

Impact of Social Network Embedding on Cooperative Members' Wage Income Distribution Mechanism and Access to Employment Information and Computational Modeling Analysis

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ABSTRACT

Social network is a special social factor in the development of cooperatives, and the influence of the degree of social network embeddedness cannot be ignored in order to realize the high-quality development of cooperative economy. In this paper, we first use the entropy power method to measure and characterize the social network embeddedness, and then use the OLS regression model to analyze the influence mechanism of social relationship network embeddedness on the mechanism of wage income distribution and access to employment information of cooperative members, and explore the moderating role of environmental dynamics. The experimental results show that there is a certain strength gap in the external relationships of the social network of rural cooperative members, and the level of social relationship network embeddedness among samples from different regions is polarized. At the same time, the internal and external embeddedness of the social network of cooperative members has a positive effect on the efficiency of employment information acquisition, and there is a mediating role of the wage income distribution mechanism between the two. In addition, environmental dynamics moderates the two paths of action between social relationship network embeddedness and wage income distribution mechanism and employment information acquisition efficiency, but the moderating effect of environmental dynamics on capital income distribution mechanism and employment information acquisition efficiency is not significant. This study has certain guiding significance for the innovative development of cooperative economy.

Keywords: entropy power method, OLS regression model, social relationship network embedding, income distribution mechanism, employment information acquisition

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1. Introduction

In recent years, with the popularization of the Internet and social media, social relationship networks have become increasingly important in modern society, and such networks not only help people establish good interpersonal relationships, but also have a positive impact on labor mobility [1-3].

Traditional job search often relies on job advertisements or intermediaries, which suffers from information asymmetry and job seekers are not informed of all job opportunities [4-5]. However, social network enables job seekers to obtain more employment information through the relationship chain established by friends, classmates, colleagues, etc. In this way, the labor force is able to broaden their job search channels and improve the chances of finding a job [6-9]. At the same time, job seekers often face the problem of trusting employers in the job search process, worrying about being cheated or encountering unfair treatment [10]. Through social networks, job seekers' uncertainty and fear can be reduced because they believe that job offers through friends' referrals are usually reliable, and employers are more likely to trust job seekers who have been recommended by their acquaintances [11-13]. However, there are also some negative effects of social networks; social networks may lead to information closure, and if job seekers in a particular social circle only interact with people in their circle, they may miss opportunities in other circles [14-17]. In this case, the social network may limit their career development, and it may also lead to a "circle effect", whereby in certain industries and organizations, recruitment tends to be more trusting and reliant on existing relationships, which may make it difficult for some people to enter or be marginalized [18-20].

This paper explores the influence mechanism of social relationship network embeddedness on cooperative members' wage income distribution mechanism and employment information acquisition by using social relationship network embeddedness as the independent variable, employment information acquisition efficiency as the dependent variable, wage income distribution mechanism as the mediator variable, and environmental dynamics as the moderator variable. The theoretical model of employment information acquisition efficiency is constructed based on previous literature, and hypotheses are formulated. Using OLS regression model, hierarchical regression method and bootstrap intermediation test, the direct paths of social network embeddedness, wage income distribution mechanism and employment information acquisition efficiency are verified respectively, the mediating effect of the wage income distribution mechanism and the moderating effect of the environmental dynamics are verified. The mediating effect of the wage income distribution mechanism and the moderating effect of environmental dynamics are verified respectively.

2. Research methodology

This paper first adopts the entropy power method to measure social network embeddedness, and then applies OLS regression to analyze the mechanism by which social network relational embeddedness affects the mechanism of wage income distribution and the efficiency of employment information acquisition of cooperative members, and to explore the moderating role of environmental dynamics in it.

2.1. *Methods for estimating social network embedding*

Entropy weight method is to determine the weight of each indicator by the degree of variation of the indicator, and the degree of variation of the indicator is expressed by information entropy [21]. If the information entropy of an indicator is smaller, it means that the degree of variation of the indicator is larger, which can provide more information and play a more important role in comprehensive evaluation, and accordingly the weight of the indicator will be larger. The entropy weight method objectively determines the weights according to the size of the information contained in each indicator itself, avoiding all kinds of subjective evaluation of human influence factors, and is widely used in the

field of economics and sociology research. In this paper, the entropy weight method is used to calculate the weights of the embedded indicators of social relationship network and get the comprehensive index, and the calculation method is as follows:

$$S_c = w_1 S_{c-1} + w_2 S_{c-2} + w_3 S_{c-3} \quad (1)$$

where S_c is the parent social capital, w_1, w_2 , w_2 , and w_3 are the weights of the indicators respectively, and S_{c-1}, S_{c-2} , S_{c-2} , and S_{c-3} are the social capital measurements selected in this paper.

The calculation process of indicator weights is as follows:

Assuming that there are m indicators, there are a total of n samples, x_{ij} denotes the j th indicator of the i th sample, and i and j satisfy the following relational equation: $1 \leq i \leq n, 1 \leq j \leq m$.

