The establishment of evaluation index system and the empirical research on the financial activity ability of specialized farmer's cooperatives

Xiaozhong Song, Linbin Wang and Jing Zhao

Department of Accounting, Yan Shan University, Qinhuangdao 066004, China

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Abstract. The current Chinese specialized farmers cooperatives' financial activity capacity is generally weak, this paper constructs an evaluation model of financial activity capacity using the factor analysis method and structural equation, then gives an empirical research based on field survey data of specialized farmers cooperatives in Suning county.

Introduction

Chinese specialized farmer's cooperatives encountered many problems in the process of vigorous development, especially problems about financial activities including financing difficulties, low efficiency of capital operation and irrationality of income distribution, which are in great need of being solved. And the key is to construct a financial activity capacity evaluation model on the basis of influencing factors, and make evaluation on specialized farmers cooperatives' financial activity capacity using the field survey data. In this way, Cooperatives of stakeholders can clear cooperatives' financial activity and make improvements, which has important significance to promote the smooth development of cooperatives.

The Establishment of evaluation index system

Financial activities ability owed by companies is the combination of unique knowledge and experience, including financing capacity, investment capacity and distribution capacity, etc.

Table 1 Financial activities ability evaluation indicator system

Rule layer	Index layer	Index code
Financing ability F	Basic ability	F1
	Development potential	F2
	Support	F3
Investment operation ability O	Group size	O1
	Operating activities	O2
	Investment in science and technology	O3
	Membership benefits	O4
	Social influence	O5
Income distribution fits D	Decision-making process	D1
	Implementation process	D2
	Effect of distribution	D3

The data used in the article is gained from a field survey on specialized farmer's cooperatives of Suning County in Hebei Cangzhou, for the reason that Suning cooperatives have great development in recent years. In this research, 66 cooperatives are surveyed through 200 copies of questionnaires, and 198 copies are taken back, among which 178 copies questionnaires are useful.

Reliability analysis

After standardizing the data processing and using SPSS18.0 to measure samples collected, the minimum value of α is 0.755, meeting the requirements of the reliability and passing the reliability test, as is shown in Table 2.

Table 2 a total of statistics of specialized farmers cooperatives' financial activities ability

Indicators	Deleted average scale	Deleted scale variance	correction of a total correlation	Deleted α of the item	α
F1	4.767	.905	.708	.913	
F2	4.212	.589	.843	.833	.892
F3	3.745	.852	.896	.783	
O1	8.439	4.903	.478	.734	
O2	9.036	4.434	.655	.670	
O3	9.650	5.197	.464	.738	.760
O4	10.271	5.153	.573	.709	
O5	8.653	4.228	.520	.730	
D1	7.12	3.031	.592	0.663	
D2	7.20	3.248	.583	0.676	.755
D3	7.03	2.865	.582	0.678	

Confirmatory factor analysis

In this paper, the three indicators of specialized farmers cooperatives' financial activity capacity which got from the exploratory factor analysis were further examined, confirming this division by confirmatory factor analysis, determining the structure validity of the index system, providing the basis for model tests. In this paper, using AMOS19.0 to analyze the fitting results which are shown in Table 3.

Table 3. Confirmatory factor analysis results of cooperatives' financial activity ability

path	Estimate	S.E.	C.R.	P
F3<---F	1.000			
F2<---F	1.457	.110	13.235	***
F1<---F	1.742	.114	15.280	***
D3<---D	1.000			
D2<---D	1.698	.224	7.570	**
D1<---D	1.345	.155	8.671	**
O3<---O	1.000			
O2<---O	1.853	.248	7.462	***
O1<---O	.669	.065	10.272	***
O4<---O	1.468	.207	7.093	***
O5<---O	.649	.124	5.239	***
χ^2	75.029	CFI	0.915	
df	44	TLI	0.932	
χ^2 / df	1.705	RMSEA	0.024	

Note: * * * said significance level (p < 0.001), * * indicates significant level (p < 0.01).

Fitting results show that, χ^2 is 75.029(degree of freedom = 44), χ^2 / df is 1.705, less than 2, P is 0.002. At the same time, CFI and TLI are greater than 0.9 and closed to 1. RMSEA is 0.024. The path coefficients' corresponding CR values in measurement equation are greater than the reference value, and path coefficients have statistical significance (p < 0.001 or p < 0.01). Synthesize the above results, using AMOS19.0 to calculate, the load factors coefficient matrix is shown in the Table 4, standardized estimate results are shown in Fig.1. Specialized farmers cooperatives' financing ability index factor loading value is reasonable and significant at the 1% level, showing that specialized farmers cooperatives' financing ability evaluation index system has good convergence. Factors through the tests on discrimination validity, showing that each factor not only can measure the different aspects of the farmers cooperatives' financing ability independently, but also can measure the same content of farmers cooperatives' financing ability, and there may be a higher-order factor.

