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The Influence of Farmers' Cognition on Forest Land Transfer Behavior: A Case Study of Chengdu City

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Abstract: In the context of China's forest rights reform, promoting forest land circulation is the key to revitalizing forest land resources and promoting the development of the forestry industry. Based on the theoretical analysis of the effect of farmers' cognition on forest land transfer behavior, data from 790 farmers in typical areas of Chengdu were used for empirical testing with the binary logit model. At the same time, the effects of the cognitive differences of the farmers with different education levels on forest land circulation are discussed. Finally, appropriate instrumental variables were selected to modify the model, and the IV probit model was used to test the endogeneity of the model. The results showed that the (1) farmers' cognition had a significant positive effect on the forest land transfer behavior. Among them, in the order of the degree of impact, were the following: ecological cognition, policy cognition, risk cognition, social regulation, and benefit cognition. (2) Among the groups with different education levels, farmers with lower education levels will consider more aspects than farmers with higher education levels when choosing to transfer forest land. By broadening the research into the cognitive composition of farmers, this study deepens our understanding of the influence of farmers' cognition on forest land transfer behavior. Moreover, it is found that Chinese farmers have strong ecological rationality in addition to economic rationality, and ecological cognition plays a greater role in forest land transfer behavior than benefit cognition, which is of considerable significance for further research on forest land transfer behavior.

Keywords: farmers' cognition; forest land transfer behavior; binary logit model

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1. Introduction

Promoting farmers' forest land transfer is an important premise to realize the rational allocation of forest land resources. Since 2003, China has been implementing the reform of the collective forest rights system, which gives farmers autonomy in forest management and further intensifies the fragmentation and decentralization of forest land. The controversy over the fragmentation of forest land and its effect on forestry production and management has always existed. Many scholars believe that after ownership of forest land is confirmed for households, the number of forest land blocks and small areas will lead to an increase in production costs [1] and that it will be difficult to achieve scale effects and generate economic benefits. They advocate for accelerating the transfer of forest land to achieve scale management [2].

From the perspective of policy practice, the Chinese government has put forward a series of policy propositions to encourage and guide farmers in transferring forest land management rights and forest tree ownership through subcontracting, leasing and shares (among others) to develop appropriate scale management. With the accelerated development of urban–rural integration in China, farmers' nonagricultural employment is increasing, and their dependence on forest land for their livelihoods is decreasing, which

also brings new development opportunities for forest land transfer [3]. The reality, however, has diverged from expectations. According to the tracking data from the collective forest rights system reform and the testing project in 2018, 85.38% of farmers still had not exhibited forest land transfer behavior. This is an increase of 0.51 percentage points compared with the previous year, and the phenomenon of "cherish forest land" among farmers is becoming increasingly obvious [4]. It can be seen that although the institutional design tries to give farmers more rights to promote the transfer of forest land, it is counterproductive, and there are deeper reasons for the influence of farmers' forest land transfer behavior.

The promotion of farmers' forest land transfer and the revitalization of forest land resources are still the keys to realizing China's forest land scale management. For this reason, many scholars have actively explored the factors affecting farmers' forest land transfer behaviors, mainly focusing on forest land property rights, transaction costs, infrastructure and resource endowments [5,6]. However, there are few studies on farmers' forest land transfer behavior from a cognitive perspective. In light of this, this study attempted to explain the impact of farmers' cognition on forest land transfer behavior. First, on a theoretical level, in this study, we expounded the constituent elements of farmers' cognition in relation to forest land transfer. Secondly, in this study, we empirically tested the impact of farmers' cognition on forest land transfer behavior and revealed its heterogeneity. Finally, instrumental variables were used to test the endogeneity. Our study is expected to provide valuable data promoting farmers' forest land transfer.