All data are standardized and then used, and the weight of the i th sample under the j th indicator for that indicator is calculated as:

$$p_{ij} = \frac{x_{ij}}{\sum_{i=1}^n x_{ij}} \quad (2)$$

The entropy value of the j st indicator is:

$$e_j = -k \sum_{i=1}^n p_{ij} \ln(p_{ij}) \quad (3)$$

where k and e_j satisfy the following properties:

$$k = \frac{1}{\ln(n)} > 0, e_j > 0 \quad (4)$$

The coefficient of variation of the information entropy of the j st indicator is calculated as follows:

$$d_j = 1 - e_j \quad (5)$$

Then, the entropy weight of the j st indicator is:

$$w_j = \frac{d_j}{\sum_{j=1}^m d_j} \quad (6)$$

2.2. OLS regression model

Among the common regression models, Ordinary Least Squares (OLS) [22] is the most common and simplest. It finds the best function match for the data by minimizing the sum of squares of the errors. Using the least squares method makes it easy to find unknown data and makes the sum of squares of the errors between these found data and the actual data to be minimized. In this paper, we use OLS regression model to analyze the mechanism of social network embeddedness on the mechanism of wage income distribution and access to employment information of cooperative members. The formula of OLS regression model is:

$$f(x) = \alpha_1 \varphi_1(x) + \alpha_2 \varphi_2(x) + \cdots + \alpha_m \varphi_m(x) \quad (7)$$

where $f(x_i)$ is a function of the explanatory variables, $\varphi_k(x)$ is a pre-selected set of linearly uncorrelated functions, and a_k is the coefficient of interest to be determined, ($k = 1, 2, \dots, m, m < n$),

and the fitting criterion is to make the distance $y_i (i = 1, 2, \dots, n)$ minimizes the sum of the squares of the distances $f(x_i)$ from δ_i , called the least squares criterion.

3. Theoretical models and research hypotheses

3.1. Theoretical Modeling

Based on related research, it is proposed that widening the access to employment information can promote the development of cooperatives. Based on the combing of related literature on employment information access, a theoretical model is constructed.

When actors are more deeply embedded in the network, the closer they are connected to the members in the network, the higher their trust, and the higher their voice in the network, which helps them to obtain employment information in the network and understand the income distribution mechanism of the members in the network. When cooperatives continue to optimize the distribution mechanism of members' wage income, more talents with professional skills and knowledge will be attracted to join cooperatives, and members of cooperatives will be motivated to take the initiative to expand the channels of obtaining employment information in order to improve their wage income through their own ability enhancement, thus promoting the circulation of the overall employment information of cooperatives, i.e., the embeddedness of the social network can influence the acquisition of employment information through the mechanism of wage income distribution. That is, social network embeddedness can affect the acquisition of employment information through the mechanism of wage income distribution.

In addition, the dynamic environment can affect the optimization effect of the wage income distribution mechanism, cooperative members in the process of constantly interacting with the information, resources and knowledge in the environment, often can get a better implementation of the wage income distribution mechanism and higher efficiency of employment information acquisition. When the external environment is more stable and favorable to the development of cooperatives, environmental dynamics can play a positive catalytic effect in the role of the wage income distribution mechanism on the acquisition of employment information.

On the basis of past research on access to employment information and interviews with cooperative members, this study constructs a conceptual model as shown in Figure 1.

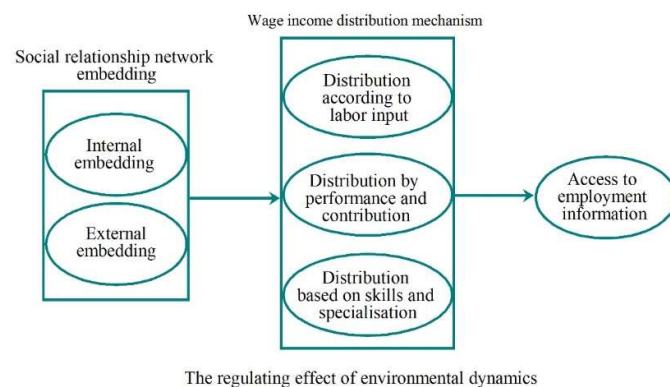


Fig. 1. Conceptual model

3.2. Research hypotheses

1) Hypothesis on the relationship between social network embeddedness and the efficiency of employment information acquisition. Scholars have applied the social network theory to cooperatives, showing that the higher embeddedness of social network relationships implies a closer relationship

between cooperatives and their members and a smoother flow of information, thus improving the efficiency of employment information acquisition. Based on the theoretical foundation, the following hypotheses are proposed:

H1: Internal embedding can positively affect the efficiency of employment information acquisition.

H2: External embedding can positively affect the efficiency of employment information acquisition.

2) The hypothesis of the relationship between social relationship network embedding and wage income distribution mechanism. The higher the node degree of the actor in the network, indicating that the higher its position in the network, the more influence it has in the wage income distribution mechanism. Based on the review and combining of the literature on social networks and income distribution mechanisms, the following hypotheses are derived:

H3: Internal embedding can positively influence the distribution by labor input.

H4: Internal embedding can positively influence the distribution by performance and contribution.

H5: Internal embedding can positively affect allocation based on skills and specialization.

H6: External embedding can positively affect the allocation based on labor input.

H7: External embedding can positively affect the allocation based on performance and contribution.

H8: External embedding can positively affect the distribution based on skills and specialties.

