

Article

Using Risk System Theory to Explore Farmers' Intentions towards Rural Homestead Transfer: Empirical Evidence from Anhui, China

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Abstract: In China, rural homesteads are strategic elements for coordinating the people and land resources relationship between urban and rural regions and are powerful means for increasing the property income of farmers. The rural homestead transfer issue has always concerned policymakers. In this paper, the risk system theory framework is employed to identify risk source (risk perception), risk control (the control measures and institutions), and risk receptor (farmers' characteristics) to explore farmers' intentions towards rural homestead transfer from the perspective of first- and second-order observation. The results demonstrate that farmers' intentions are significantly affected by risk source from first-order observation, and risk control and risk receptor from second-order observation. The heterogeneity of outcomes is examined by grouping of ages and regions of sampled farmers. It is suggested that the risk perception needs of farmers should be respected, land tenure of rural homesteads should be tightly protected, and farmers' characteristics should be of great concern. Moreover, more attention should be paid to idle homesteads, and full advantage taken of rural resources to develop featured rural industries.

Keywords: rural homestead transfer; first- and second-order observation; risk system theory; farmers' intentions



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1. Introduction

China is currently facing the contradiction between the red line of arable land and urban construction land expansion [1]. There is an urgent need to allocate and utilize rural land resources intensively and efficiently [2]. Rural homesteads, as an essential driver of rural revitalization, are not only strategic elements for coordinating the people and land resources relationship between urban and rural regions [3] but also powerful means for increasing the property income of farmers.

In reality, the rural homestead transfer issue has always concerned policymakers in China. In past decades, central and local governments in China focused on protecting the tenure of farmers' homesteads, enhancing the transfer of property and rights of farmers' homesteads prudently, starting pilot rural homestead reforms, and accelerating confirmation of rights and registration of rural homesteads. In early 2018, the "Three Rights" policy entitled separated rights of ownership, tenure, and membership to farmers, which has aroused an extensive series of rural homestead reforms throughout China. Statistically speaking, in 2022, a new round of homestead pilots proceeded in 104 counties (cities and districts) and three prefecture-level cities around the country¹. However, some serious problems have emerged against the wishes of farmers amidst the reform process. For example, villages underwent large-scale demolition and rebuilding, and farmers were forced to move to new residences [4]. Farmers' wishes should be respected in a particular way during the process of rural homestead transfer, which needs to be more noticed in the context of rural homestead reform and rural revitalization in China.

Factors influencing farmers to transfer rural homesteads have been extensively explored within the academic community from two main angles. Specifically, (1) objective factors, including farmers' characters [5,6], household endowment [7], homestead status [8], locational conditions [9,10], land tenure policy [11], and rural homestead transfer process [12], and (2) subjective factors, including farmers' subjective perceptions (e.g., policy, property rights, welfare) [13–15], and psychological factors [16]. Practically, risk awareness and the response of farmers have emerged as critical preconditions to transfer rural homesteads under the background of China's rural homestead reform [17,18]. For the past few years, some scholars have increasingly drawn attention to the influence of risk factors on farmers' intentions to transfer rural homesteads [19]. The existing studies illustrate that the effect of risk perceptions on farmers' intentions of rural homestead transfer is significantly negative in the light of household differentiation [20], and farmers' livelihood risks are closely correlated with rural homestead transfer [21]. For instance, the risks of being homeless and changes in living conditions have been identified as negative factors in rural homestead transfer [22,23]. However, empirical studies concerning risk factors are relatively limited. Further, few studies have highlighted the pivotal role of risk factors in rural homestead transfer. Guan et al.'s [24] study reconstructed the indicator system to analyze rural homestead transfer based on the dual dimensions of Amartya Sen's new welfare economics theory and Dercon's risk theory. In a follow-up study, they estimated the total value of farming households' livelihood assets through risk assessment, classified them with diverse resilience to risk, and then analyzed the influence of welfare factors on rural homestead transfer [25]. Still, the risk perception factor of farmers have not been taken into consideration. More importantly, the current studies mentioned above have failed to explain the importance of risk factors in rural homestead transfer from a risk system perspective.

Given this, this paper aims to propose a comprehensive analytical framework to explore the impact of risks on farmers' intentions to transfer their rural homesteads with a case study from Anhui, China. The findings of this paper aim to provide policy suggestions for enhancing farmers' intentions to transfer their rural homesteads and promote rural homestead reform in China.

2. Analytical Framework

2.1. Concept Definition

At present, there is a period of development and reform in rural China, and various land regimes have emerged. A rural homestead is the most crucial element of land in rural areas, the reform of which is a top priority in rural land reform. Especially, the "Three Rights" policy highlights the moderate liberalization of the right to use rural homesteads and farmers' houses. The focus is on revitalizing the economic value of rural homestead use rights [26], which has become another essential innovation in rural land property rights reform in China. In actuality, with the development of secondary and tertiary industries and the mobility of rural labor, rural homesteads' assets and capital attributes have gradually become more prominent than their resource attributes. In this context, farmers need to realize and reinforce the economic value of their rural homesteads [27]. Rural homestead transfer is broadly defined as a dynamic land use process in which farmers pursue higher returns through changes in form, stages of mobility, and continuous appreciation [28]. For this reason, rural homestead transfer in this paper mainly reflects farmers' market-oriented transfer of rural homesteads for rent, capital contribution, mortgage, etc. The majority of the transferred rural homesteads are utilized for the development of farmhouses, bed and breakfasts, and other development sites to derive property income.

2.2. Analytical Framework

Our theoretical framework is inspired by the risk system theory [29], in which the risk system consists of elements that generate, control, and accept risk. The risk indicates the possible hazards of present choices due to future uncertainty, which cannot be eliminated

or transformed into certainty; any decisions made to obtain absolute safety would lead to risk [30]. Importantly, the idea of first- and second-order observation was proposed by Luhmann [30] to identify risk events. First-order observation focuses on “what the observed is”. The observer distinguishes the object with an explicit aim to confirm the type of the observed object. Second-order observation considers “how to make observations” as a kernel. The observed is no longer a passive object but an active process or the way the second-order observer observes [31]. In short, the essence of second-order observation is that when it comes to judge whether something is risky to society, it needs to be from a general public perspective, more than the risk event itself [32]. Nowadays, Luhmann’s risk system theory is widely applied in the ecological and environmental fields, for example, organic arable farming [33], water resources governance [34,35], tailings mine environmental risk assessment [36], and power system risk assessment [37].

In this paper, the risk system theory is employed to explore farmers’ intentions towards rural homestead transfer in China. From the perspective of first- and second-order observation, first-order observation reveals how farmers are observing the risk of rural homestead transfer. Risk perceptions are farmers’ subjective attitudes and intuitive judgments about avoiding the harms of rural homestead transfer [38,39], affecting farmers in transferring their rural homesteads directly. Therefore, farmers are first-order observers, and risk perception is a product of first-order observation. Second-order observation describes how farmers assess the risk of rural homestead transfer from a social-observation viewpoint. In actuality, the government always restrains and adjusts farmers’ behaviors through different kinds of policies and regulations. Furthermore, farmers reflect on the risk level according to the natural characteristics. Then, a complex risk system of farmers’ intentions towards rural homestead transfer is formed, which is composed of complicated factors with risk perception at the core. Apparently, the control measures and institutions adopted by the government are achievements of second-order observation. Besides, as risk receptors, farmers are indispensable in second-order observation, and their characteristics are vital in assessing risk resistance [25]. In general, risk system theory can be interpreted in three dimensions. Firstly, a risk source is considered as a source that has adverse effects on the objects, which often arises along with decision-making [40]. Risk perception expresses the human–risk relationship [41], which means that different risk perceptions are generated when farmers face risk events of tenure transfer and prompt themselves to make negative or positive decisions on rural homesteads. Hence, risk perception is deemed as a source of risk. Secondly, since risk perception cannot be directly observed or intervened in, there is a need to create a favorable environment for farmers to transfer rural homesteads, especially to safeguard farmers’ interests and rights affiliated with their rural homesteads. Thus, related regulations are perceived as risk control. Thirdly, the risk receptor is the bearer of a risk event. In the process of land tenure transfer, farmers have to suffer from the loss or profit caused by rural homestead transfer, so they are regarded as risk bearers. In this way, a comprehensive analysis framework of “risk source–risk control–risk receptor” is proposed to explore farmers’ intentions towards rural homestead transfer based on the perspective of second-order observation (see Figure 1).