The contributions of this study are as follows: First, based on the microdata of the farmers, which were obtained from a field investigation, the influences on their forest land transfer behavior are discussed from the perspective of the farmers' internal factors, and the framework of the factors affecting forest land transfer was expanded. Second, the cognition of the farmers was subdivided into five cognitive dimensions: ecological cognition, benefit cognition, risk cognition, policy cognition and social regulation. Then, the internal composition of the farmers' cognition is discussed in detail. This paper provides a scientific basis and policy suggestions for further improving farmers' cognition and for promoting forest land transfer.

The rest of the study is structured as follows: Section 2 is the literature review and theoretical framework. Section 3 is the research methods and data variables. Section 4 provides the empirical results, including the baseline regression, heterogeneity analysis and endogeneity test. Section 5 is the discussion and analysis. Section 6 presents the research conclusions and policy recommendations.

2. Literature Review and Theoretical Analysis

2.1. Literature Review

Although there are no foreign statements and thematic studies on forest land transfer, in essence, the forest land transfer behaviors of Chinese farmers and private forest owners are in line with each other [7]. Studies on the relevant influencing factors mainly focus on external factors, such as the surrounding environment [8], transaction costs, government support and capital input [9,10]. For example, Butler et al. [11] argue that tax policy combined with other factors can influence forest management decisions. Creighton et al. [12] find that regulatory uncertainty, financial instability and urban influence have an impact on the intergenerational flow of forest land. As a country with strong governmental power, China's government policy and attitude play an important role in forest land transfer behavior [13]. Some scholars also believe that the resource endowment of farmers also affect forest land transfer behavior [14–16]. As Markowski-Lindsay et al. [7] believe, age, forest area and education level have a significant impact on forest land transfer plans. Gruver et al. [17] also pointed out that family members' emotional dependence on forests have an impact on the ownership and use rights of forests.

Behavioral economists point out that cognition is the basis of behavior [18]; therefore, farmers' cognition plays an important role in driving their behaviors. Many authors have studied the relationship between farmers' cognition and behavior [19–22]. For example, ac-

cording to Gebrehiwot et al. [23], farmers' risk perception significantly positively influences the number of drought risk reduction measures implemented. Furthermore, Ren et al. [24] believe that ecological cognition plays a positive moderating role in farmers' decisions on green production. Other authors also verified the effect of farmers' policy cognition on land transfer intention [25,26]. Through a literature review, we found that in-depth research has been conducted on forest land transfer behavior; however, studies from the perspective of farmers' cognition need to be further explored. The research on farmer's cognition and behavior mainly focuses on a single dimension of farmer's cognition, ignoring that cognition is actually multidimensional. So, what is the relationship between farmers' cognition and forest land transfer behavior? What are the dimensions of farmer's cognition? In this study, we tried to answer this question.

2.2. Theoretical Analysis

Cognitive and behavioral theory holds that people's feelings, thoughts and behaviors are interrelated, and most of the time people's cognition and behavior are coupled together [27]. People's observations and understanding of things form cognition, and behavior is affected by cognition [28]. Therefore, this study holds that farmers' cognition is the pre-evaluation formed by farmers' understanding and observation of forest land transfer. Forest land transfer behavior refers to the process that farmers use to evaluate the best plan for forest land transfer, which they put into practice according to their own cognition and resource endowment.

The rational peasant school believes that farmers are rational, economic men, and any behavioral decisions they make are based on the goal of profit maximization [29]. In fact, farmers are constrained by their own ideas, resource endowments and social norms from being fully rational [30–32]. As the most important subject of forest land transfer behavior, farmers are not only economic actors but also ecological and social actors. Farmers' forest land transfer behavior shows the change in farmers from a traditional production mode to a transfer mode. It also shows the change in the farmers' conceptualization of production value. In this process, farmers will make a comprehensive consideration: not only will they pursue output and income, but they will also be affected by other factors, including risk judgment, policy regulation, etc. [33,34]. Therefore, based on the theory of cognition and behavior and on practical research needs, this study divided the cognition of farmers into five dimensions: ecological cognition, benefit cognition, risk cognition, policy cognition and social regulation. And the influence on farmers' forest land transfer behavior is explored separately.

