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# Formal and Informal Institutions in Farmers' Withdrawal from Rural Homesteads in China: Heterogeneity Analysis Based on the Village Location

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**Abstract:** Withdrawal from rural homesteads (WRH) in China is mainly conducted under the guidance of government and follows the principle of farmers' voluntary participation, in which both formal and informal institutions play essential roles. However, few studies have systematically analyzed the institutional factors in WRH. By introducing both formal and informal institutions into the analysis framework, the aim of this study was to explore the impacts of formal and informal institutions on farmers' behavior to WRH, and the interaction between formal and informal institution in different villages. Based on survey data from farmers in Jinzhai, China, this study adopted a binary probit model and factor analysis. (1) The study revealed that farmers' cognition of homesteads property rights and their trust in village cadres are the key formal institutional factors affecting farmers' behavior to WRH, and farmers' social networks, reciprocal norms, and trust in villagers are the key informal institutional factors affecting farmers' WRH; (2) Both formal and informal institutions promote farmers' WRH, and informal institutions play a more important role. However, there is no interaction between formal and informal institutions in the whole sample. (3) Furthermore, the effect of formal and informal institutions on farmers' WRH have the heterogeneity of village location: there is a complementary relationship between formal and informal institutions in farmers' WRH for villages with a medium proximity to the county seat, and a substitution relationship for villages far away from the county seat. Finally, this study discusses the implications of these findings on the new round of WRH policy.

**Keywords:** formal institution; informal institution; withdrawal from rural homesteads; village location

## 1. Introduction

With the accelerating pace of urbanization and industrialization in China, many farmers have moved to towns and cities [1,2]. Although the rural population is dropping, the area of rural homesteads is rising [3,4]. Approximately 7.58 million hectares of rural residential land were abandoned in 2012 across China [5,6], and the vacancy rate of rural homesteads in China was estimated at 20 % in 2018 [7]. The inefficient utilization of rural resources in China is becoming an increasingly severe problem [8], hindering the development and revitalization of China's rural areas [9,10]. To resolve the issue of idle rural homesteads and revitalize the rural homestead assets, in 2015, China's central government selected 33 counties (cities and districts) as pilot areas to carry out the reform of withdrawal from rural homesteads (WRH). WRH refers to farmers' withdrawing from their vacant homesteads or giving up their usage rights to rural homesteads voluntarily under the guidance of the local government or rural collective economic organizations, and acquiring money or new houses as compensation [3,4,11]. In December 2018, The Summary Report of the State Council on Rural Land Expropriation, the Entry of Collectively Operated Construction Land into the Market, and the Reform Pilot of the Homestead System pointed

out that approximately 140,000 households and 5600 hm$^2$ scattered and idle homesteads had been vacated in 33 pilot areas since 2015. And in the same year, the "Village Revitalization Strategic Plan (2018–2022)" announced that one of its major reforms was to establish and perfect the WRH mechanism. Subsequently, from 2019 to 2021, the "No. 1 Central Document" of China proposed to steadily and prudently promote the reform of rural homestead systems. In 2020, a new round of pilot reform of rural homestead institutions was launched in 104 counties/cities/districts and three prefecture-level cities in China. The WRH is an integral part of China's rural land system reform and also an emerging issue of the global land system study. Therefore, the study on WRH has become a hot topic in recent years [3,6].

However, farmers' willingness to WRH is not high [12] and the withdrawal is inefficient [13] in many pilot areas in China. Farmers are critical stakeholders in WRH, and the vital principle of WRH is to respect farmers' willingness. Therefore, exploring the driving factors of farmers' WRH has important practical significance for the government to guide farmers WRH voluntarily and in an orderly manner. According to the existing research, many developed regions such as Europe, North America and Australia have good practical experience in guiding farmers to participate in the consolidation of residential land [4,14–16]. The rural homestead reform in China is different and more complex than in many Western countries. A lot of the literature has explored the influencing factors of farmers' willingness or behavior to WRH in China. For instance, some scholars have considered farmers' characteristics, including age, gender, and education [6,17]. Some studies have paid attention to household characteristics including economic conditions, population size, household employment, and cultivated land [18,19]. Many researchers have focused on homestead and housing characteristics involving homestead location, homestead area, and urban housing [5,20,21]. Several scholars have emphasized the effects of WRH policy characteristics like policies promotion and withdrawal compensation [22–24]. In addition, farmers' cognition characteristics including knowledge of the policy and cognition of property rights have been taken into consideration [25–27].