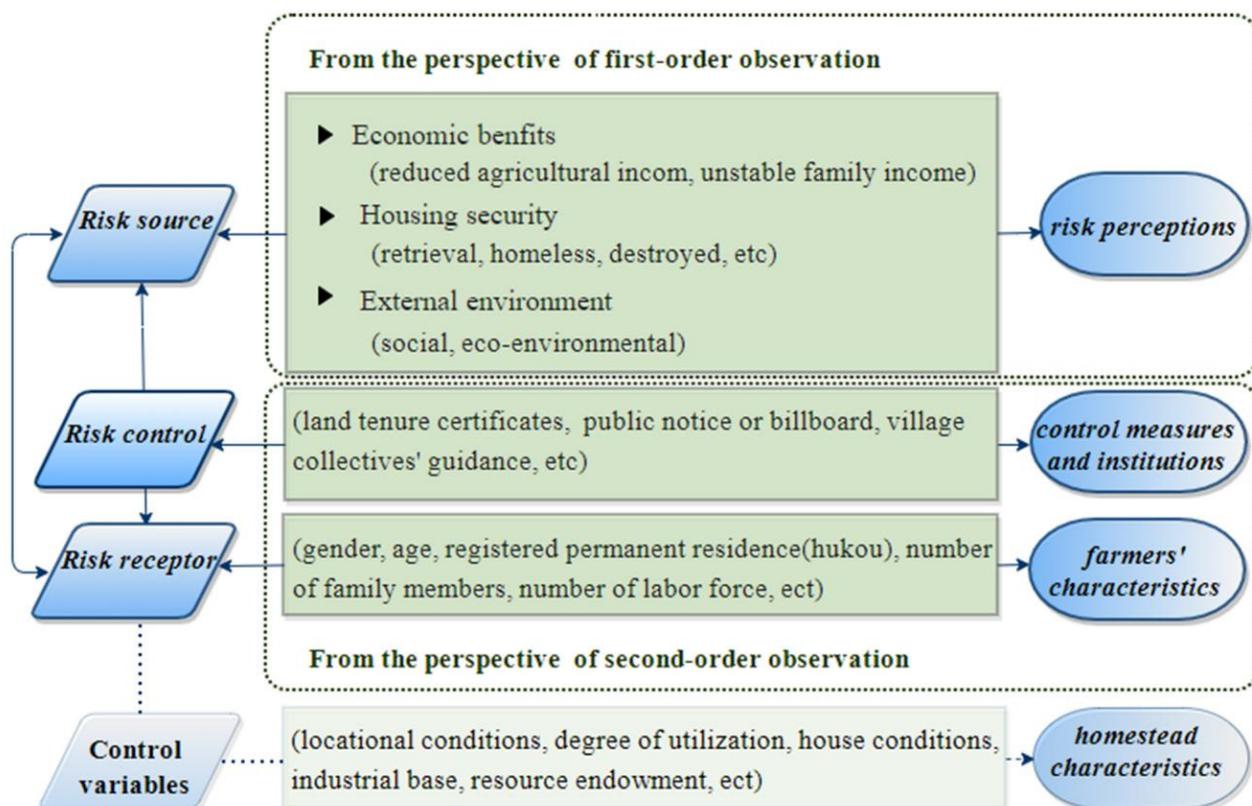


Figure 1. Theoretical analysis framework.

1. Risk source is represented by risk perception. Drawing on scholars' studies, it includes economic benefits [42], residential security [39], and the external environment [43].

The risk of economic benefits is in close relationship with farmers' uncertain income due to rural homestead transfer, usually including reduced agricultural income and unstable family income. Most farmers tend to move from rural to urban areas after rural homestead transfer and withdraw from the traditional agricultural industry, leading to a reduction in agricultural income, which has been examined by scholars [24,44]. Given that farmers' risk perceptions are rooted in living costs, job difficulty, housing issues, and others [43], unstable family income after rural homestead transfer is another important part of farmers' economic benefits risk, as those farmers who migrate into urban districts for work or living may suffer from the serious stress of higher consumption and accommodation fees, fewer employment opportunities, and poorer professional skills.

The risk of housing security manifests the uncertainty of farmers' housing welfare owning to rural homestead transfer, which is denoted by three indicators: the risk of retrieval, being homeless, and being destroyed. The risk of retrieval occurs when the land tenure of rural homesteads cannot be retrieved by the owner after the transfer contract's expiration due to unpredictable reasons. The risk of being homeless happens when farmers cannot afford to rent or purchase new apartments in cities after transferring rural homesteads, or they may return to their hometowns to find themselves homeless. The risk of being destroyed means artificial damages to transferred rural homesteads or houses from house decoration or business behaviors by the operators.

The external environmental risk contains social and eco-environmental issues. The social risk describes the possibility of farmers' rights and interests being ruined in transferring rural homesteads when the contract or oral agreements are destroyed without any constraint by individuals, village committees, and even the local government. The eco-

environment risk refers to the eco-environment destruction caused by village construction or rural industrial developments after rural homestead transfer.

2. Risk control implies control measures and institutions adopted for risk sources, including public notice or billboards, village collectives' guidance, land tenure certificates of rural homesteads, and so forth.
3. Risk receptor is certainly farmers, which is characterized by gender, age, registered permanent residence (hukou), number of family members, and labor force numbers.
4. Control variables, or rural homestead characteristics, are expressed by the locational conditions, the degree of utilization (whether an idle homestead is owned), the house conditions (used years of the house), the industrial base (whether an agricultural processing and storage base exists nearby) and the resource endowment (whether a wetland exists nearby). Of note, agricultural processing and storage bases, which are a typical application for rural industries and rural homestead transfer, have been rapidly expanding due to the sufficiency of agricultural products and residual rural labor in rural China. Further, the resource endowment is explained by wetlands, which are plentiful and variable in type in Anhui. It is well acknowledged that the availability of wetlands demonstrates a high quality of living in rural districts.

3. Study Area and Data Sources

3.1. Study Area

Anhui, located in East China, is a typical agricultural province and one of the earliest provinces to start rural homestead reform in the country. It has 586.66 hm² of arable land and 14,936,800 rural households. The province has conducted two waves of pilot rural homestead reforms². By the end of January 2021, 4.203 million square meters of rural homesteads and 4350 dwellings had been reused in 18 pilot counties, which helped 9376 farmers to be employed, increased village collective income by CNY 31.92 million, and raised farmers' property income by CNY 67.3575 million. The reform of rural homesteads of Anhui is suitable for the case study³.

Typical villages in Hefei, Wuhu, Maanshan, Xuancheng, and Huainan were selected at random as the study areas (see Figure 2). Hefei is the capital of Anhui, located between the Yangtze River and the Huai River. In the rural districts of this city, specialty stores, such as cultural and creative goods stores, agricultural products stores, and convenience stores, are operated using idle farmhouses by shared economic cooperatives. Wuhu is located in the southeast of Anhui. It has attempted to transfer the land tenure of rural homesteads in various ways, such as "farmers' right withdrawal with compensation and village collective share", "rural homestead reclamation and farmers' share", and "rent out of rural homesteads by farmers". Maanshan is an eastern city of Anhui. As a demonstration site of rural tourism, it is trying to rent rural homesteads as industrial housing for livestock and poultry breeding, garment processing, and daily living by the village shares of economic cooperatives, garment enterprises, and business workers, respectively. Xuancheng lies in southeastern Anhui, the transition zone between the southeastern hills and the middle and lower reaches of the Yangtze River Plain. A novel transfer model of rural homesteads has been established, including multiple stakeholders, such as farmers, village collectives, and enterprises, to develop high-quality rural lodgings and an agricultural product processing base. Huainan is a city in central Anhui. Thanks to the joint tourism development company co-operated by the town government and the village collective, local farmers can sign a formal agreement, rent unused farmhouses, and develop the tourism industry.