Ecological cognition refers to farmers' judgment that the ecological environment and quality of forest land can be improved, which can reflect farmers' awareness of forest land's ecological environment protection [35]. Benefit cognition is farmers' expectation of the change in benefits brought by participating in forest land transfer [36]. Risk cognition is the perception and understanding of farmers' psychology concerning the possible risk events involved in forest land transfer, which, thus, guides the transfer behavior [37]. Policy cognition is the farmers' understanding of the content of forest land transfer policy and the process of judging policy information [38]. Social regulation is a rural social relationship network, which is a unique relationship with the Chinese countryside and plays an irreplaceable role in promoting the practice of forest land transfer [39].

In addition, it has been proved that resource endowments, such as farmers' personal characteristics and family characteristics, play a role in farmers' behavior [40,41]. Personal characteristics are the aggregation of their own knowledge and skills, which are the basis of farmers' behavior. From the perspective of family characteristics, the family labor force determines, to a large extent, the production and consumption capacity of the family, which has an impact on the behavior of farmers. As a natural resource for farmers, the condition of forest land is closely related to the method of its utilization. In summary, the forest land transfer behavior of farmers is affected by their cognition, personal characteristics, family characteristics and natural resources (Figure 1).

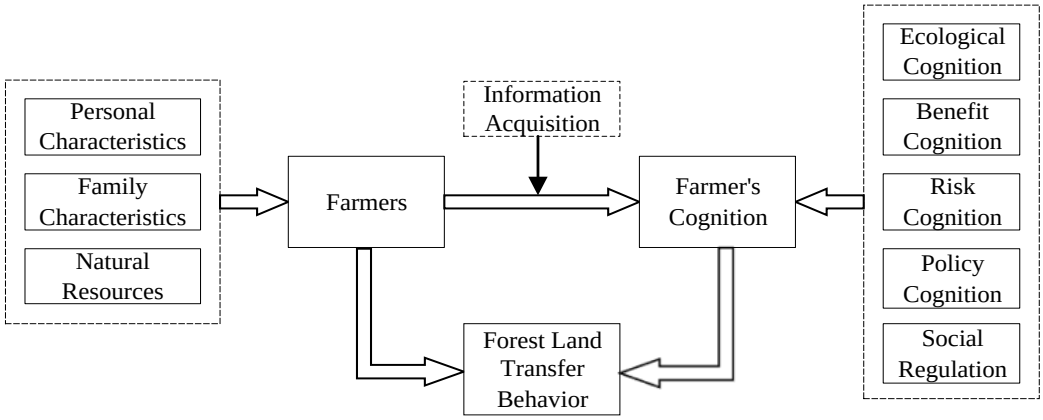

Figure 1. Analysis of influencing factors of farmers' forest land transfer behavior.

3. Materials and Methods

3.1. Research Design

3.1.1. Questionnaire Design

Our fieldwork included questionnaires and semi-structured interviews. The questionnaire mainly includes: basic characteristics of the village cadres (age, ethnicity, gender, education level whether to transfer forest land, etc.); individual characteristics of farmers (gender, age, social relations, education level, etc.); family characteristics (household size, structure, employment situation, etc.); natural resources (forest area, slope, etc.); and farmer's cognition (ecological cognition, benefit cognition and risk cognition, etc.). Basic information on the farmers and village cadres was mostly in the form of direct judgment and selection, while the cognition of farmers was measured using a 5-level Likert scale. The questionnaires were completed with one-to-one interviews.

The semi-structured interview targets were mainly from government departments, such as the Rural Development Bureau or Natural Resources and Planning Bureau, as well as village cadres and persons in charge of forest-related enterprises in various districts and counties. The content of the interviews mainly concerned the status quo, progress, achievements and problems regarding forest land transfer in the study area.