3) Hypothesis on the relationship between wage income distribution mechanism and the efficiency of employment information acquisition. Reasonable wage income distribution mechanism can attract more professionals to join the cooperative and motivate cooperative members to take the initiative to expand the channels of employment information acquisition and improve the efficiency of the overall flow of employment information in the cooperative. Based on this, the following hypotheses are proposed:

H9: Distribution by labor input can positively affect the efficiency of employment information acquisition.

H10: Allocation based on performance and contribution can positively affect employment information acquisition efficiency.

H11: Allocation based on skills and specialization can positively affect the efficiency of employment information acquisition.

4) The mediating role of wage income distribution mechanism. The analysis of empirical research shows that all three dimensions of wage income distribution mechanism have good mediating effects in the relationship between relational embeddedness and employment information acquisition efficiency. Based on the relevant research content, the hypothesis is proposed:

H12: Allocation by labor input has a mediating effect in the relationship between social relationship network embeddedness and employment information acquisition efficiency.

H13: Allocation based on performance and contribution has a mediating effect in the relationship between social relationship network embeddedness and employment information acquisition efficiency.

H14: Allocation based on skills and specialization has a mediating effect between social network embeddedness and employment information acquisition efficiency.

5) Moderating effect of environmental dynamics. Based on the literature combining, it is known that environmental dynamics plays a moderating effect in the interaction of social relationship network embeddedness, wage income distribution mechanism and employment information acquisition efficiency, so the following hypothesis is proposed:

H15: Environmental dynamics plays a moderating role in the interaction between social relationship network embeddedness and employment information acquisition efficiency.

H16: Environmental dynamics plays a moderating role in the interaction between social relationship network embeddedness and wage income distribution mechanism.

H17: Environmental dynamics moderates between wage income distribution mechanism and employment information acquisition efficiency.

4. Study design

4.1. Questionnaire design

This study used a questionnaire to travel to members of Chinese rural cooperatives to obtain data for analysis. The questionnaire consists of two sections: the first section is the personal information of the cooperative members and the basic information of the cooperative, including questions on gender, education, age, as well as the number of years the cooperative has been founded, its size, and the industry in which it has been created. The second part is the main body of the study, which consists of questions about the relevant variables involved in the conceptual model, including two dimensions of social network embeddedness, three dimensions of wage income distribution mechanism, four dimensions of environmental dynamics, and the efficiency of access to employment information, with the questions about the variables referring to the results of existing literature. Each item of the variable was measured on a 5-point Likert scale, assigning a value of 1-5 to the item, with 1 being “very much out of line” and 5 being “very much in line”.

4.2. Measurement of variables

Based on the literature on social network embeddedness, this paper measures the social relationship network of cooperative members from two dimensions: internal embeddedness and external embeddedness. Internal embedding was measured from three items: “network size”, “network location”, and “network density”, and external embedding was measured from three items: “interaction frequency”, “trust strength”, and “reciprocity strength”. The measurement of the three dimensions of the wage income distribution mechanism is measured from the perspective of the labor input, contribution and professional skills of the cooperative members, and each contains 3 items, a total of 9 items.

The measurement of environmental dynamics is carried out from the four dimensions of customer demand dynamics, product technology dynamics, market competition dynamics and national policy dynamics, and the number of questions is 3, 2, 2 and 2 respectively.

For the measurement of the efficiency of employment information acquisition, this paper measures the efficiency of employment information acquisition from the subjective cognitive perspective of cooperative members, with subjective indicators such as “easy access to employment information” and “gained a certain degree of competence enhancement through employment information”.

5. Empirical analysis

5.1. Measuring and analyzing social network embeddedness

In order to measure social relationship network embeddedness effectively, ensure the accuracy and scientificity of the measurement results, and simultaneously safeguard the multidimensional embeddedness characteristics of social relationship network embeddedness, this paper adopts the entropy value method to measure social relationship network embeddedness indicators. The specific steps include data standardization, calculation of weight matrix, entropy value, degree of consistency, weights of indicators at all levels, and finally calculation of comprehensive social relationship network embeddedness. According to the selection of indicators of internal embeddedness and external embeddedness in the social relationship network of cooperative members, and according to the weight of each variable of the three levels of indicators, the cumulative sum is used as the weight of the

indicators of the two kinds of embeddedness, and the internal embeddedness and external embeddedness indexes are derived. The specific measurement results are shown in Table 1. The weight of internal embeddedness of 0.583 is slightly higher than the weight of external embeddedness of 0.417, indicating that the internal embeddedness of the social relationship network formed by the sample of cooperative members is strong and solid, while there is a certain gap of strength and weakness in the external embeddedness of the social relationship network.