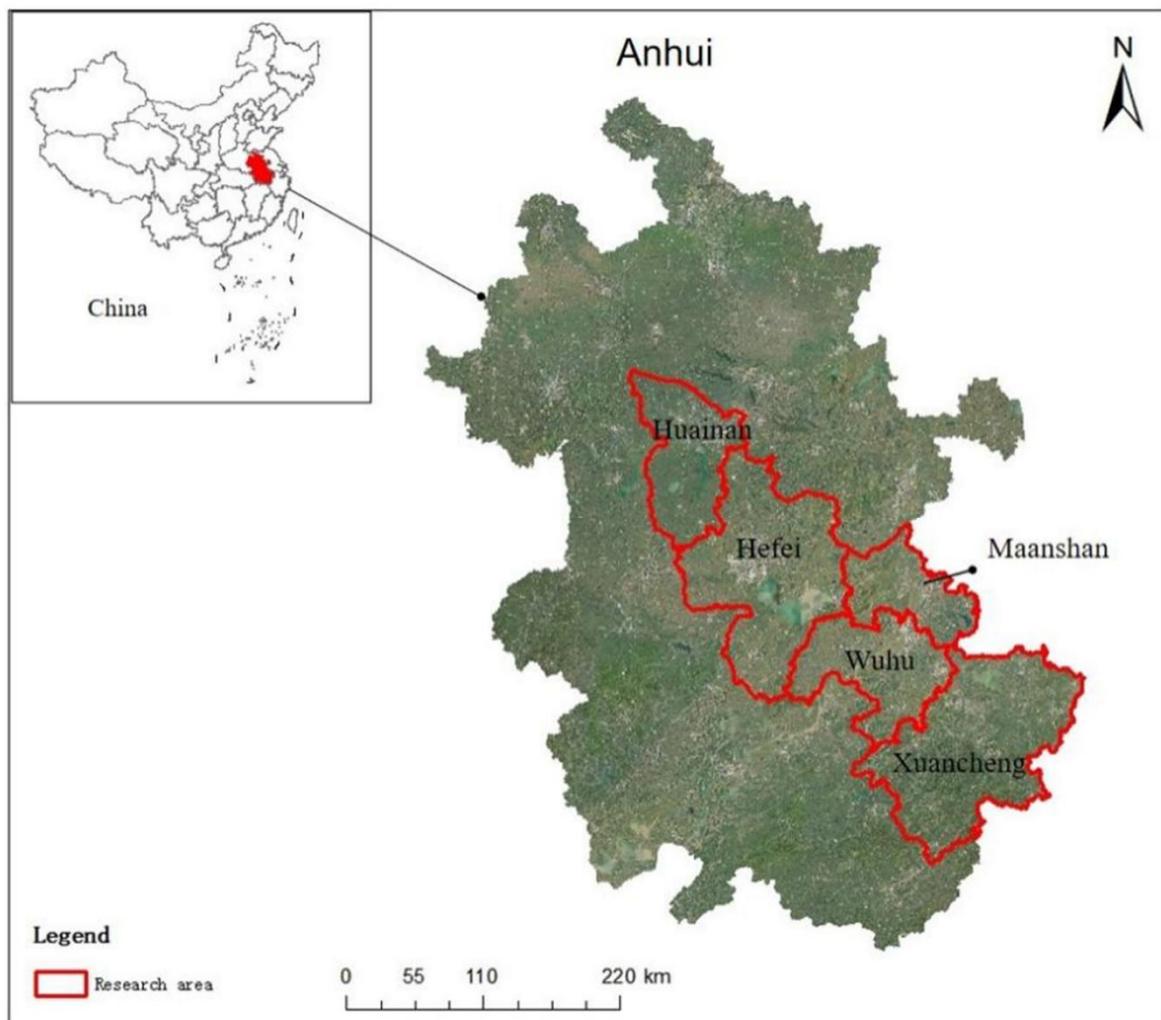


Figure 2. Study area.

3.2. Data Sources

The data were obtained from household surveys by questionnaire from December 2020 through January 2021 in 46 villages, 17 towns, and 5 cities of Anhui. A total of 585 farmers were questioned, and 539 valid questionnaires were returned, with a validity rate of 92.14% (see Table 1).

Table 1. Description of samples.

City	Number of Townships Surveyed	Number of Villages Surveyed	Valid Samples	Township
Hefei	4	12	94	Luchen, Yefushan, Tangchi, Baihu
Huaibei	3	7	116	Bagongshan, Anfengtang, Wabu
Mananshan	2	7	69	Huhe, Dalong
Wuhu	5	12	177	Wanzhi, Liulang, Tangxin, Hongyang, Huaqiao
Xuancheng	3	8	84	Lucun, Taozhou, Baizhi
sum	17	46	539	-

Among the valid sample, 50.5% of interviewed farmers are men, 55.9% are over 55 years old, and 37.1% of farmers have never attended school. A total of 8.9% and 22.3% of the surveyed farmers indicated that their intentions to transfer rural homesteads are

“highest” and “high”, respectively, “medium”, accounting for 40.3%, and “low”, accounting for 15.2%.

4. Model Specification

With the proposed theoretical framework of “risk source–risk control–risk receptor”, we examine the impact of risk on farmers’ intentions towards rural homestead transfer using an ordered logistic regression model. The response probabilities can thus be written as

$$\ln p/(1-p) = a + \sum b_i X_1 + \sum c_i X_2 + \sum d_i X_3 + \sum e_i Z + \varepsilon$$

where p is the probability of farmers’ intentions towards rural homestead transfer (y), X is the explanatory variable (X_1 denotes the risk perception variables, X_2 denotes the risk control variables, and X_3 denotes the risk receiver variables), Z is the control variable, a is the constant term, b , c , d , and e are the regression coefficients of the variables, ε is random disturbance terms, and i is the ordinal number of the observations (see Table 2).

Table 2. Model variables description.

Variables	Description of Variables	Mean	S.D.
Explained variables			
y	The interviewed farmer’s intention towards rural homestead transfer (1 = Lowest, 2 = Lower, 3 = Medium, 4 = High, 5 = Highest)	2.993	1.123
Explanatory variables			
(1) Risk source			
Risk perceptions			
1) Economic benefits			
Reduced agricultural income	Whether the respondent perceives the risk of reduced agricultural income after rural homestead transfer (1 = Yes, 0 = No)	0.269	0.444
Unstable family income	Whether the respondent perceives the risk of unstable family income after rural homestead transfer (1 = Yes, 0 = No)	0.466	0.510
2) Housing security			
Retrieval	Whether the respondent perceives the risk of rural homestead could not be retrieved (1 = Yes, 0 = No)	0.189	0.392
Homeless	Whether the respondent perceives the risk of being homeless after rural homestead transfer (1 = Yes, 0 = No)	0.152	0.359
Destroyed	Whether the respondent perceives the risk of man-made damages to transferred rural homesteads or houses (1 = Yes, 0 = No)	0.124	0.330
3) External environment			
Social	Whether the respondent perceives the risk of the contract or oral agreements destroyed without any constrain in transferring rural homesteads (1 = Yes, 0 = No)	0.212	0.409
Eco-environmental	Whether the respondent perceives the risk of eco-environment destruction after rural homestead transfer (1 = Yes, 0 = No)	0.102	0.303
(2) Risk control			
Land tenure certificates	Whether the respondent has a land tenure certificate of the rural homestead (1 = Yes, 0 = No)	0.359	0.480
Public notice or billboard	Whether the respondent learns of homestead policy through public notice or billboard (1 = Yes, 0 = No)	0.181	0.385
Village collectives’ guidance	Whether the respondent has a village collectives’ guidance in transferring rural homesteads (1 = Extremely disagree, 2 = Rather disagree, 3 = Neutral, 4 = More agree, 5 = Absolutely agree)	2.803	1.030

Table 2. Cont.