Using SPSS18.0 to calculate the correlation coefficient (0.920) which illustrates that the above method of calculation about financing ability, capital operation ability and suitability of the income distribution is feasible. This is also the validation of the related research results in this paper, which shows that model fitting is very well.

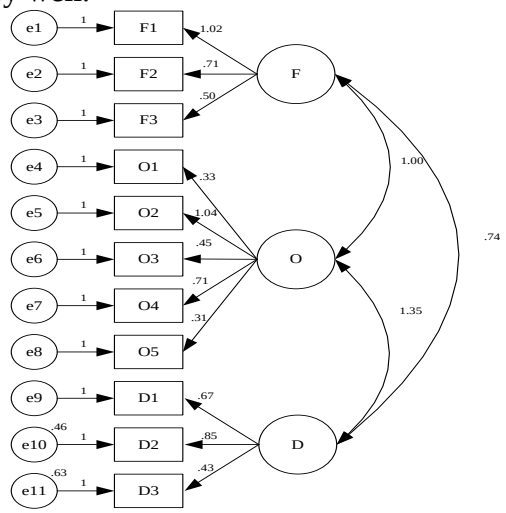

Fig.1 Confirmatory factor analysis of farmer's cooperatives' financial activity ability

Table 4 Factor loading matrix of specialized farmers cooperatives' financial activity ability

path	Estimate	path	Estimate	path	Estimate
F3<---F	1.017	D1<---D	.666	O5<---O	.307
F2<---F	.709	O3<---O	.446	F<---＞O	.995
F1<---F	.504	O2<---O	1.35	D<---＞O	1.345
D3<---D	.425	O1<---O	.327	D<---＞F	.744
D2<---D	.845	O4<---O	.710		

The results show that the factor structure of specialized farmer's cooperatives' financial activity ability was tested, and specialized farmers cooperatives' financial activities can be divided into three parts, namely financing ability, working capital operation ability and income distribution fits. The empirical research based on the three parts is reliable.

A second-order factor model test

In order to simplify the model, this paper further builds the second-order factor of structural equation model based on the above research, and analyzes the structural equation model fitting using AMOS19.0. The results are shown in Fig.2.

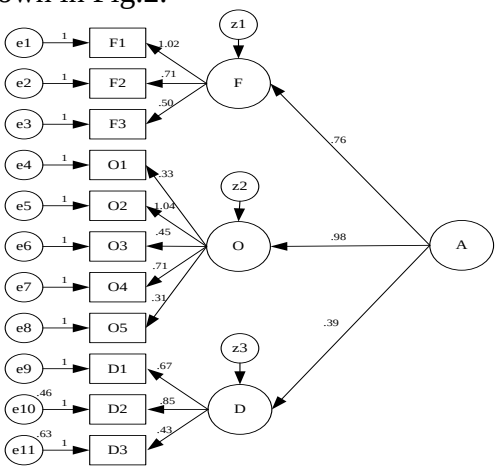

Fig. 2 Fitting results of second-order factor structure equation model

Table 5 Fitness of structural equation model

Fitting index	Results	Reference	Fitting index	Results	Reference
χ^2 / df	1.803	Less than 3 best	RFI	0.652	Close to 1 good
RMR	0.046	>0.08	IFI	0.898	>0.9
GFI	0.886	>0.9	TLI	0.908	>0.9
AGFI	0.927	>0.9	CFI	0.950	>0.9
PGFI	0.512	>0.5	RMSEA	0.132	>0.5
NFI	0.928	>0.9			

Listed in Table 6 are the second-order factor of structural equation model fitting results of absolute fitting effect indicators, relative fitting effect indicators, alternative indicators and simple indicators, and most of indicators are in the range of reference and through the test. GFI value of 0.886, IFI value of 0.898, although do not reach the optimal value of 0.9, are very close and can be accept. In addition, through the CMIN model fitting summary can be seen that the minimum sample differences CMIN is 77.521, greater than 0.5, the relative chi-square CMIN/DF is 1.803, less than 2.There are no negative measurement errors, and the measurement errors are significant. Composite reliability of latent variables (C.R.) above 0.7 indicating good reliability composition. We can determine that goodness-of-fit index is ideal based on the above statistics.

Table 6 Path analysis results of structural equation model

Path	Estimate	S.E.	C.R.	P
O<---A	1.000			
F<---A	1.000			
D<---A	1.000			
F3<---F	1.000			
F2<---F	1.455	.114	12.763	***
F1<---F	1.747	.112	15.598	***
D3<---D	1.000			
D2<---D	1.693	.219	7.731	**
D1<---D	1.349	.157	8.592	**
O3<---O	1.000			
O2<---O	1.851	.246	7.524	***
O1<---O	.669	.063	10.619	***
O4<---O	1.467	.208	7.053	***
O5<---O	.648	.124	5.226	***

Note: * * * said significance level ($p < 0.001$), * * indicates significant level ($p < 0.01$).

