio, and the log likelihood value is relatively small. The change of likelihood value indicates the model’s impact on the fitting degree of data when the selected variable into the model or rejected. Here the final results’ -2LL likelihood value is 184.015, is relatively small, indicating a good model fit.

First, from the survey and analysis results, we know that the vast majority of farmers and herdsmen in Ili valley do not understand even heard of farmer cooperatives, or have heard but not completely understand its operate, means their understanding level still in the lowest grade.

Second, their willingness to join in cooperatives is obviously influenced by age, education level, the ability of hear-speak Chinese. For the limitation of arable land (two acres per household), the outskirt farmers prefer to join the cooperatives, while pastoral herdsmen is unwilling to join for fear their shares being public property.

Third, recent years, the price of livestock continues to decrease, sale difficulty is an obvious

influential aspect. The lag behind of economic seriously affected the marketing process of livestock. Moreover, the farmers and herdsmen lacking of brand management sense and the production of green, organic livestock consciousness, resulting sale sluggish.

Fourth, breeding farmer cooperatives being formalized, include some autonomous region and autonomous prefecture-level model agency. This kind of cooperatives being a means to obtain government support for some person or groups, which can't bring any economic benefits for their members and meanwhile affecting farmer's willingness to participate in.

Suggestions

First, increase investment in rural education, especially in bilingual education, attention to the training of cooperatives members. Second, strengthen the efforts in propaganda to improve farmer's understanding of cooperatives. Third, government enhances supervision and management on cooperatives avoiding being the means to obtain government financial support for some people and groups. Fourth, government strengthen the promotion of high-quality agricultural and livestock products in inland and developed areas, constructing a "internet+" platform, establish sale information site, promoting brand awareness, solving the livestock sale problems. Fifth, the government need to transform animal husbandry development ideas, promoting scale farming in rural areas, encourage natural pastures in pasturing areas, achieving the livestock-grass balance, developing organic livestock farming, increase added values and turning vulnerable of industrial into advantages of organic agriculture development.

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