Variables	Description of Variables	Mean	S.D.
(3) Risk receptor			
Farmers' characteristics			
Gender	Gender of the respondent (1 = Male, 2 = Female)	1.484	0.500
Age	Age of the respondent (1 = Under 44 years old, 2 = Age 45 to 49, 3 = Age 60 to 74, 4 = Age 75 to 89)	2.165	0.854
Registered permanent residence (hukou)	Respondent's registered permanent residence (1 = Urban, 2 = Rural)	1.987	0.113
Number of family members	Number of family members of the respondent	4.369	1.841
Number of the labor force	Number of the labor force of the respondent's family	2.425	1.106
(4) Control variables			
Homestead characteristics			
Locational conditions	Locational conditions of the respondent's rural homestead (1 = Scenic area, 2 = Non-scenic area)	1.442	0.497
Degree of utilization	Whether the respondent's family owns an unused rural homestead (1 = Yes, 0 = No)	0.020	0.142
House conditions	The used years of the house on the respondent's rural homestead (years)	14.12	13.88
Industrial base	Whether the respondent has an agricultural processing and storage site near the rural homestead (1 = Yes, 0 = No)	0.013	0.114
Resource endowment	Whether the respondent has wetlands near the rural homestead (1 = Yes, 0 = No)	0.054	0.226

5. Results and Analysis

5.1. Baseline Regression Results

Regression analysis of the baseline model is carried out using version SE 16.0 of Stata software, which is originally developed by the US Computer Resource Center. The final pseudo R^2 value of the model is 0.0465, the log-likelihood value of the last iteration is -673.50 , and the likelihood ratio chi-square value is 65.75 with a probability value of 0.0000, indicating that the model fits well (Table 3).

Table 3. Significant variable regression results of ordered logistic model.

Variables	Odds Ratio	Coef.	z-Statistics	Prob
Reduced agricultural income	1.636	0.492	2.170	0.030 **
Unstable family income	1.029	0.029	0.160	0.876
Retrieval	0.628	-0.466	-1.950	0.051 *
Homeless	0.594	-0.520	-1.890	0.059 *
Destroyed	1.484	0.394	1.320	0.186
Social	0.594	-0.520	1.890	0.346
Eco-environmental	0.904	-0.101	-0.450	0.581
Land tenure certificates	2.052	0.719	3.710	0.000 ***
Public notice or billboard	1.047	0.046	0.190	0.848
Village collectives' guidance	1.327	0.283	3.160	0.002 ***
Gender	0.970	-0.031	-0.180	0.860
Age	0.930	-0.072	-0.640	0.522
Registered permanent residence	0.192	-1.648	-2.020	0.044 **
Number of family members	0.958	-0.043	-0.810	0.416

Table 3. Cont.

Variables	Odds Ratio	Coef.	z-Statistics	Prob
Number of the labor force	0.857	−0.154	−2.010	0.044 **
Locational conditions	0.898	−0.107	−0.560	0.575
Degree of utilization	4.464	1.496	2.420	0.016 **
House conditions	0.996	−0.004	−0.560	0.572
Industrial base	13.950	2.635	3.070	0.002 ***
Resource endowment	1.766	0.569	1.380	0.169

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

5.1.1. Risk Perception Factors

Agricultural income has a significant effect on the decision-making of farmers' intentions to transfer rural homesteads: when the awareness of reduced agricultural income increases by a unit, the tendency for transferring rural homesteads increases by 63.6%. In the study area, the proportion of part-time farmers is 52.0%; they have more non-farm income, which reduces to some extent the dependency on the utilization of the homestead for farming. Meanwhile, for pure agricultural farmers, they are mainly engaged in traditional intensive farming and depend greatly on the cultivation of rice, wheat, and oilseed rape. Most questioned farmers have complained that they have small-scale farmland to operate but have to invest more money in seeds, pesticides, fertilizers, agricultural equipment, and employees than before, which lowers the net income of the household. The negative experience weakens farmers' intentions to keep a farming-oriented livelihood and makes them turn to off-farm employment in urban districts. The expectation of reduced agricultural income reflects the transition of farmers' livelihood after rural homestead transfer; thus, it has a positive impact on farmers' decision-making on rural homesteads.

The effect of the risk of retrieval on the decision regarding rural homestead transfer is statistically significant, where, as risk perception increases, farmers are less likely to choose rural homestead transfer. At present, there seem to be many conflicts and disputes concerning transferred rural homesteads or houses among farmers [45]. Some farmers are worried that the transfer period is too long to ensure their rights and interests when facing all kinds of uncertainties. Further, interviewed farmers do not have a better understanding of the latest policy reforms: 68.4% are never or seldom aware of rural homestead policy, especially about the policy of "Three Rights", the protection of farmers' rights and interests after rural homestead transfer, and the procedures for land tenure disputes resolution. This sort of fear for the future affects farmers' perceptions, thus discouraging them from transferring their rural homesteads.

When the concern of homelessness increases by a unit, rural homestead transfer probability declines by 37.2%. This implies that the greater the perceived risk of being homeless, the less likely farmers will transfer their rural homesteads. From the viewpoint of multi-function, living is one of the most important functions of rural homesteads. Usually, after the transfer of rural homesteads, farmers leave their previous house and move to a new residence in the town or city. The elderly may be worried that they are not used to urban life and return to the village, sadly to find out that they do not have a house to live in. In addition, middle-aged or young people are most often afraid that it would be big trouble when they celebrate traditional festivals or make temporary visits to native places without a stable house since hotels are not popular in most rural districts. Moreover, rural homesteads undertake the essential function of social and cultural ties, and some farmers may feel uneasy in case of cutting off social relations with acquaintances and friends in the village.

5.1.2. Risk Control Factors

The effect of land tenure certificates on rural homestead transfer is significantly positive at the 1% significance level. It shows that land tenure certificates raise farmers' intentions to transfer rural homesteads. Recently, the confirmation of rights and registration for rural homesteads have been put into practice across Anhui, which primarily covers declaration, land title investigation, review and announcement, approval, registration, and certificate granting. For the study area, 86.4% of farmers have their rural homesteads registered, and the farmers with rural homestead certificates account for 35.8%. This means that farmers with a rural homestead certificate may have a deeper comprehension of the land tenure and safer ownership of their rural homesteads, which may lead to a more favorable policy response to the rural homestead transfer by farmers.

It is evident that village collectives' guidance is positively associated with rural homestead transfer and is significant at the 1% level. Village collectives' guidance reduces farmers' concerns about transferring homesteads. Generally, village collectives have powerful organization capacity, negotiation capacity with enterprises, service capacity for farm households, market expectation capacity, and distribution capacity for business income, which have contributed remarkably to transferring rural homesteads [46]. In practice, farmers' perceptions of the role of village collectives differ a lot in the study area. Specifically, for non-transferred farmers, which account for 81.1 % of the total sample, they have considerably less confidence in village collectives than in the central government. For 67.2% of transferred farmers without the help of the village collective, they believe that the village collectives could guarantee the validity of the transfer contract and meet the bottom-line requirements of farmers, which has a favorable effect. For transferred farmers with the help of village collectives, they are highly dependent on village collectives, which help to introduce social capital, conduct village infrastructure construction, regularize transfer behavior, and supervise the signing of contracts during the transfer procedure.