As can be seen from the fitting results, working capital operation capacity makes decisive effect for specialized farmer's cooperatives, financing ability is the second and income distribution fits are the lowest. Compared with the traditional factor analysis, the second-order factor model can more truly reflect the intrinsic link among indicators of specialized farmers cooperatives' financial activity ability, structural equation model allows the existence of index measurement error, the influence of the traditional factor analysis can't control other variables, and there are different levels of information loss when extracting total factor, and the structural equation model is more accurate than the obtained factor loading.

Specialized farmers cooperatives' financial activity ability evaluation

Weight. To determine weight of index system in this article by using correlation weight method, which is to determine the weight according to the correlation coefficient, and the method through a large number of sample data for related data test between variables. Correlation coefficient in Structural equation model is essentially standardization factor loading, and through the factor loading normalization processing could get indexes weights. After measuring, financing ability, operating ability and income distribution ability and related evaluation index's weight can be seen in Table 7.

Table 7.Evaluation indicator system

Rule layer	Index layer	Index code	Index weight
Financing ability	Basic ability	F1	0.435
F	Development potential	F2	0.343
0.357	Support	F3	0.222
	Group size	O1	0.117
Investment operation ability	Operating activities	O2	0.366
O	Investment in science and technology	O3	0.157
0.46	Membership benefits	O4	0.250
	Social influence	O5	0.109
Income distribution	Decision-making process	D1	0.319
D	Implementation process	D2	0.456
0.183	Effect of distribution	D3	0.225

Measuring specialized farmers cooperatives' financial activities ability. By the calculation, specialized farmers cooperatives' financial activities ability evaluation results are shown in Table 8.

Table 8 Evaluation result of specialized farmers cooperatives' financial activities ability

Organization name	Score	Ranking	Organization name	Score	Ranking	Organization name	Score	Ranking
XD	3.4342	1	HR	2.8215	17	ZX	2.4033	33
MH	3.1355	2	ZO	2.8009	18	FX	2.3954	34
HS	3.0852	3	WQ	2.7922	19	ZL	2.3917	35
TC	3.0755	4	YY	2.7754	20	YC	2.3528	36
CL	3.0416	5	SX	2.7680	21	ZJ	2.3126	37
QF	2.9695	6	SF	2.7552	22	WJ	2.3097	38
CH	2.9653	7	LY	2.7099	23	LF	2.3047	39
FY	2.9653	8	HX	2.6936	24	TR	2.2776	40
HO	2.9582	9	JF	2.6844	25	FA	2.2227	41
WY	2.9368	10	CQ	2.6834	26	YX	2.1241	42
LD	2.9082	11	JR	2.5848	27	SG	2.1184	43
QA	2.8730	12	XY	2.5245	28	GY	2.0497	44
XZ	2.8650	13	LC	2.4905	29	GZ	2.0427	45
QZ	2.8646	14	JG	2.4731	30	LS	1.9922	46
NY	2.8323	15	SN	2.4442	31	BG	1.7021	47
TH	2.8260	16	JB	2.4292	32			

Analysis of the results. As can be seen from comprehensive evaluation of the financial activities ability: 1.The top-rated cooperatives whose three kinds of ability coordinate with each other and relatively high. Such as XD (Xin Ding fruit and vegetable farming co-operatives), working capital score of 3.4467, ranking first, income distribution fit evaluation score of 4.1293, ranking second, financing ability score of 2.024, ranking twenty-fifth. It shows that only the three ability develop coordinately can cooperatives make greater progress. 2. The ability to play a leading role in three is investment capital operation ability mostly, for example, XD, the total ranking first, capital operation ability score of 3.4467, the investment in science and technology ability is particularly outstanding score of 4.51, ranking first, membership benefits score of 3.8622, ranking third.3. Most cooperatives which have strong comprehensive ability is established earlier, managed normally, and operated with a large scale, such as XD whose registered capital of 2 million yuan, 2.3 million yuan in fixed assets, turnover in 2012 of 3.15 million yuan.

Therefore, specialized farmers cooperatives' financing structure, income distribution and value creation is a united and indivisible organic. Financing structure determines the income distribution system, while the distribution of income in turn affects the financing structure, financing structure and income distribution system jointly determine whether the cooperatives can have the necessary funding supply, whether there is sufficient room for value creation. Only the more value created can it ensure the distribution. So from the perspective of harmony, it is crucial to study how to coordinate the three. Projects of Hebei province science and technology plans, 14457509D.

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