3.1.2. Sample Area Selection

In this study, Chengdu city in Sichuan province of China was selected as the research area because it is representative. First, Chengdu has long undertaken the task of comprehensive forestry reform. As early as 2014, Chengdu was established as an area for the second batch of central rural reform pilots and undertook the task of deepening the reform of the collective forest rights system pilot. In 2021, Chengdu was, again, established by the National Forestry and Grassland Administration as one of six comprehensive pilot cities for forestry reform and development. Second, Chengdu, as a central city in the west, is relatively well developed socially and economically. As a result, the livelihoods of the surrounding farmers are not very dependent on forest land; thus, the forest land flow rate is high. Third, Chengdu has a unique form of landform: "one third plain, one third hills and one third mountains". It is rich in natural resources, such as forest land and trees, and has the potential to promote the transfer of forest land.

3.2. Data Collection

In order to ensure the reliability and validity of the survey data, a presurvey was conducted in Xieyang village, Dao Ming town, before the formal investigation. On the one hand, according to the feedback from the farmers, the language expression used in the survey questionnaire was modified to make it easier to understand. On the other hand, the reliability and validity of the scale formed by the questionnaire were tested with the survey data. Combined with the suggestions from the government staff responsible for the transfer

of forest land and the relevant experts in the field of forestry industry management, the indicators for the questionnaire were revised to form the final formal survey questionnaire.

The authors' team conducted field investigations between August 2022 and March 2023. The formal investigation adopted a combination of a representative survey, stratified sampling and random sampling. Initially, the areas with a high number of forest areas were selected for the representative survey, including Dujiangyan city, Dayi county and Chongzhou city. Next, 1–3 townships were randomly selected from each prefecture level city. Finally, on the basis of the determination of the townships, no less than 2 administrative villages in each township were randomly selected as sample villages, and questionnaires were conducted with a standard of no less than 50 households in each village. In the end, 850 actual questionnaires were collected, including those with core problems such as inconsistencies and other questionnaires. Discounting these, a total of 790 effective questionnaires were obtained, with an effective rate of 92.94%.

3.3. Model Setting

Farmers' choice of forest land transfer behavior is a typical binary discrete variable, which is usually solved using a logit model and probit model. Among these, logit models have been widely used in various fields because of their obvious probability expression and simple operation [42,43]. Therefore, this study selected the binary logit model to empirically test the influencing factors of farmers' forest land transfer behavior. It is defined as $adoption = 1$, which indicates the transfer behavior of farmers' forest land, and $adoption = 0$, which indicates that farmers have shown no forest land transfer behavior.

The specific regression model is as follows:

$$prob(adoption = 1|cog, X) = \theta(\alpha_0 + \alpha_i cog + \alpha_j X + \varepsilon) \quad (1)$$

In the above formula, cog represents the variable for the cognition of the farmers; X indicates personal characteristics, family characteristics and natural resources; α_i and α_j represent the estimated parameters of the corresponding variables; and ε represents the random disturbance term of the model.

3.4. Variables' Measurement

3.4.1. Dependent Variable

As the explained variable in this study, the farmers' forest land transfer behavior is a typical binary variable. The dependent variable of the farmers' forest land transfer behavior is assigned a value of 1 or 0.

3.4.2. Independent Variables

In this study, the farmers' cognition was measured from five dimensions: ecological cognition, benefit cognition, risk cognition, policy cognition and social regulation. With specific reference to the research of Yi et al. [44], Luo et al. [45] and Chen et al. [46], the cognition of the farmers was measured by asking questions such questions as "Do you think forest land transfer can improve forest land environment?", "Do you think forest land transfer can increase forestry income?", etc. All items were measured positively, using a 5-level Likert scale. The specific model settings are shown in Table 1.

Table 1. Variable meaning and descriptive results.