5.1.3. Risk Receptor Factors

The coefficient estimate for registered permanent residence (hukou) becomes negative and statistically significant at the 5% level, revealing that urban hukou lowers farmers' intentions towards rural homestead transfer to a certain extent. A possible reason for this is the endowment effect of rural homesteads. The endowment effect is the fact that the close connection between personality and property makes it painful to lose personal property, which is impossible to be compensated for by a substitute [47]. People may endow a high value to an object once they own it, thus inhibiting the occurrence of transactions. According to current policy, although farmers who have urban hukou can retain their rural homesteads, they and their descendants have lost the right to apply for new homesteads, and the existing rural homesteads are the only asset in the village. That is, if farmers choose to transfer their rural homesteads, they lose control over the use of their rural homesteads, showing a strong endowment effect. Additionally, the traditional concept and ideas of "deep love for land" and "returning to one's birthplace when aging" are solidly embedded in ordinary farmers; hence they attach more importance to the emotional attachment to rural homesteads' property, which enhances the endowment effect of rural homesteads.

Labor force numbers have a significantly negative effect on farmers' intentions to transfer rural homesteads. This illustrates that when the labor force is relatively high, farmers participate in rural homestead transfer less. The possible explanation could be that there is a clear division of labor force among members of a big family, in which the elders often work in farming. According to the field survey, 33.5% of households have more than three available workers, 90% of which are elderly laborers engaging in agricultural production. For these families, rural homesteads still play a vitally crucial role in facilitating farming and housing security.

5.1.4. Homestead Characterization Factors

The coefficient estimate for the degree of utilization is statistically significant at the 5% level, positively influencing rural homestead transfer. That is, with the increased degree of homestead utilization, farmers' intentions of rural homestead transfer are gradually increasing. In the research area, the percentage of farmers with idle homesteads is 2%, and 10% admit that the length of residence is less than three months per year. By transferring idle homesteads, the efficiency of land use would be improved, and additional income would be gained.

There is a significant and positive effect of agricultural processing and storage based on farmers' intentions of rural homestead transfer. The study area features agricultural products, such as grain and oil, aquatic products, fruits and vegetables, bamboo and tea, and Chinese herbs, usually processed by local enterprises, which need plenty of rural homesteads and houses. Supposing that farmers are familiar with the production-processing model and learn about the purpose of transferred rural homesteads, they are more likely to take part in the modern agricultural industry chain, as it provides more employment opportunities. In the same way, unique agricultural resources and raw materials are integrated, local competitive industries are developed, and regional economic growth is effectively boosted, which would lead to a more positive response from farmers' rural homestead transfer. However, the interviewed farmers are concerned that the lack of necessary knowledge, information channels, and skill levels may be an unavoidable barrier, even though agro-processing and storage bases are nearby.

5.2. Heterogeneity Analysis

5.2.1. Age Differences

Following related research [48–50], the sampled farmers are divided into four groups: under 44 years old, 45 to 59 years old, 60 to 74 years old, and 75 to 89 years old. It is noted that no interviewed farmers are less than 30 years old. The estimation results are listed in Table 4.

1. For young farmers under 44 years old

A total of 52.9% of young farmers surveyed are part-time workers, which may alleviate the pressure on household livelihoods through multiple streams of income. In addition, the rural homestead has an increasingly significant function in ensuring residence. That is, as rational economic agents, farmers compute the expected risk of displacement against the substantial property income. This potentially influences the statistical significance of the perceived risk of agricultural income reduction after rural homestead transfer, which suggests that the variable is no longer significant.

Young people have a richer education experience; 41.4% have completed high school or above. It is much easier for them to understand the public policies, collect helpful information, and suppress the potential risks of rural homestead transfer, resulting in a significantly positive effect of social risks on farmers' intentions ($\text{prob} = 0.810 < 0.1$).

Well-educated young people also ordinarily pay more attention to eco-environment issues, and they are generally worried about eco-environment ruin problems by inappropriate sewage discharge or garbage throw-away during business operation after rural homestead transfer, which may enrich the farmers' income but reduce the convenience of living. Therefore, the effect of the risk of ecological destruction on farmers' intentions to transfer their rural homesteads is significantly negative ($\text{prob} = 0.061 < 0.1$).

Young people have to earn enough to maintain the balance of income–expenditure of the family. A large-sized family is likely to transfer to a rural homestead to earn extraneous income and ease their economic burden. Thus, the effect of the number of family members on rural homestead transfer is significant and positive ($\text{prob} = 0.006 < 0.01$).

2. For middle-aged farmers aged 45–59 years old

For these farmers, their houses have been in service for a long time, most more than 20 years, with the living function expiring to some extent. Due to the renovation cost of the

houses, they are willing to transfer rural homesteads to others who are able to decorate and maintain the appearance and structure of the houses. In this way, the used years of the houses influence farmers' intentions of rural homestead transfer significantly and positively (prob = 0.028 < 0.05).

3. For older farmers aged 60–74 years old

In reality, older farmers have a high level of trust in the central government. In their opinion, rural homestead transfer is supported and encouraged by the government and embodies the credibility of the country without regard to any risk events. This results in the coefficient estimate for social risks becoming positive and in statistical significance at the 10% level (prob = 0.096 < 0.1).

Most of the elderly farmers stay alone in the countryside while their children and grandchildren are settled in the cities or towns. They hold the traditional faith of "living for the next generation". In particular, elderly farmers with large-sized families tend to increase their income through rural homestead transfer in order to reduce the burden on their children. Therefore, the number of family members is positively correlated with farmers' intentions of rural homestead transfer (prob = 0.036 < 0.05).

4. For elderly farmers aged 75–89 years old

These farmers are incredibly traditional. They believe that the male makes the crucial decisions for the family while the female respects their authority, causing a significantly negative impact (prob = 0.002 < 0.01).

Elderly farmers do not want to be a burden to their children. They are losing physical strength, but as long as they have it, they will plant a few "ration plots". Compared with scenic areas, rural homestead transfer prices are inexpensive in non-scenic areas, and there is a relative demand for "land for self-reliance" relying on rural homesteads, leading to more difficulty in choosing rural homestead transfer. Consequently, the location conditions have a negative impact on making a decision about rural homestead transfer (prob = 0.019 < 0.05).

Table 4. Analysis of household age heterogeneity.

	Model 2	Model 3	Model 4	Model 5
	Under 44 Years Old = 1 (N = 128)	Aged 45 to 49 = 2 (N = 225)	Aged 60 to 74 = 3 (N = 143)	Aged 75 to 89 = 4 (N = 43)
Reduced agricultural income	−0.244 (0.568)	0.828 ** (0.324)	0.889 * (0.466)	0.698 (1.475)
Unstable family income	0.525 (0.466)	0.173 (0.270)	0.547 (0.352)	2.281 (1.727)
Retrieval	−0.348 (0.769)	−0.233 (0.350)	−1.223 *** (0.460)	−3.746 ** (1.456)
Homeless	0.967 (0.676)	−0.459 (0.398)	−1.341 ** (0.547)	−2.142 * (1.091)
Destroyed	−0.437 (0.727)	−0.192 (0.329)	−0.290 (0.422)	0.630 (1.045)
Social	2.925 * (1.674)	0.453 (0.452)	0.896 * (0.537)	−22.544 (228.467)
Eco-environmental	−2.183 * (1.165)	−0.641 (0.626)	−1.008 (0.648)	1.807 (1.864)
Land tenure certificates	1.390 ** (0.554)	0.718 ** (0.294)	1.321 *** (0.400)	1.401 (0.941)
Public notice or billboard	0.017 (0.534)	−0.202 (0.353)	0.120 (0.580)	0.116 (1.493)
Village collectives' guidance	0.410 ** (0.204)	0.295 ** (0.147)	0.351 ** (0.186)	−0.277 (0.597)

Table 4. Cont.