Table 1. Descriptive statistics of social relationship network embeddedness

Dimensions (weight)	Variable name	Weight	Mean value	Standard deviation
Internal embedding (0.583)	Network scale	0.092	0.334	0.106
	Network location	0.365		
	Network density	0.126		
External embedding (0.417)	Interaction frequency	0.131	0.242	0.045
	Strength of trust	0.168		
	Reciprocity intensity	0.118		
Social relationship network embeddedness		-	0.576	0.127

In order to better compare the differentiated characteristics of the social network embeddedness of cooperative members, this paper analyzes the regional differences in the sample of cooperative members based on the results of the derived overall and subdimensional measures of the social network, combined with the two levels of dimensions of internal embeddedness and external embeddedness. The regional differences in the sub-dimension of social relationship network embeddedness are shown in Table 2. The mean values of internal embeddedness, external embeddedness, and overall social network embeddedness in the western and central regions are slightly larger than those in the eastern region, probably because the social network embeddedness of cooperative members in the eastern region forms more weak relationship networks than those in the other two regions, which are not only limited to traditional social networks such as blood and kinship, but also incorporate new social network factors such as karmic kinship and interesting kinship. In contrast, cooperative members in the central and western regions rely more on traditional social networks such as blood and kinship, and the social network relationships will be relatively strong and high level. However, in the eastern, central and western regions, there is little difference between the internal and external embeddedness of the social relationship network in terms of the mean, standard deviation or maximum and minimum values, and the social relationship network formed by cooperative members in each region is maintained relatively stable. Meanwhile, the internal embeddedness is consistently higher than the external embeddedness, indicating that the internal social relationships of the sample cooperative members are relatively solid, in line with China's national conditions that emphasize the interactions of kinship, blood, and geography, but there is still a gap between the embeddedness of the relationships with a high degree of trust and the norms of shared values. In addition, the minimum value of social network embeddedness in each region is much lower than the mean value and the maximum value is much higher than the mean value, indicating that there are significant differences in the level of information transmission and absorption among cooperative members between the samples, and that the level of embeddedness in the social network is polarized, and that there still exists an information gap within the rural cooperatives.

Table 2. Sub-dimensional regional differences in social network embeddedness

Sample area	Statistics	Social network embedding	Structural embedding	Relational embedding
Eastern region	Mean value	0.548	0.326	0.222
	Standard deviation	0.122	0.096	0.055

	Maximum value	0.842	0.522	0.348
	Minimum value	0.166	0.064	0.054
Central region	Mean value	0.575	0.338	0.237
	Standard deviation	0.120	0.103	0.039
	Maximum value	0.831	0.543	0.296
	Minimum value	0.185	0.071	0.064
Western Region	Mean value	0.577	0.346	0.231
	Standard deviation	0.119	0.108	0.039
	Maximum value	0.849	0.521	0.318
	Minimum value	0.202	0.066	0.059

5.2. Regression analysis

In order to investigate the impact of social relationship network embeddedness on the mechanism of wage income distribution and the efficiency of employment information acquisition of cooperative members, this study intends to use OLS regression to analyze the causal relationship between social relationship network embeddedness and the efficiency of employment information acquisition and to check whether there is a mediating role of the mechanism of wage income distribution between the two.

1) Regression analysis of social network embeddedness and employment information acquisition efficiency. First of all, the internal and external embeddedness of social relationship network is taken as the independent variable of analysis, and the efficiency of employment information acquisition is taken as the dependent variable, and regression analysis is carried out by using SPSS. In the second step, the dimensions of the social relationship network and the employment information acquisition efficiency as a whole are analyzed by regression analysis, and the employment information acquisition efficiency is taken as the dependent variable, and internal embedding and external embedding are taken as the independent variables, and multiple linear regression is carried out.

The results of the first round of regression analysis are shown in Table 3. Where * denotes $P < 0.1$, ** denotes $P < 0.05$, *** denotes $P < 0.001$, and t-value is in parentheses, the same below. After the M1 and M2 models, it can be seen that ΔR^2 reflects the part that can be explained by the independent variable by taking the variables into account and the degree of change that occurs in the dependent variable, so the ΔR^2 in this study is 0.373, which means that the social network embeddedness can be used to explain the part of variation in the efficiency of the access to information on employment by 37.3%. The Sig. value is equal to 0.000, which indicates that the model has good goodness of fit and a high level of significance, and the correlation coefficient is 0.578, which indicates that there is a significant positive relationship between social relationship network embedding and employment information acquisition efficiency.

Table 3. Results of the first round of regression analysis

	Employment information acquisition efficiency	
Model	M1	M2
Variable		
Gender	0.048 (0.593)	0.034 (0.538)
Highest academic credentials	-0.067 (-0.054)	-0.043 (-0.715)
Age	0.029 (0.325)	0.041 (0.662)
Number of members	0.183 (2.132)	0.236 (3.184)
Profitability	0.091 (0.973)	0.009 (0.115)
Network embedding	-	0.578 (9.859) ***
R^2	0.065	0.392
ΔR^2	0.042	0.373
F	2.754**	20.845***

The results of the second round of regression analysis are shown in Table 4. Observing M3, M4 and M5, M6, the t-value is 9.563 and 8.641, the Sig. value is 0.000 and 0.000, and the F-value is 19.274 and 16.547, respectively, and the internal embedding and the external embedding are significant at the 1% level, which indicates that both dimensions of the social relationship network have a positive influence on the efficiency of the acquisition of employment information and have significant regression effects. On this basis, H1 and H2 are verified.