Currently, WRH can be divided into four modes according to the enforcing agencies: government-led, village-spontaneous, enterprise-pushed, and market-allocated [11]. And the government-led mode accounts for the most significant proportion. To realize the rational use of land, local governments have tried their best to guide farmers to participate in WRH voluntarily [3]. In this process, formal institutions represented by government affect farmers' decision-making. At the same time, the rural environment in which Chinese farmers live is a typical "relationship society". A large number of scholars have shown that the informal institutions embedded in rural areas are important complements to the formal institutions [28,29]. The informal institutions also play an essential role in farmers' voluntary participation in WRH. North's theory of institutional change regards institutions as "rules of the game in a society" constraining individuals' behavior [30]. And institutions, including formal and informal institutions, are crucial to understanding the behavior of economies [31–34].

By reviewing the existing literature, a few scholars began to pay attention to the institutional factors in farmers' WRH [4,24,35], but the literature on the institutional factors of farmers' WRH is relatively deficient and has some shortcomings in need of improvement. First, existing studies usually focus on a single dimension. Liu et al. [4] introduced property certificates into the model of the influencing factors of farmers' behavior to WRH, and Sun and Zhao [17] explored the impact of social trust on farmers' WRH. However, many studies have shown that formal and informal institutions do not operate independently of each other in influencing farmers' behavior, and they are intricately intertwined in the multidimensional and complex institutional environment [36,37]. We can understand the actual effects of such environment only by simultaneously examining multiple institutions. Therefore, it is more meaningful to systematically integrate formal and informal institutions from multiple dimensions to understand farmers' WRH. Second, no research has focused on the joint impact of formal and informal institutions in farmers' WRH. Many scholars

argue that it is theoretically meaningful to study the interaction between formal and informal institutions [34,38], and it is better to combine the influence of formal and informal institutions to explain behavior [30,34]. It is necessary to study the interaction effect of formal and informal institutions on farmers' behavior to WRH. Third, current studies ignore the distance effect of institutions in farmers' WRH. Many studies on enterprises have explored the distance effect of institutions [38,39], that is, the differences of institutional environments in different regions [40]. And some scholars argue that the rural areas in the center differ from those in the periphery [41]. Based on this, we have reasons to believe that the heterogeneity of farmers' village locations should be considered when analyzing the effect of institutional factors on farmers' behavior to WRH.

Overall, studies on the institutional factors in farmers' behavior to WRH are still lacking and the joint influence of formal and informal institutions is an important study gap at present. Accordingly, this study innovatively introduced both formal and informal institutions into the analysis framework of influencing factors of farmers' WRH from the perspective of institutional theory. Based on field survey data from 570 farmers in Jinzhai County, Anhui Province, this study explored the impact of formal and informal institutions on farmers' behavior to WRH and the interaction effect of formal and informal institutions. The study also discussed the distance effect of formal and informal institutions in farmers' WRH for the first time. The findings are of great significance for an in-depth understanding of the role of institutions in farmers' participation in WRH and for providing a scientific basis for improving WRH policy.

This study is arranged as follows: Section 2 constructs the theoretical framework and proposes the corresponding hypotheses. Section 3 provides the study area, data source, and method. Section 4 illustrates the results. Section 5 presents the conclusions and discussions.

## 2. Theoretical Framework and Research Hypotheses

### 2.1. The Impact of Formal and Informal Institutions on Farmer' Behavior to WRH

The theory of institutional change represented by North and Scott [30,42] provides a solid theoretical basis for the analysis. Institutions are a set of rules, norms, and moral and cultural-cognitive values designed to constrain the behavior of individuals [36,42]. Institutionalists believe that institutions influence the actions of individuals or organizations mainly by cutting down on transaction costs, reducing uncertainty, and resisting opportunistic behavior [30,43–45]. Both formal and informal aspects of institutions are essential drivers of shaping the behavior of economic actors [30,34].