	Model 2	Model 3	Model 4	Model 5
	Under 44 Years Old = 1 (N = 128)	Aged 45 to 49 = 2 (N = 225)	Aged 60 to 74 = 3 (N = 143)	Aged 75 to 89 = 4 (N = 43)
Gender	−0.189 (0.462)	−0.240 (0.260)	0.429 (0.342)	−3.268 *** (1.070)
Registered permanent residence(hukou)	−0.441 (1.313)	−17.307 (849.482)	−1.423 (1.629)	-
Number of family members	0.496 *** (0.180)	−0.134 (0.091)	−0.227 ** (0.108)	−0.245 (0.162)
Number of the labor force	−0.919 *** (0.351)	0.016 (0.174)	−0.241 (0.221)	−0.096 (0.129)
Locational conditions	0.012 (0.528)	−0.023 (0.287)	−0.426 (0.378)	−2.884 ** (1.225)
Degree of utilization	0.099 (2.015)	1.370 (0.971)	0.764 (1.204)	−0.722 (3.929)
House conditions	0.023 (0.019)	0.027 ** (0.012)	−0.003 (0.010)	−0.007 (0.027)
Industrial base	0.700 (2.049)	2.843 * (1.501)	35.650 (17.40)	55.533 (154.096)
Resource endowment	−0.614 (0.932)	0.562 (0.580)	0.740 (0.665)	3.131 (2.288)
LR χ^2	53.280	41.730	53.670	39.080
P-Statistics	0.000	0.001	0.000	0.009
Pseudo R ²	0.190	0.063	0.130	0.068

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The robust standard error statistics are shown in parentheses. - indicates missing results due to a limited sample in the group.

5.2.2. Regional Difference

Scenic areas or not is an exciting topic. Scenic areas are commonly recognized as advantageous locations and distinctive resources, which may geographically influence farmers' risk perceptions and their intention to transfer their rural homesteads. From the perspective of the scenic source characteristics [51], the scenic areas in this paper are identified as national tourist attractions by local government, with beautiful natural or human landscapes. Two groups of samples from scenic and non-scenic areas are conducted logit estimation separately to examine their potential influence (see Table 5).

In contrast to the baseline model, the estimation of the coefficients for social risks, eco-environmental risks, number of family members, and resource endowment are statistically significant (at 10%, 10%, 5%, and 10% levels, respectively) in scenic areas. Specifically, social risks positively and significantly affect farmers' intentions of rural homestead transfer. In practice, the scale of rural homestead transfer in scenic areas is overwhelming, and the local government has released relevant policies to regulate the transfer norms, with an excellent restraining effect. The effect of eco-environmental risks on rural homestead transfer is significantly negative. This may be because farmers pay more attention to the environment of the village and have high requirements for environmental quality. Similarly, for farmers with many family members, the demand for homesteads for self-occupation is comparatively high. It is often difficult to find a satisfactory place to live after the transfer, inducing a negative impact on transferring rural homesteads. Moreover, the result indicates a positive and significant relationship between nearby wetlands and farmers' intentions of rural homestead transfer. Scenic areas have natural wetland resources with high cultural tourism value, such as rivers, lakes, and marshes. Farmers often receive lucrative economic rewards for participating in rural homestead transfer to develop rural tourism.

Table 5. Heterogeneity analysis of location conditions.

	Model 6	Model 7
	Scenic Areas (N = 301)	Non-Scenic Areas (N = 238)
Reduced agricultural income	0.598 ** (0.293)	0.300 (0.397)
Unstable family income	0.144 (0.282)	0.051 (0.266)
Retrieval	−1.204 *** (0.404)	−0.000 (0.320)
Homeless	−1.155 ** (0.557)	−0.486 (0.332)
Destroyed	−0.315 (0.382)	−0.111 (0.307)
Social	0.845 * (0.449)	0.062 (0.443)
Eco-environmental	−1.596 * (0.864)	−0.310 (0.574)
Land tenure certificates	1.394 *** (0.310)	−0.072 (0.308)
Public notice or billboard	0.012 (0.329)	0.473 (0.395)
Village collectives' guidance	0.270 ** (0.116)	0.230 (0.168)
Gender	0.063 (0.246)	−0.329 (0.254)
Age	0.116 (0.165)	−0.304 * (0.176)
Registered permanent residence	−3.824 *** (1.255)	0.043 (1.138)
Number of family members	−0.215 ** (0.073)	0.082 (0.093)
Number of the labor force	−0.271 *** (0.101)	0.036 (0.174)
Degree of utilization	3.821 *** (1.078)	0.964 (0.802)
House conditions	0.002 (0.009)	−0.004 (0.012)
Industrial base	-	2.699 *** (0.895)
Resource endowment	1.180 * (0.602)	−1.204 * (0.660)
LR χ^2	85.760	32.810
P-Statistics	0.000	0.0253
Pseudo R ²	0.117	0.0492

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The robust standard error statistics are shown in parentheses. — indicates missing results due to a limited sample in the group.

For non-scenic areas, both age and resource endowment affect farmers' intentions of rural homestead transfer at a 10% significance level. The negative coefficient suggests that the older the farmers are, the more unfavorable the rural homestead transfer is. This can be attributed to those elderly farmers in non-scenic areas who usually have old-fashioned ideas and are willing to lean on their rural homesteads rather than transferring. In addition, the effect of resource endowment is statistically significant, and farmers become increasingly reluctant to transfer rural homesteads. There is a collection of artificial wetlands in non-

scenic areas, such as breeding ponds, agricultural ponds, and paddy fields. Farmers rely heavily on the rich wetland resources through aquaculture and agricultural production, resulting in less interest in transferring rural homesteads. Notably, the risk perception factors of farmers are not significant. There are not too many cases of rural homestead transfer, most of which occur within the collective economic organization. An example is that young people who have been settling in the city worry that their parents are not used to a new life in the city and rent a homestead for them, which may reduce the risk perceived by the farmers and removes the statistical significance.

6. Robustness Analysis

6.1. Omitted Variable Test

As explained above, our results may be driven by some omitted variables that are correlated with risk factors and rural homestead transfer. Therefore, the method proposed by Oster [52] is introduced to test omitted variables, which is a modification of Altonji, Elder, and Taber [53]. The strategy relies on the information from the selection of observables to assess the extent to which unobservables could be driving the main results. The essence of this test is to ascertain the size of the unobservable objects relative to the observable objects. In such a way, the risk of reduced agricultural income is taken as an example and would render the coefficient estimate to be zero.

To that end, the value of R^2_{\max} should be calculated first, denoting the value of the coefficient of determination based on a hypothetical regression. This is obtained from the regressions of risk perception, risk control, risk receptors, and observed and unobserved covariates. Following Oster [52], the value of R^2_{\max} has been computed based on multiplying the R^2 from an OLS estimation, which in our case is 0.1244, by a factor of 1.3. This is particularly noteworthy in order to explore the correlation between omitted variables and the risk variable of reduced agricultural income in homestead transfers. The control variables in that regression are risk perception, risk control, risk receptors, and homestead characteristics, in addition to the risk of reduced agricultural income. The Oster check results show that any unobserved heterogeneity needs to be 17 times greater than the variables included in Table 2 to explain the consequence of risk factors affecting farmers in transferring their rural homesteads. In other words, the omitted variables have no statistically significant association with the results of this paper.

6.2. Selection Bias Test

Selection bias could seriously alter the econometrical results due to farmers' identity. Rural homestead reform in China follows the route of "piloting and spreading", and the homestead pilot areas may have been selected carefully. As a result, it may not be applicable for farmers to take rural homestead transfer in other areas into consideration. On the basis of Milena et al. [54], the adjusted regression results of the entropy balance method [55] are given using the balance command by Hainmueller et al. [56].

To be specific, we first create two groups of respondents who live inside rural homestead pilot areas (treated group) and outside pilot areas (control group). This involves generating a set of entropy balancing based on both the mean and the variance of the covariates' distribution in order to eliminate the differences between the two regions due to unobservable factors. Then, the set of entropy balancing is brought into the baseline model for re-estimation. If the selection bias does not affect the estimation results, then the coefficient estimates of the core variables after balanced regressions should be broadly consistent with the baseline model. The regression results (see Table 6) are relatively consistent, and the model is statistically significant at the 1% level. This provides some reassurance that selection is not the primary driver of our results.

Table 6. Regression results of selection bias test.