Table 4. Results of the second round of regression analysis

	Employment information acquisition efficiency			
Model	M3	M4	M5	M6
Variable				
Gender	0.048 (0.593)	0.031 (0.515)	0.048 (0.593)	0.037 (0.567)
Highest academic credentials	-0.067 (-0.054)	-0.027 (-0.423)	-0.067 (-0.054)	-0.065 (-1.132)
Age	0.029 (0.325)	0.025 (0.396)	0.029 (0.325)	0.051 (0.795)
Number of members	0.183 (2.132)	0.191 (2.524)	0.183 (2.132)	0.247 (3.414)
Profitability	0.091 (0.973)	0.024 (0.306)	0.091 (0.973)	0.016 (0.196)
Internal relational embedding	-	-	-	0.524 (8.641) ***
External relational embedding	-	0.557 (9.563) ***	-	-
R^2	0.065	0.368	0.065	0.328
ΔR^2	0.042	0.347	0.042	0.306
F	2.754**	19.274***	2.754**	16.547***

2) Regression Analysis of Social Relationship Network Embedding and Wage Income Distribution Mechanisms:

(1) Regression analysis of relationship embeddedness and distribution according to labor inputs. Internal embeddedness and external embeddedness are treated as independent variables, and distribution according to labor inputs is treated as the dependent variable for regression analysis, and using SPSS software, the results of the third round of regression analysis are obtained as shown in Table 5.

From M7, M8 and M9, M10, it can be seen that the Sig. value of the two dimensions of social relationship network embeddedness internal relationship embeddedness and external relationship embeddedness and distribution by labor input are 0.000 and 0.006 respectively, the t-value is 9.024 and 8.253 respectively, and the ΔR^2 is 0.313 and 0.278, which indicates that internal relationship embeddedness and external relationship Embedding of opportunity identification ability is 31.3% and

27.8% respectively, indicating that both internal and external relationship embedding have a significant positive correlation with the role of distribution by labor inputs, internal relationship embedding and external relationship embedding are significant at the level of 1% and 5%, respectively, and both of them can promote the distribution of wage income of cooperative members according to their labor inputs, and based on this, hypotheses H3 and H6 are verified.

Table 5. Results of the third round of regression analysis

Model	Distribution according to labor input			
	M7	M9	M9	M10
Variable				
Gender	-0.088 (-1.253)	-0.097 (-1.624)	-0.088 (-1.253)	-0.099 (-1.638)
Highest academic credentials	-0.152 (-2.105)	-0.146 (-2.359)	-0.152 (-2.105)	-0.065 (-1.132)
Age	0.016 (0.205)	0.049 (0.672)	0.016 (0.205)	0.018 (0.236)
Number of members	0.006 (0.061)	0.084 (1.144)	0.006 (0.061)	0.008 (0.095)
Profitability	0.145 (1.608)	0.072 (0.825)	0.145 (1.608)	0.083 (1.104)
Internal relational embedding	-	0.538 (9.024) ***	-	-
External relational embedding	-	-	-	0.506 (8.253) ***
R^2	0.051	0.335	0.051	0.306
ΔR^2	0.027	0.313	0.027	0.278
F	1.994**	16.428***	1.994**	14.219***

(2) Regression analysis of relational embedding and allocation by performance and contribution. Internal embeddedness and external embeddedness are treated as independent variables and allocation mechanism by performance and contribution as dependent variables for regression analysis, and the results of the fourth round of regression analysis are obtained as shown in Table 6.

The results show that the Sig. values of the two dimensions of social relationship network embeddedness, internal embeddedness and external embeddedness, and allocation by performance and contribution are 0.000 and 0.000, respectively, and the t-values are 9.852 and 8.176, respectively, and the ΔR^2 reaches 0.354 and 0.275, respectively, which indicates that internal relationship embeddedness and external relationship embeddedness can explain respectively 35.4% and 27.5% of the performance and contribution allocation mechanism, indicating that internal relationship embeddedness and external relationship embeddedness have a significant positive correlation with the mechanism of allocation according to performance and contribution at the 1% significance level, and both of them can promote members of the cooperative to realize the allocation of wage income according to their own performance and contribution, and thus the hypotheses H4 and H7 have been verified.

Table 6. Results of the fourth round of regression analysis

	Distribution by performance and contribution			
Model	M11	M12	M13	M14
Variable				
Gender	0.015 (0.162)	0.003(0.038)	0.015 (0.162)	0.001 (0.003)
Highest academic credentials	-0.041 (-0.484)	-0.031 (-0.485)	-0.041 (-0.484)	0.006 (0.082)
Age	0.098 (1.373)	0.132 (2.141)	0.098 (1.373)	0.098 (1.545)
Number of members	0.015 (0.148)	0.097 (1.344)	0.015 (0.148)	0.016 (0.194)
Profitability	0.173 (1.907)	0.089 (1.225)	0.173 (1.907)	0.118 (1.426)
Internal relational embedding	-	0.574 (9.852) ***	-	-
External relational embedding	-	-	-	0.504 (8.176) ***
R^2	0.056	0.373	0.056	0.298
ΔR^2	0.029	0.354	0.029	0.275
F	1.996**	19.313***	1.996**	14.126***

(3) Regression analysis of relational embedding and skill- and specialty-based allocation. Internal embeddedness and external embeddedness are treated as independent variables, and skill- and specialty-based wage income distribution mechanism is treated as the dependent variable for regression analysis, and the results of the fifth round of regression analysis are shown in Table 7.