Formal institutions refer to structures of codified and explicit rules and standards that shape interaction among societal members [30]. They are usually codified institutions created, communicated and enforced through official channels [36,46]. Currently, scholars' investigations of the formal institutions in rural areas mainly focus on property rights [4] and institutional trust [17]. Coase's theory of property rights holds that the economic function of property rights is to overcome externalities and reduce social costs, to ensure the effectiveness of resource allocation in institutions [47]. In rural areas, it is hard for farmers to cognize rural residential land property rights only through current legal regulations [35], while institutions could function by restructuring peoples' shared information and cognition [30]. In the process of WRH, farmers' clear cognition of homestead property rights, including ownership, use, qualification, disposal, inheritance, and mortgage rights, could reduce the transaction costs between farmers and the other relevant stakeholders, thus promoting farmers' behavior to WRH [35]. As for institutional trust, farmers' trust in village cadres and relevant laws and policies are important aspects [33], and trust is a mechanism that could reduce the risk of opportunistic behavior of people engaged in various activities [45]. Therefore, farmers' trust in village cadres and relevant laws and policies could reduce farmers' concerns about WRH and increase the possibility of their participation. This study proposes:

**Hypothesis 1.** *The higher the farmers' formal institution, the more likely farmers are to WRH.*

**Hypothesis 1a.** *The higher the farmers' property rights cognition of homestead, the more likely farmers are to WRH.*

**Hypothesis 1b.** *The higher the farmers' trust in village cadres, the more likely farmers are to WRH.*

**Hypothesis 1c.** *The higher the farmers' trust in relevant laws and policies, the more likely farmers are to WRH.*

Informal institutions are a set of conventions, norms of behavior, and self-imposed codes of conduct [30]. They are usually unwritten institutions created, communicated, and enforced through unofficial channels [36,46]. Usually, scholars use social networks, social trust and reciprocal norms to represent informal institutions in rural areas [17,33,48]. A social network is a stable relationship formed between people. It is helpful for individuals to exchange information and acquire advice, which is used to facilitate action [49]. Reciprocal norms specify what actions are acceptable or unacceptable [50], and can be understood as constraints people impose upon themselves to structure their relationships with others [51]. Social trust includes trust in kin and trust in villagers in the same or other villages, representing the different order patterns of trust in rural China [33]. These reciprocal norms and types of trust help to build shared expectations of the reliability of others by facilitating information sharing and knowledge transfer [37], and then effectively reducing opportunistic risks [45] and transaction costs [34]. In the process of WRH, the social network based on trust and reciprocity is one of the most important ways for farmers to obtain effective information, promoting farmers' behavior [52]. Social trust and reciprocal norms are beneficial for reducing the information asymmetry and farmers' worries about unreliable government execution in WRH and improving the possibility of farmers' WRH [17]. This study proposes:

**Hypothesis 2.** *The higher the farmers' informal institution, the more likely farmers are to WRH.*

**Hypothesis 2a.** *The higher the farmers' social network, the more likely farmers are to WRH.*

**Hypothesis 2b.** *The higher the farmers' reciprocal norm, the more likely farmers are to WRH.*

**Hypothesis 2c.** *The higher the farmers' trust in kin, the more likely farmers are to WRH.*

**Hypothesis 2d.** *The higher the farmers' trust in villagers, the more likely farmers are to WRH.*

*2.2. The Interactive Effect of Formal and Informal Institutions on Farmer' Behavior to WRH*

Formal and informal institutions are not independent in influencing people's behavior; on the contrary, they interact and jointly shape their behavior [36]. Formal and informal institutions can interact, contradict and overlap [53], making their relationships complementary or substitutive [54,55]. Some scholars argue that informal institutions can complement formal institutions' support for economic activities [32], and formal institutions can also mediate informal institutions [56], and their relationship is complementary or symbiotic [57,58]. Other studies find that there is an endogenous substituting relationship between formal and informal institutions [34,54], and informal institutions can emerge and replace them as the preponderant rules of interaction when formal institutions fail [37,48]. According to the above literature, we believe there is an interactive relationship between formal and informal institutions in farmers' WRH, whether complementary or alternative. This study proposes:

**Hypothesis 3.** *Formal and informal institutions have interactive effect on farmers' behavior to WRH.*

### 2.3. Heterogeneity Analysis of Village Location

Studies on enterprises generally agree that there are significant differences between formal and informal institutions in different regions, and their effects are different to some extent, i.e., institutions have certain distance effects [39,40,59]. For rural areas in China, there are differences in geographical distance, administrative region, infrastructure, and information access across villages [24,41], which may lead to the institutional differences across villages. Formal institutions are more standardized for villages closer to the county seat, and farmers' access to relevant laws and regulations is more convenient, and the social network and interaction degrees among farmers are relatively lower. So, farmers rely more on formal institutions than informal institutions when participating in WRH. On the contrary, formal institutions find it difficult to function in villages far away from the county seat. Farmers mainly rely on informal institutions such as social networks and trust to maintain contact. So, farmers rely more on informal institutions than formal institutions when participating in WRH. This study proposes:

**Hypothesis 4.** *The effect of formal and informal institutions on farmers' behavior to WRH varies with the village location.*

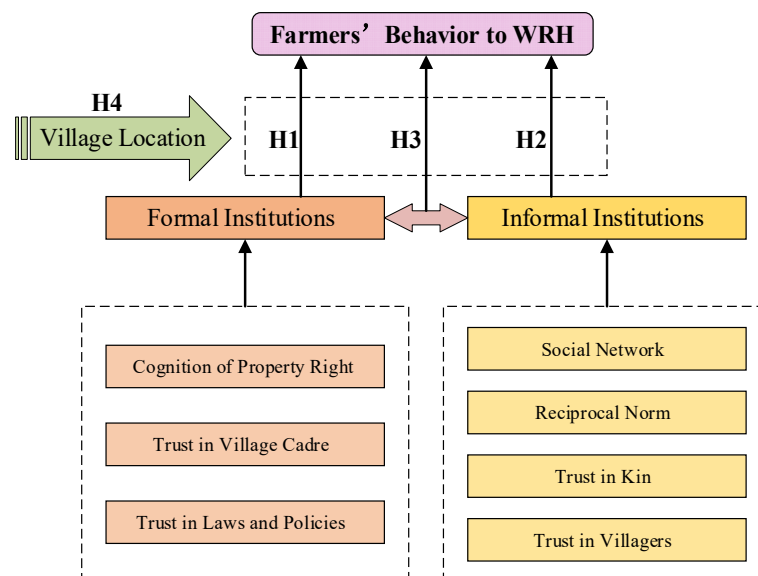Based on the above analysis, the theoretical analysis framework of this study is shown in Figure 1.



**Figure 1.** Theoretical analysis framework.

### 3. Methodology

#### 3.1. Study Area and Data Collection

Jinzhai is located in the west of Anhui Province and the hinterland of the Dabie Mountains, with a total area of 3814 square kilometers. It governs 23 townships, and one Development Zone. It is the county with the largest area and the largest population in the mountain reservoir area in Anhui Province. It is also one of the first batch of key poverty-stricken counties at the national level. In 2016, Jinzhai County officially issued relevant measures [60] and actively carried out the work of WRH to realize the intensive and economical use of rural land. The WRH in Jinzhai County is carried out in combination with the Construction of Beautiful Villages, Relocation of Poverty Alleviation and Relocation of Reservoir Immigrants, and follows the principles of voluntariness according to law, reasonable compensation, scientific utilization, and overall promotion. By the end of 2019, more than 44 thousand households had withdrawn and vacated, and 48.5 thousand mu of homestead in Jinzhai [61] were reclaimed, with remarkable results. This makes Jinzhai an

excellent example for studying farmers' behavior to WRH. Meantime, the county seat is located in the north of the whole county and the distance from each township to the county seat presents obvious differences of distance, which is helpful for studying the location difference of farmers' WRH.