Variable Class	Variable Name	Variable Meaning	Mean Value	Standard Deviation	Maximum Value	Minimum Value
Dependent variable	Transfer behavior	Whether there is forest land transfer behavior: Yes = 1, No = 0	0.657	0.475	1	0
Independent variables	Ecological cognition	"Do you think forest land transfer can improve forest land environment?" Strongly disagree = 1; Disagree = 2; Generally = 3; Comparative agreement = 4; Strongly agree = 5	2.943	0.898	5	1
	Benefit cognition	"Do you think forest land transfer can increase income?" Strongly disagree = 1; Disagree = 2; Generally = 3; Comparative agreement = 4; Strongly agree = 5	3.272	1.111	5	1
	Risk cognition	"Are you worried that the converted forest land cannot be recovered?": Very worried = 1; More worried = 2; Generally = 3; Do not worry too much; Not worrying = 5	3.160	1.096	5	1
	Policy cognition	"Do you think you know much about forest land transfer policy?" Very little = 1; Do not know much = 2; Generally = 3; Better understanding = 4; Well understood = 5	2.571	0.966	5	1
	Social regulation	The degree to which relatives and neighbors advocate farmers to transfer forest land: Strongly disagree = 1; Disagree = 2; Generally = 3; Comparative agreement = 4; Strongly agree = 5	3.308	1.109	5	1
Control Variables	Personal Characteristics					
	Age	The actual age of farmers: Under 30 = 1; 30~40 years old = 2; 40~50 years old = 3; 50~60 years old = 4; Over 60 years old = 5	3.158	1.195	5	1
	Gender	Male = 1; Female = 0	0.561	0.498	1	0
	Education level	"How many years did you attend school?" Never = 1; Less than 3 years = 2; 3 to 6 years = 3; 6–9 years = 4; 9 years or more = 5	2.968	1.097	5	1
	Village post	Whether they are village cadres: Yes = 1; No = 0	0.076	0.265	1	0
	Family Characteristics					
	Household size	Actual number of people	4.258	1.682	9	1
	Migrant work experience	"Are there any migrant workers in the family?" Yes = 1; No = 0	0.638	0.481	1	0
	Number of migrant workers	Total number of migrant workers in households	1.825	1.363	5	0

Table 1. *Cont.*

Variable Class	Variable Name	Variable Meaning	Mean Value	Standard Deviation	Maximum Value	Minimum Value
Control Variables	Natural Resources					
	Forest land management	"Whether there are other forestry operations?" Yes = 1; No = 0	0.271	0.445	1	0
	Slope of forest land	Plot slope grade: Flat (below 10 degrees) = 1; Gentle slope (10–30 degrees) = 2; Medium steep (30–50 degrees) = 3; Steep (50–70 degrees) = 4; Very steep (over 70 degrees) = 5	2.915	1.070	5	1
	Area of forest land	Actual forest area (mu)	10.943	7.073	335	1

3.4.3. Control Variables

According to the above theoretical analysis and reference to the existing research results [47,48], to avoid interference from other factors that may have affected the relationship between farmers' cognition and their forest land transfer behavior, the control variables were selected according to three factors: personal characteristics (such as gender, education and position); family characteristics (such as family size); and natural resources (such as forest land slope and area).

3.5. Descriptive Results

Table 1 shows the results of the descriptive statistical analysis for the relevant variables.

The results show the following: First, the average value of the farmers' forest land transfer behavior was 0.657, which proves that the farmers have a certain enthusiasm for this. Second, the average age was 3.158, and the average educational level was 2.968, indicating that the average age of the sample farmers was over 50 years old and that the average educational level was below primary school, which is consistent with the current demographics in rural China: low educational levels and older ages [49]. The average number of posts was 0.076, indicating that most farmers are not village cadres. Third, the average family size, the average migrant worker experience and the average number of migrant workers were 4.258, 0.481 and 1.363, respectively, indicating that most of the rural households in the survey area have more than four people and that almost all have more than one migrant worker. Finally, the average slope of the forest land was 2.915, indicating that the average slope of farmers' forest land is mostly below 30 degrees and that the average area of forest land is 10.943 mu. The statistical results are in line with the geographical pattern of the transition zone from the hills to the mountains in the investigation area.

4. Results

4.1. Empirical Results

Table 2 lists the regression results and estimates of the farmers' forest land transfer behavior.