From the results of the analysis, it can be seen that the t-value of the two social relationship network embedded dimensions of internal embeddedness and external embeddedness with skill and specialty-based allocation is 10.253 and 8.354 respectively, with the Sig. value less than 0.001, and the ΔR^2 is 0.372 and 0.288 respectively, which indicates that the explanatory degree of internal relational embeddedness and external relational embeddedness on skill and specialty allocation mechanism is 37.2% respectively. The degree of explanation is 37.2% and 28.8% respectively, internal relationship embedding and external relationship embedding are both significantly positively correlated with the skill and specialty allocation mechanism at 1% level of significance, and both of them can promote the employees of cooperatives to participate in the distribution of wage income based on their own skills and specialties, and hypotheses H5 and H8 are verified on the basis of this hypothesis.

Table 7. Results of the fifth round of regression analysis

	Distribution based on skills and specialisation			
Model	M15	M16	M17	M18
Variable				
Gender	0.017 (0.220)	0.007 (0.116)	0.017 (0.220)	0.005 (0.072)
Highest academic credentials	0.021 (0.275)	0.028 (0.446)	0.021 (0.275)	0.064 (0.945)
Age	0.004 (0.049)	0.035 (0.556)	0.004 (0.049)	0.004 (0.062)
Number of members	-0.208 (2.263)	-0.124 (-1.728)	-0.208 (2.263)	-0.207 (-2.674)
Profitability	0.293 (3.241)	0.214 (2.839)	0.293 (3.241)	0.239 (2.967)
Internal relational embedding	-	0.585 (10.253) ***	-	-
External relational embedding	-	-	-	0.507 (8.354) ***
R^2	0.063	0.394	0.063	0.306
ΔR^2	0.038	0.372	0.038	0.288
F	2.317**	20.856***	2.317**	14.674***

3) Regression Analysis of Wage Income Distribution Mechanism and Employment Information Acquisition Efficiency. For the relationship between the mechanism of wage income distribution and

the efficiency of employment information acquisition, SPSS was used to analyze it, and the results of the sixth round of regression analysis were obtained as shown in Table 8.

(1) Distribution by labor input and employment information acquisition efficiency. Analyzing the M19 and M20 models, it can be seen that the R^2 and ΔR^2 between the labor input distribution mechanism and the employment information acquisition efficiency are 0.318 and 0.295, respectively, indicating that the labor input distribution mechanism explains the employment information acquisition efficiency of 29.5%, while the t value is 8.361 and the Sig. value is 0.000, indicating that there is a significant positive correlation between opportunity identification ability and employment information acquisition efficiency at the significance level of 1%, and the hypothesis H9 is verified on this basis.

(2) Distribution by performance and contribution and efficiency of access to employment information. According to the M21 and M22 models, the ΔR^2 between the distribution mechanism by performance and contribution and the efficiency of employment information acquisition reached 0.168, indicating that the explanatory degree of the distribution mechanism according to performance and contribution to the efficiency of employment information acquisition was 16.8, the corresponding t value was 5.428, and the Sig. value was less than 0.001, indicating that there was a significant positive correlation between the distribution mechanism by performance and contribution and the efficiency of employment information acquisition at the significance level of 1%, so it was assumed that H10 was verified.

(3) Skill- and specialty-based allocation and employment information acquisition efficiency. Regression analysis of the allocation mechanism based on skills and professions and employment information acquisition efficiency, as shown by the results of M23 and M24 model, the R^2 and ΔR^2 between the two are 0.373 and 0.352 respectively, which indicates that the allocation mechanism based on skills and professions can explain 35.2% of the efficiency of employment information acquisition, with the t -value of 9.604 and the Sig. The value of 0.000 indicates that the allocation mechanism based on skills and specialization is significantly and positively related to the efficiency of employment information acquisition at 1% level of significance, on the basis of which hypothesis H11 is tested.

Table 8. Results of the sixth round of regression analysis

	Employment information acquisition efficiency					
Model	M19	M20	M21	M22	M23	M24
Variable						
Gender	0.048 (0.597)	0.092 (1.386)	0.048 (0.597)	0.046 (0.577)	0.048 (0.597)	0.038 (0.573)
Highest academic credentials	-0.074 (-0.958)	0.007 (0.091)	-0.074 (-0.958)	-0.059 (-0.843)	-0.074 (-0.958)	-0.086 (-1.417)
Age	0.028 (0.326)	0.019 (0.265)	0.028 (0.326)	-0.015 (-0.157)	0.028 (0.326)	0.028 (0.365)
Number of members	0.184 (2.118)	0.185 (2.427)	0.184 (2.118)	0.185 (2.206)	0.184 (2.118)	0.302 (4.015)
Profitability	0.091 (0.984)	0.019 (0.227)	0.091 (0.984)	0.034 (0.345)	0.091 (0.984)	-0.079 (-0.975)
Distribution according to labor input	-	0.519 (8.361) ***	-	-	-	-
Distribution by performance and contribution	-	-	-	0.364 (5.428) ***	-	-
Distribution based on skills and specialisation	-	-	-	-	-	0.571 (9.604)
R^2	0.066	0.318	0.066	0.194	0.066	0.373
ΔR^2	0.042	0.295	0.042	0.168	0.042	0.352
F	2.753**	15.472***	2.753**	7.348***	2.753**	19.415***

4) Test of the mediating effect of the wage income distribution mechanism. The most commonly used method to test the mediation effect is the hierarchical regression method, and the three-step regression method can be used to verify the mediating role of the wage income distribution mechanism between the embeddedness of the social relationship network and the efficiency of employment information acquisition. In addition, more and more scholars believe that the bootstrap mediation test [23] can complement and enrich the hierarchical regression method, so this section uses the hierarchical regression method and the bootstrap method to double test the data.