The data used in this study comes from a field survey conducted in Jinzhai from August to September 2020. According to the situation of farmers' households in 2019, one-to-one household interviews were carried out, applying the method of stratified random sampling to ensure samples were representative and to carry out the investigation: First, according to the distance from the county seat, eight towns were selected: Quanjun Town and Baitafan Town around the county seat, Huaishuwan Town, Youfangdian Town, and Taoling Town moderate to the county seat, Qingshan Town, Gubei Town, and Nanxi Town far away from the county seat. Second, between two to nine villages were selected in each town according to economic development. Finally, the households that participated in WRH were randomly selected from the centralized resettlement area (after WRH, farmers could choose to buy ordinary commercial housing in the county or township, or jointly and collectively build new housing in the planned township or village. In this study, the WRH farmers are mainly those who settled in the centralized planning areas.) in sample villages, and those who did not participate in WRH were randomly selected from the other areas. The location of the study areas is shown in Figure 2.
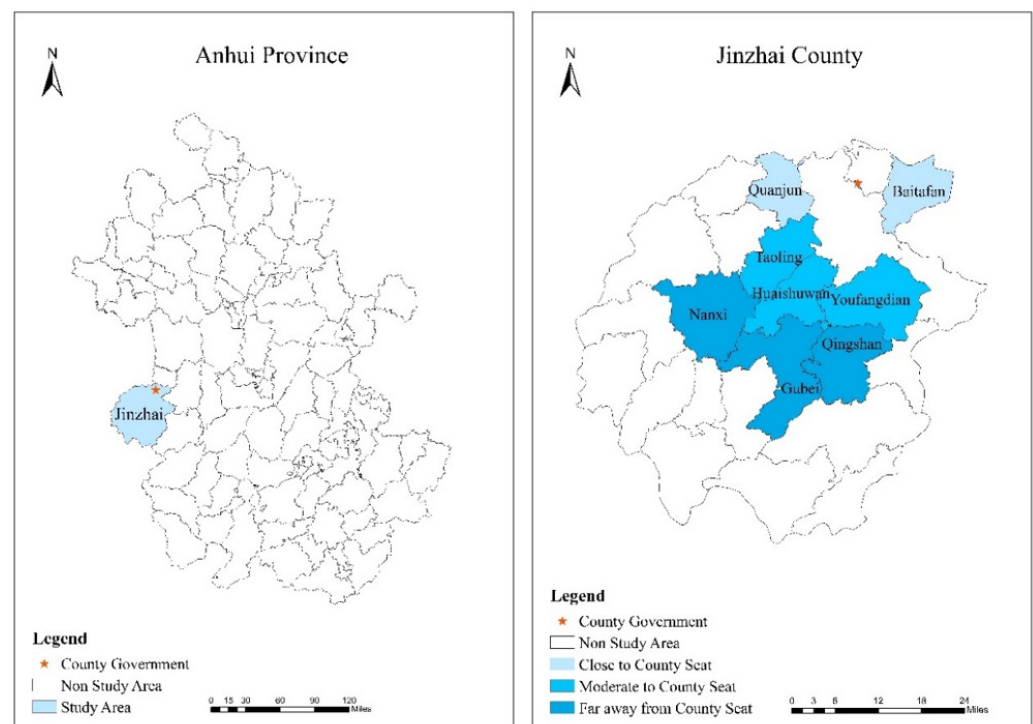


**Figure 2.** Location of the study areas.

The questionnaires were discussed and modified with experts and scholars frequently based on pre-investigation. Final questionnaires covered the homestead withdrawal status of WRH farmers', basic information of farmers' households, relevant situation of formal and informal institutions, respondents' cognition of homestead and homestead withdrawal policy, etc. The questionnaires were completed by specially trained investigators (both doctoral and master students) through one-on-one interviews with the head or the principal decision-makers of the household. Other family members were encouraged to participate in discussions and supplements. 620 questionnaires were distributed, and 570 valid questionnaires were obtained. Among the valid questionnaires, 354 sample households were WRH households. The regional distribution of sample households is shown in Table 1.

**Table 1.** Sample distribution.

| Distribution | Close to County Seat | | Medium to County Seat | | | Far away from County Seat | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| Town | Quanjun | Baitafan | Huaishuwan | Youfangdian | Taoling | Qingshan | Gubei | Nanxi | |
| Households (household) | 60 | 85 | 61 | 96 | 47 | 85 | 73 | 63 | 570 |
| Proportion (%) | 10.53 | 14.91 | 10.71 | 16.84 | 8.24 | 14.91 | 12.81 | 11.05 | 100 |

*3.2. Variables Description*

3.2.1. Dependent Variable

The dependent variable is farmers' behaviors to WRH. The question is: "Have you WRH?", 1 = yes 0 = no.