Specifically, Model I is the result of the ordinary least squares (OLS) regression. The farmers' forest land transfer behavior is a typical binary choice behavior; therefore, the binary logit model was adopted to obtain the Model II results. The results show that gender, village location and family size did not pass the significance test. Therefore, after eliminating the above three nonsignificant variables, the binary logit regression was applied to obtain the Model III results, and all variables in the model were still significant.

Table 2. Model estimation of the effect of farmers' cognition on their forest land transfer behavior.

Variable Name	Model I (OLS)	Model II (Logit)	Model III (Logit)	Model IV (Logit)
Farmers' overall cognition	-	-	-	6.287 *** (1.055)
Ecological cognition	0.064 *** (0.015)	0.573 *** (0.139)	0.541 *** (0.135)	-
Benefit cognition	0.034 ** (0.013)	0.210 * (0.116)	0.198 * (0.115)	-
Risk cognition	0.038 *** (0.013)	0.303 *** (0.116)	0.298 *** (0.115)	-
Policy cognition	0.031 ** (0.014)	0.332 ** (0.134)	0.322 ** (0.132)	-
Social regulation	0.029 ** (0.013)	0.248 ** (0.111)	0.236 ** (0.110)	-
Age	−0.048 *** (0.013)	−0.288 *** (0.106)	−0.296 *** (0.106)	−0.285 *** (0.105)
Gender	0.006 (0.026)	−0.025 (0.230)	-	−0.048 (0.227)
Education level	0.048 *** (0.013)	0.650 *** (0.135)	0.641 *** (0.133)	0.618 *** (0.133)
Village post	−0.042 (0.049)	−0.681 (0.555)	-	−0.559 (0.546)
Household size	0.007 (0.008)	0.045 (0.068)	-	0.036 (0.067)
Migrant work experience	0.065 ** (0.028)	0.502 ** (0.237)	0.535 ** (0.233)	0.522 ** (0.235)
Number of migrant works	0.057 *** (0.008)	0.855 *** (0.114)	0.837 *** (0.111)	0.820 *** (0.111)
Forest land management	−0.059 ** (0.030)	−0.460 * (0.256)	−0.434 * (0.255)	−0.487 * (0.257)
Slope of forest land	−0.014 (0.012)	−0.335 *** (0.119)	−0.332 *** (0.119)	−0.316 *** (0.118)
Area of forest land	0.017 *** (0.002)	0.160 *** (0.022)	0.158 *** (0.022)	0.159 *** (0.022)
Chi-square	41.22 ***	513.55 ***	511.54 ***	507.08 ***
Pseudo R^2	0.444	0.506	0.504	0.499
Sample size	790	790	790	790

*, **, and *** represent significance at the 10, 5, and 1% levels, respectively. The numbers in brackets are t-values of the robust estimates.

From the chi-square value of the model, it can be seen that the fitting degrees of Model II and Model III were stronger than that of Model I, which indicates that the binary logit regression model had stronger explanatory power than the OLS regression. In addition, in order to further test the reliability of the estimated results, the key explanatory variables were redefined. The five dimensions—ecological cognition, benefit cognition, risk cognition, policy cognition and social regulation—were fitted into the "farmer's overall cognition" index using the entropy method. According to Model IV, the overall cognition of the farmers has a significant positive impact on their transfer behavior.

From the perspective of the five subdimensions of the farmers' cognition, the following was found:

(1) Ecological cognition and risk cognition were both significant at the 1% level and the coefficient was positive, indicating that the higher the evaluation degree of the farmers' ecological cognition and risk cognition, the more inclined they are to implement forest land transfer behavior.

(2) Policy cognition and social regulation were significant at the 5% level and the coefficient was positive, which indicates that the higher the evaluation degree of the benefit cognition and risk cognition of the farmers, the more inclined they are to implement forest land transfer behavior.

(3) Benefit cognition was only significant at the level of 10%, and the coefficient was positive, indicating that the greater the benefit cognition evaluation level, the more inclined farmers are to implement forest land transfer behavior. However, the significance level of the benefit cognition was lower than that of the other four dimensions.