The mediating role of the wage income distribution mechanism between social network embeddedness and the efficiency of employment information acquisition is shown in Table 9. First, look at the regression coefficient of the dependent variable social relationship network embeddedness on the dependent variable employment information acquisition efficiency in model 1 is 0.4361, which has a significant positive effect, the first step of the test is valid, and the next step of the test is carried out. Secondly, look at the regression coefficient of model 2 social relationship network embeddedness on the mechanism of wage income distribution is 0.6512, which indicates that the independent variable has a significant effect on the mediating variable, and the second step of the test is valid, and the next test is carried out. Finally look at model 3 the regression coefficient of the mediating variable is 0.2385, indicating that the effect of wage income distribution mechanism on the efficiency of employment information acquisition is significant. Also look at the regression coefficient of the independent variable is 0.2284, the effect on the dependent variable employment information acquisition efficiency is still significant, but compared with the regression coefficient of 0.4361 in model 1 is significantly lower, so the wage income distribution mechanism plays a partially mediating role between the social relationship network embeddedness and the efficiency of the acquisition of employment information, i.e., hypotheses H12~H14 are verified.

Table 9. An analysis of the mediating effects of wage income distribution mechanism

Predicted change	Model 1	Model 2	Model 3
	Employment information acquisition efficiency Beta	Wage income distribution mechanism Beta	Employment information acquisition efficiency Beta
Control variable			
Gender	0.0988	0.0525*	0.0490
Highest academic credentials	0.0084	-0.0761	-0.0624
Age	0.0215**	0.0320	-0.0172
Number of members	0.1872	0.1885*	0.1938
Profitability	0.0201	0.0954	0.0377
Independent variable			
Social relationship network embedding.	0.4361***	0.6512***	0.2284***
Intermediate variable			
Wage income distribution mechanism	-	-	0.2385***
<i>F</i>	21.069***	17.594**	23.725***
<i>R</i> ²	0.2425	0.4657	0.3411
Adjusted <i>R</i> ²	0.2292	0.4231	0.3255

In addition, the direct effect of social network embeddedness on the efficiency of employment information acquisition and the mediating effect of wage income distribution mechanism are shown in Table 10. The results show that the lower limit of BootCI and the upper limit of Boot are both positive, indicating that the effect is significant, and the value of the mediating effect of the wage income distribution mechanism is 0.1127, accounting for 54.39%, while the direct effect is 0.0945, accounting for 45.61%.

Table 10. Decomposition of total effect, direct effect and intermediate effect

	Effect size	Boot standard error	Lower limit of BootCI	Upper limit of BootCI	Effect proportion
The mediating effects of wage income distribution mechanism	0.1127	0.0486	0.0126	0.2054	54.39%
Direct effect	0.0945	0.0661	0.1438	0.2237	45.61%
Total effect	0.2072	0.5457	0.4571	0.6340	

5) Moderating effect of environmental dynamics. The results of the specific moderating effect of environmental dynamics on the relationship between social network embeddedness and employment information acquisition efficiency are shown in Table 11. Model 4 is the regression model of the independent variable social network embeddedness and the moderating variable environmental dynamics on the efficiency of employment information acquisition, and Model 5 is the regression model of the efficiency of employment information acquisition after adding the moderating interaction term on the basis of Model 4, and the regression coefficient Beta indicates the standardized regression coefficient.

Based on the introduction of control variables, the adjusted *R*² in Model 4 and Model 5 are 0.3045 and 0.3567 respectively, and the F-values are all significant at the 0.001 level. Comparing the two models, *R*² in model 5 is 0.3643 after adding the interaction term to model 4, and the regression coefficient of the independent variable in model 5 is 0.1957 and significant at the 0.001 level, which is improved compared to the coefficient of the independent variable in model 4, and the regression coefficient of the interaction term is -0.1247, which is significant at the 0.01 level, implying that environmental dynamics plays a role in moderating the interaction between the embeddedness of the

social relationship network and the moderating role between the efficiency of employment information acquisition. Therefore, hypothesis H15 is valid.