Variables	Coef.	Std. Err.	z-Statistics	Prob
Reduced agricultural income	0.213	0.530	0.400	0.687
Unstable family income	0.584	0.430	1.360	0.174
Retrieval	−0.680	0.504	−1.350	0.177
Homeless	−0.830	0.464	−1.790	0.070 *
Destroyed	−0.119	0.358	−0.330	0.740
Social	1.618	0.418	3.870	0.000 ***
Eco-environmental	−0.566	0.620	−0.910	0.361
Land tenure certificates	1.346	0.410	3.280	0.001 ***
Public notice or billboard	2.464	0.913	2.700	0.007 ***
Village collectives' guidance	0.342	0.181	1.890	0.058 **
Gender	0.422	0.310	1.360	0.173
Age	0.208	0.220	0.950	0.343
Registered permanent residence	−3.242	2.242	−1.450	0.148
Number of family members	−0.199	0.096	−2.070	0.039 **
Number of the labor force	−0.122	0.075	−1.640	0.100
Locational conditions	−0.837	0.343	−2.440	0.015 **
Degree of utilization	0.445	0.775	0.570	0.565
House conditions	−0.000	0.008	−0.020	0.981
Industrial base	2.275	1.171	1.940	0.052 *
Resource endowment	0.055	0.528	0.100	0.917
Homestead reform pilot	0.081	0.322	0.250	0.801

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

6.3. Excluding Extreme Data

To test the robustness of the model further, the sample of farmers without risk perceptions, accounting for 21%, is excluded [57]. After that, the pseudo R^2 value of the model is 0.0539, the log-likelihood value of the last iteration is −513.30, the likelihood ratio chi-square value is 58.47, and the corresponding probability value is 0.0000, implying an overall fitting of the model.

Generally, the results are consistent with the baseline model, and the model robustness is confirmed. From Table 7, in comparison with the baseline model, it can be observed that the house conditions affect farmers' intentions to rural homestead transfer significantly and negatively. As the used years of houses increase, homestead utilization would be invested in high repair costs due to rural homesteads being mostly deserted or idle, and farmers' enthusiasm would be diminished. The effect of the resource endowment on farmers' intentions to rural homestead transfer is significantly positive, which shows that wetlands can encourage farmers to transfer rural homesteads. Because wetlands have unique socioeconomic, ecological, and cultural values, local farmers may have a stronger sense of superiority over wetland resources and higher expectations of homestead development, which would produce more confidence in rural homestead transfer. Moreover, the registered permanent residence (hukou) does not have a significant effect on farmers' intentions to transfer rural homesteads. This is attributed to fact that the risk perception of farmers is unsubstantial when owning urban registration, and sample excluding reduces the statistical significance.

Table 7. Regression results excluding extreme data.

Variables	Coef.	Std. Err	z-Statistics	Prob
Reduced agricultural income	0.425	0.246	1.730	0.084 *
Unstable family income	−0.051	0.214	−0.240	0.811
Retrieval	0.432	0.244	−1.770	0.077 *
Homeless	−0.474	0.282	−1.680	0.093 *
Destroyed	−0.192	0.238	−0.800	0.422
Social	0.316	0.308	1.030	0.305
Eco-environmental	−0.029	0.421	−0.070	0.945
Land tenure certificates	0.848	0.229	3.690	0.000 ***
Public notice or billboard	−0.029	0.281	−0.100	0.918
Village collectives' guidance	0.177	0.104	1.700	1.700
Gender	−0.251	0.199	−1.260	0.207
Age	−0.027	0.129	−0.210	0.833
Registered permanent residence	0.528	1.595	0.330	0.741
Number of family members	−0.010	0.061	−0.170	0.866
Number of the labor force	−0.162	0.086	−1.890	0.059 *
Locational conditions	−0.147	0.227	−0.650	0.516
Degree of utilization	0.672	0.672	2.380	0.017 **
House conditions	−0.014	0.008	−1.770	0.077 *
Industrial base	2.714	0.866	3.140	0.002 ***
Resource endowment	0.761	0.449	1.700	0.090 *

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

6.4. Instrumental Variables Method

The bidirectional causality between risk perceptions and behavioral decisions has been verified. For example, Zhang et al. [58] used average risk attitudes as an instrumental variable to examine the causality between risk attitudes and entrepreneurial choices. Gao et al. [59] introduced environmental governance inputs and religious beliefs as instrumental variables to explore the endogeneity between environmental risk perceptions and environmentally friendly behaviors. In consideration that variables of risk perception and farmers' intentions may have measurement errors and farmers' intentions to transfer rural homesteads may also affect their risk perception, there would be a two-way causal relationship that leads to endogeneity, and results in biased and inconsistent benchmark problems.

When facing the risk of reducing agricultural income, ordinary people choose to increase their non-farm employment income to maintain a family living level. The rural labor force is fundamentally welcome by construction enterprises due to a relatively low technology threshold. Inspired by the idea of Qian [60], it would be necessary to pick the average cement and concrete prices⁴ in the cities of Anhui in 2020 as the instrumental variables for the risk of reduced agricultural income. Firstly, the validity of the instrumental variables is tested. The regression coefficients of the instrumental variable, the average price of cement and concrete, are positive. The value of the Kleibergen–Paap rk LM statistic is 12.41 (prob = 0.001 < 0.01 and prob = 0.000 < 0.01), which indicates that the instrumental variables are associated with endogenous explanatory variables. Secondly, for the weak instrumental variables tests, the minimum eigenvalue F statistic value is 15.3459 (F > 10), and the Cragg–Donald F and Kleibergen–Paap rk F statistic values are 15.346 and 12.414, respectively, illustrating that there is no weak instrumental variable problem. It is reasonable to choose the average price of cement and concrete price in each city as the instrumental variables. As known to all, in China, urban migrant workers work in the construction and manufacturing industries, where cement and concrete are the essential elements. The prices of both elements are in close relationship with construction products and the demand for workers by these industries, which thereafter absorb more

surplus rural labor force, who would never put more time and energy into traditional farming with a lower comparative income [61]. This implies that the change in farmers' agricultural income is linked to the prices of both elements to some extent. Logically, there is no causality between the prices and the intentions of farmers to transfer rural homesteads.

Additionally, the model is tested for its endogeneity. Since the Hausman Test does not hold in the case of heteroskedasticity, the Durbin–Wu–Hausman Test is performed. The p -value of ei is 0.000, showing that the model does not have endogeneity problems caused by biased measurement and two-way causality.

6.5. Placebo Test

Drawing on Milena et al. [54], Li et al. [62], and Ferrara et al. [63], we tested whether the relationship between risk factors and farmers' intentions to transfer their rural homesteads is affected by other random factors. One of the core explanatory variables for reduced agricultural income is selected to perform simulated experiments. First, values of the risk variables for reduced agricultural income in the total sample are disrupted and assigned randomly to each instance. This virtual value is replaced into the baseline model for regression. Afterwards, there is a need to repeat the process 1000 times and find the estimated coefficients of the virtual variable concerning reduced agricultural income. In other words, if reduced agricultural income can indeed affect rural homestead transfer, the virtual variable in the regression results of the placebo test will not be statistically significantly associated with intentions to rural homestead transfer. It shows that the value of the estimated coefficient should be insignificant. As shown in Figure 3, the distribution of coefficients after 1000 regressions is concentrated around 0, while it is 0.492 in the baseline model. This denotes that the virtual treatment effect of the above construction does not exist, thus ruling out the possibility of other random factors interfering with the estimation results.