(4) Among the control variables, the farmers' education level, the number of migrant workers and the forest area had a significant positive effect on their forest land transfer behavior at the 1% Level. Their migrant worker experiences had a significant positive effect on their forest land transfer behavior at the 5% level. Moreover, the age of the farmers and the slope of the forest land had a significant negative effect on forest land transfer behavior at the 1% level. Their forest land management activities had a significant negative effect on forest land transfer behavior at the 10% level.

4.2. Heterogeneity Analysis

To some extent, the education level of the farmers reflects their ability to obtain information and to make judgements and decisions. The average length of time spent attaining an education for farmers in most developing countries is approximately six years [50], and China is no exception. In order to further analyze the differences affecting forest land transfer among farmers with different education levels, the samples in this study were divided into "low education level" (less than six years) and "high education level" (more than six years) using the education level of the farmers presented in Table 3 and by conducting a subsample regression. This also helped to verify the robustness of the above regression results.

Table 3. Estimated results of the heterogeneity analysis.

Variable Name	Low Education Level Group	High Education Level Group
Ecological cognition	0.562 ***	0.759 *
	(0.154)	(0.440)
Benefit cognition	0.226 *	0.366
	(0.128)	(0.351)
Risk cognition	0.171	1.272 **
	(0.129)	(0.423)
Policy cognition	0.427 **	0.252
	(0.154)	(0.359)
Social regulation	0.263 **	0.453
	(0.125)	(0.315)
Control variables	Control	Control
Chi-square	339.16 ***	113.76 ***
Pseudo R^2	0.456	0.597
Sample size	542	248

*, **, and *** represent significance at the 10, 5, and 1% levels, respectively. The numbers in the brackets are t-values of the robust estimates.

As can be seen from Table 3, the impact of the farmers' cognition on the forest land transfer behavior was different between the groups with different education levels. Specifically, in the group with low education levels, ecological cognition, benefit cognition, policy cognition and social regulation all significantly affected the farmers' forest land transfer behavior, while in the group with high education levels, only ecological cognition and risk cognition significantly affected the farmers' forest land transfer behavior.

5. Discussion

This study selected field survey data of 790 farmers to study the impact on forest land transfer behavior from the perspective of farmers' cognition. The farmers' cognition was further subdivided into ecological cognition, risk cognition, benefit cognition, policy cognition and social regulation to make the research more comprehensive and practical. In China, the largest developing country in the world, what are the factors that influence farmers' forest transfer behavior? The research results presented in this study have strong

practical significance and will be able to provide a reference for other developing countries in realizing small-scale forest land utilization.

The results of this study have both similarities and differences to previous studies. Consistent with previous research results, the farmers' cognition was found to significantly affect forest land transfer behavior [51]. However, unlike the findings of Xue et al. [52] and Casey et al. [53], the study showed that the ecological cognition of all sampled farmers—not just those in specific farmer groups—significantly affected forest land transfer behavior. A possible reason for this is that China's leaders put forward the following important ecological civilization concept: "clear water and green mountains are also gold hills and silver mountains". Over nearly 20 years of development, this concept has gradually gained popularity. Therefore, the perception of farmers has changed, meaning that they are paying increasing attention to ecological environmental protection. Farmers' ecological cognition has become an important factor affecting their behavior [54–56].

From the perspective of benefit cognition, although benefit perception can still affect farmers' behavior in returning farmland to forest, the intensity of its influence has weakened, which is contrary to some developing countries [57,58]. This is especially true among farmers with higher education levels [25], therefore, benefit cognition was not significant. The likely reason for this is that, with the overall success in alleviating poverty in China, the income and livelihood security of Chinese farmers is increasing, and their livelihood dependence on forest land is already weak. Therefore, the effect of benefit cognition on farmers' forest land transfer was found to be weak in this study. As shown by Maybery et al. [59], farmers' behavior is determined by their values and attitudes rather than profit maximization.

This is also consistent with a study by Zhang et al. [25], who found that farmers can further influence their circulation behavior by understanding policies through cognitive internalization. The formulation of any policy cannot be based on the wishful thinking of the government, but policy must be internalized within the target groups' cognition to be implemented [60].