Table 11. Regulatory effect analysis (1)

Predicted change	Model 4	Model 5
	Employment information acquisition efficiency Beta	Employment information acquisition efficiency Beta
Control variable		
Gender	-0.1635	-0.1548
Highest academic credentials	0.0474	0.0064
Age	0.1725	0.3622**
Number of members	0.1638*	0.3419*
Profitability	-0.0642	-0.0954
Independent variable		
Social relationship network embedding.	0.1126***	0.1957***
Environmental dynamics	0.3138***	0.3452***
Interaction term		
Social relationship network embedding * Environmental dynamics	-	-0.1247**
<i>F</i>	36.319***	38.153***
<i>R</i> ²	0.3256	0.3643
Adjusted <i>R</i> ²	0.3045	0.3567

The results of the specific moderating effect of the moderating effect of environmental dynamics on the relationship between social relationship network embeddedness and wage income distribution mechanism are shown in Table 12, Model 6 is the regression model of the independent variable social relationship network embeddedness and the moderating variable environmental dynamics on the wage income distribution mechanism, and Model 7 is the regression model of the wage income distribution mechanism after adding the moderating interaction term on the basis of Model 6.

Based on the introduction of control variables, the adjusted *R*² of model 6 and model 7 are 0.5432 and 0.5291 respectively, and the F-values are all significant at the 0.001 level. Comparing the two models, the *R*² of model 7 after adding the interaction term is 0.5384 and the regression coefficient of the independent variable is 0.4418, which is improved compared with the coefficient of the independent variable of model 6, and the regression coefficient of the interaction term is -0.1413, which implies that environmental dynamics plays a moderating role between the embeddedness of the social relationship network and the mechanism of the distribution of wage-based income. Therefore, hypothesis H16 is valid.

Table 12. Regulatory effect analysis (2)

Predicted change	Model 6	Model 7
	Wage income distribution mechanism Beta	Wage income distribution mechanism Beta
Control variable		
Gender	0.0648	0.0586
Highest academic credentials	-0.3618	-0.4283
Age	0.4042	0.4073
Number of members	0.4725*	0.5263**
Profitability	-0.1857	-0.1824
Independent variable		
Social relationship network embedding.	0.4235***	0.4418***
Environmental dynamics	0.2416***	0.2724***
Interaction term		
Social relationship network embedding * Environmental dynamics	-	-0.1413
<i>F</i>	14.4295***	13.6442***
<i>R</i> ²	0.5563	0.5384
Adjusted <i>R</i> ²	0.5432	0.5291

The results of the specific moderating effect of environmental dynamics on the relationship between the mechanism of wage income distribution and the efficiency of access to employment information are shown in Table 13, Model 8 is the regression model of the independent variable wage income distribution mechanism and the moderating variable environmental dynamics on the efficiency of access to employment information, and Model 9 is the regression model of the efficiency of access to employment information based on the addition of the moderating interaction term to Model 8.

Based on the introduction of control variables, the adjusted R^2 in model 8 is 0.3165, and the F value is significant at the 0.001 level. The adjusted R^2 in model 9 is 0.4472 and the F -value is significant at the 0.001 level. Comparing the two models, R^2 is 0.4724 after adding the interaction term in model 9 on the basis of model 8, but the regression coefficient of the independent variable in model 9 is -0.0158, which is not significant, and the regression coefficient of the interaction term is -0.0162, which is also not significant, implying that the moderating effect of environmental dynamics between the mechanism of distributing wage income and the efficiency of acquiring employment information is not obvious, and hypothesis H17 is not tested. Therefore hypothesis H17 is not verified.

Table 13. Regulatory effect analysis (3)

Predicted change	Model 8	Model 9
	Employment information acquisition efficiency Beta	Employment information acquisition efficiency Beta
Control variable		
Gender	-0.1752	-0.1584
Highest academic credentials	0.0951	0.0742
Age	0.2043	0.4183*
Number of members	0.2805*	0.4572**
Profitability	-0.0443	-0.0958
Independent variable		
Wage income distribution mechanism	0.1365***	-0.0158
Environmental dynamics	0.2964***	0.5932***
Interaction term		
Wage income distribution mechanism * Environmental dynamics	-	-0.0162
<i>F</i>	5.4674***	9.8425***
<i>R</i> ²	0.3341	0.4724
Adjusted <i>R</i> ²	0.3165	0.4472

6. Conclusion

This paper uses entropy power method, OLS regression model and bootstrap mediation test to explore the influence mechanism of social relationship network embedding on the mechanism of wage income distribution and employment information acquisition of cooperative members.

The internal embeddedness weight of the social relationship network of rural cooperative members, 0.583, is slightly higher than the external embeddedness weight, 0.417, which indicates that the internal relationship of the social network formed by the sample of cooperative members has strong solidity, while the external relationship of the social network exists a certain gap of strength and weakness. As for the measurement in different regions, the minimum value of social network embeddedness in each region is much lower than the mean value, and the maximum value is much higher than the mean value, indicating that the level of information transfer and absorption of cooperative members between samples varies significantly, and that there is an information divide within rural cooperatives.

In addition, from the results of regression analysis, it can be concluded that social network embeddedness and wage income distribution mechanism have a significant positive effect on the efficiency of employment information acquisition. Social relationship network embeddedness plays a facilitating role on wage income distribution mechanism. Wage income distribution mechanism plays a mediating role between social network embeddedness and employment information acquisition efficiency. Environmental dynamics moderates the two paths of action between social network embeddedness and the mechanism of wage income distribution and the efficiency of employment information acquisition, but the moderating effect of environmental dynamics on the mechanism of wage income distribution and the mechanism of wage income distribution is not significant.

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