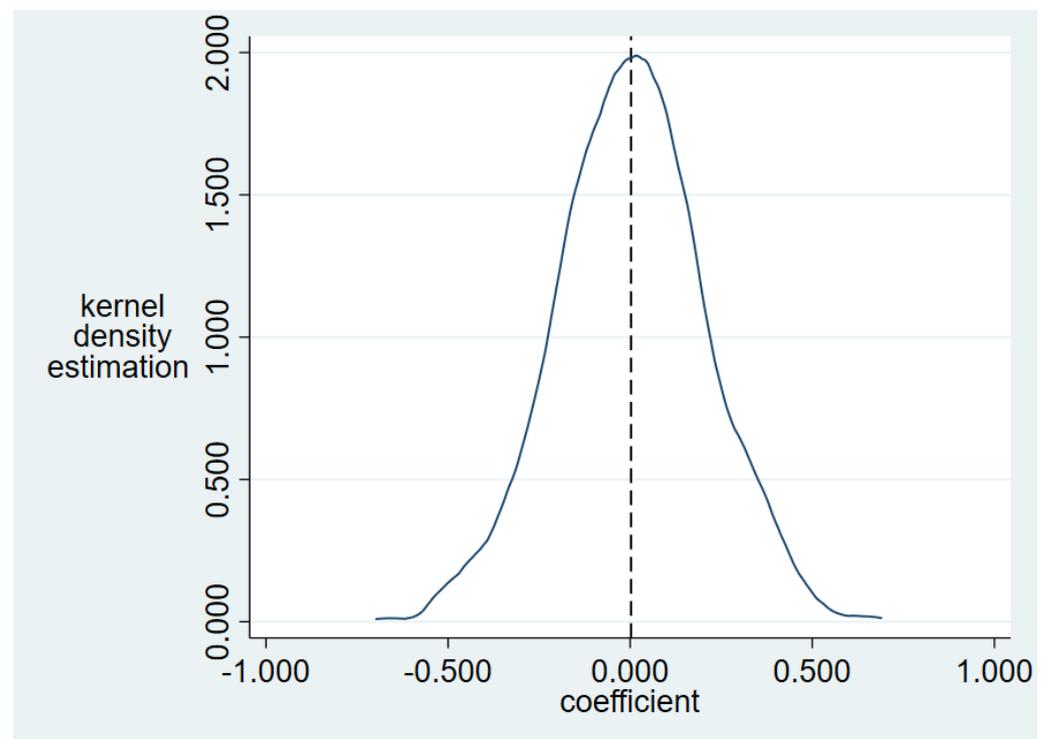


Figure 3. Plot of coefficient kernel density estimation for placebo test.

7. Discussion

Based on the risk system theory, we investigate the impact of risk factors on the transfer of rural homesteads from the perspective of first- and second-order observation. The findings show that factors of risk source (risk perception) from first-order observation, and both risk control (the control measures and institutions) and risk receptor (farmers' characteristics) from second-order observation are significantly affecting the intentions of farmers to transfer their rural homesteads. It is of note that only the risk perceptions from economic benefits and housing security have a significant impact on farmers' intentions to transfer their rural homesteads. The possible explanation could be that risk factors related to farmers' realistic benefits may be more effective in influencing rural homestead transfer.

The vast literature argues that risk perceptions significantly inhibit farmers' behavior of rural homestead utilization, especially withdrawal from idle homesteads [19,39,64,65]. On the contrary, the overall result denotes that the effect of risk perception on farmers' intentions is in different directions. For instance, the increased risk perception of reduced household farm income enhances the intentions to transfer rural homesteads. More interestingly, after grouping by age, besides the risk of reduced agricultural income, social risk also positively affects young farmers (up to 44 years old) and older farmers (60–74 years old), respectively. The reason may be that some scholars have overlooked the complexity of the risk system, especially in identifying individual farmer's risks, including economic, social, environmental, and security [8]. Consistent with the study by Kuang et al. [65], an age effect on farmers' risk perception is observed as well. Compared with older farmers, external environmental risks (such as social and eco-environmental risks) are determinants of young farmers' (under 44 years old) intentions. Notably, the risk perception factor has no significant effect on farmers' intentions in non-scenic areas, which may be related to the low transfer proportion of rural homesteads, similar to the findings of Zhu [11].

Concerning risk control factors, Chen et al. [7] revealed that farmers' social capital could not influence their intentions to transfer rural homesteads. However, the results of this paper suggest that village collectives play a vital role in guiding and helping farmers to transfer rural homesteads. Sun et al. [64] explained that it might be social networks that mitigate the adverse effects of risks. As far as risk receptor factors, an existing study [13] has concluded that the number of family members has no significant effect on farmers' intentions to rural homestead transfer, but Wu et al. [8] insisted that the number of family members negatively affects the intentions for some farmers grouped by regional characteristics. Our findings also uncover that the effect does exist after grouping by age, which demonstrates that it is necessary to take into account farmers' heterogeneity. Some findings of the previous studies were verified in this paper, such as land tenure certificates [19], the degree of utilization [7], and the family labor force numbers [13].

Risk is an essential perspective for studying farmers' intentions to transfer rural homesteads. Although diverse indicator systems for rural homestead transfer have been established in reality for different research subjects, a multidimensional-oriented analysis framework reflecting social, ecological, economic, and natural pressure should be rethought comprehensively both from farmers' and social perspectives on the basis of Luhmann's first- and second-order observations [33], which are more appropriate to promote the rural homestead reform system in China. Some interesting results are found based on the "risk source–risk control–risk receptor" framework in this paper. The empirical results illustrate that farmers with urban hukou are more reluctant to transfer rural homesteads, contrary to the generally accepted view that the division of farmers promotes the transfer of farmers' rural homesteads [13]. This could be explained by the strong endowment effect of rural homesteads. It is noteworthy that agricultural product processing and storage bases are conducive to the transfer of farming homesteads attributed to excellent demonstration effects.

8. Implications

Firstly, during the progress of rural homestead reform, the risk perception needs of farmers should be respected. The results reveal that farmers' intentions to transfer their rural homesteads are significantly affected by the reduced risk of reduced agricultural income, retrieval, and homelessness. Given this, it is better for policymakers to accelerate the process of agricultural modernization, encourage farmers to perform moderate-scale operations, and bring new industries to transform them. In addition, there is a need to strengthen legal education on farmers' rural homestead transfer, set up legal aid centers, and improve the channels for expressing farmers' rights and interests, complaints, and feedback. Policy transmission should also meet farmers' demands and enhance farmers' risk resistance.

Secondly, the land tenure of rural homesteads should be tightly protected. In view of property rights certificates, it is vitally important to speed up the process of property rights certificates issued for rural homesteads to guarantee the rights and interests of farmers effectively. In the meantime, it is strongly suggested to pay attention to the village collectives' leadership and organization, to operate skills training programs and improve the service function of village collectives.

Thirdly, for the sake of rural homestead transfer, there should be concern about farmers' characteristics. For farmers with urban hukou, more attention should be paid to the social-psychological problems of farmers through reducing their emotional dependence on rural homesteads as well as the endowment effect in an advisable way. Further, for families with a large labor force, non-farm employment capacity needs to be enhanced to weaken their dependence on agricultural income.

Fourthly, attention should be paid to the idle homesteads and advantage taken of rural resources to develop featured industries. Farmers with idle homesteads should be encouraged to transfer rural homesteads to others, develop an industrial base and support the local agricultural industry. This is proved to be a valuable way to enrich employment opportunities and channels for farmers and improve the welfare level of the rural communities.

Lastly, risk system theory should be actively applied to facilitate rural homestead transfer. In the process of implementing rural homestead reform, systemic governance concepts need to be strengthened to adequately understand risk sources, risk controls, and risk receptors, and risk prevention measures need to be pre-positioned. Meanwhile, the government should respond to the two-dimensional needs of farmers and society to enhance farmers' intentions to transfer their idle homesteads.

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Notes

¹ <http://www.moa.gov.cn/>. URL (accessed on 10 March 2022).

² <http://tjj.ah.gov.cn/>; <http://nync.ah.gov.cn/>. URL (accessed on 10 March 2022).

³ http://www.hzjjs.moa.gov.cn/zjdglygg/202104/t20210409_6365555.htm. URL (accessed on 10 March 2022).

⁴ <https://www.mysteel.com/>. URL (accessed on 13 April 2022).

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