It is well known that Chinese farmers are typical "risk avoiders" [61,62], and this research also proves this. Risk aversion varies across cultures, and Chinese people are generally more sensitive to potential risks than Americans and the Dutch [63].

Chinese rural society is a unique "acquaintance society" [64], which was also verified in this study. Most of China's rural land transfer behavior is based on the relationship between relatives and friends. Many authors agree with this view [65–67]. However, Li et al. [68] found that with the development of China's social economy, the continuous migration of the labor force led to the transition from an "acquaintance society" to a "semi-acquaintance society" in rural China.

An interesting finding in this study was that among farmers with higher education levels, only ecological cognition and risk cognition were found to significantly affect their forest land transfer behavior. This indicates that farmers with lower education levels will consider more aspects than farmers with higher education levels when choosing to transfer forest land. A possible reason for this is that the farmers with higher education levels are more likely to find nonagricultural jobs [69] and to have greater confidence in using "trial and error" in their own behavior; therefore, it is not necessary to consider all aspects when making decisions about forest land transfer behavior.

6. Conclusions

Based on the field survey data of 790 farmers, this study discussed the influence of farmers' cognition on forest land transfer behavior using the binary logit model. The conclusions are summarized as follows:

(1) Farmers' cognition had a significant positive effect on their forest land transfer behavior. In general, farmers' ecological cognition, benefit cognition, risk cognition, policy cognition and social norms had significant positive effects on the forest land transfer

behavior. Among them, in the order of the degree of impact, were the following: ecological cognition, policy cognition, risk cognition, social regulation and benefit cognition.

(2) Different resource endowments also affected the forest land transfer behavior of the farmers. First, from the individual characteristics, age negatively affected the forest land transfer behavior of the farmers, while education had a significantly positive effect. Secondly, from the perspective of the family characteristics, their migrant worker experience and the number of migrant workers had a significant positive impact on the forest land transfer behavior of the farmers. Finally, from the characteristics of the natural resources, farmers' forest land management activities and the slope of the forest land significantly negatively affected forest land transfer behavior, while forest land area significantly positively affected it.

(3) Our other meaningful findings are that, compared with farmers with low education levels, farmers with high education levels considered fewer factors when implementing forest land transfer behavior, whereas only ecological cognition and risk cognition significantly affected the forest land transfer behavior of farmers with high education levels.

According to the research findings, the following suggestions are put forward to further promote farmers' forest land transfer behavior:

(1) Emphasize the ecological advantage of forest land transfer behavior. As mentioned above, farmers' ecological cognition had the most significant impact on forest land transfer behavior; therefore, when introducing the advantages of forest land transfer, it should be emphasized that it is a win–win behavior, which can realize the utilization of forest land resources and can build an ecological protection barrier.

(2) The forest land transfer policy should be elaborated in various forms. In addition to the traditional method of using staff to explain the policy, modern forms of communication should also be utilized to fully explain the forest land transfer policy, such as multiple television broadcasts, mobile phone alerts and short videos. It is especially important that elderly farmers and those with lower education levels should be provided with comprehensive and practical information on the forest land transfer policy.

(3) Establish a formal and standardized forest land transfer contract. The research shows that farmers' risk cognition of forest land transfer behavior affects their behavior. Oral contracts are widely used in rural areas of China. While this is a way to reduce transaction costs within a short period of time, a formal written contract is more effective in preventing risk. Therefore, it is suggested that, where possible, farmers should adopt formal written contracts when implementing forest land transfer behavior.

Despite the valuable results that were obtained, this study had limitations. This study was based on empirical evidence from Chengdu, which shows that the landform in this area belongs to a mountainous transitional zone, with relatively fragmented woodland. However, it remains to be seen whether the results are applicable to areas such as high mountains with high altitudes and large forest areas. Therefore, future studies should include regions with different geomorphic characteristics to further verify and expand the relationship between farmers' cognition and forest land transfer behavior. In addition, the possibility of reverse causality should also be considered.

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