3.2.2. Independent Variables

(1)　The core explanatory variable

Formal institutions. Formal institutions included three variables: farmers' property right cognition of homestead [25], farmers' trust in village cadre, and farmers' trust in laws and policies [33]. According to China's current laws and policies, farmers only have the right of qualification and use to their homestead, but not the right of ownership, disposal, inheritance or mortgage in general rural areas. Farmers' cognition of homestead property rights was measured according to the number of farmers' corrected cognition of the above six rights. And 1 = no or one correct cognition, 2 = two correct cognitions, 3 = three correct cognitions, 4 = four correct cognitions, 5 = five or six correct cognitions. Farmers' trust in village cadres and farmers' trust in laws and policies is measured by the questions "your trust in village cadres" and "your trust in relevant laws and policies", 1 = very low, 2 = low, 3 = general, 4 = high, 5 = very high.

Informal institutions. Informal institutions included four variables: social network [17], reciprocal norm, farmers' trust in kin and trust in villagers [33]. The social network was assigned 1~5 according to the "number of relatives and friends who often walk around in the village", 1 = very low, 2 = low, 3 = general, 4 = high, 5 = very high. Reciprocal norms were measured by the question "your willingness to help community villagers" to reflect farmers' constrains on themselves as they build connections with others, 1 = very low, 2 = low, 3 = general, 4 = high, 5 = very high. Farmers' trust in kin and trust in villagers are measured by the questions "your trust in your kin" and "your trust in your villagers", 1 = very low, 2 = low, 3 = general, 4 = high, 5 = very high.

In order to further explore the common impact of formal institution and informal institution on farmers' behavior to WRH, the comprehensive scores of formal institutions and informal institutions were calculated by factor analysis using software spss26. For the formal institution, factor analysis was conducted on the three indicators mentioned above. The KMO value was 0.705, Bartlett value was 563.024 (sig = 0.000), and the cumulative contribution rate was 72.143%. For the informal institution, factor analysis was conducted on the four indicators mentioned above. The KMO value is 0.788, Bartlett value is 1086.010 (sig = 0.000), and the cumulative contribution rate is 70.741%. The KMO is an indicator used to compare simple correlation coefficients and biased correlation coefficients. The closer its value is to 1, the more suitable it is for factor analysis. According to the judgment criterion, a KMO value above 0.7 is better. Bartlett's test is used to test whether the correlation matrix is a unit array. If the Sig value rejects the original hypothesis (sig < 0.05), a correlation exists between the variables, indicating that factor analysis is suitable. The cumulative contribution rate indicates how much information of the original variables is extracted cumulatively by the previous k principal components. In operation, a cumulative contribution rate of 70% or more is generally considered suitable for factor analysis. Thus, the selection of factor analysis in this study was appropriate.

(2)　Control variables

Referring to a relevant study [3,4,6,35], the control variables included the characteristics of household head, household and homesteads. The characteristics of household head included gender, age, and the education level of the household head. The characteristics of household included household size, per capita income, proportion of non-agricultural income, farmland area. The characteristics of farmers' homestead included homestead area, confirmation of homestead right, distance from homestead to town government. The selected final variables are shown in Table 2.

**Table 2.** Variables, assignment, and description.

| Variables | Variable Descriptions | Mean | SD |
|---|---|---|---|
| Dependent variable | | | |
| Behavior to WRH | Have WRH = 1; have never WRH = 0 | 0.621 | 0.486 |
| Independent variables | | | |
| Formal institution | A comprehensive score of each dimension by factor analysis and normalizing it. | 0.658 | 0.196 |
| Cognition of homestead property rights | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 2.874 | 1.028 |
| Trust in village cadre | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 3.688 | 0.896 |
| Trust in laws and policies | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 4.232 | 0.857 |
| Informal institution | A comprehensive score of each dimension by factor analysis and normalizing it. | 0.775 | 0.188 |
| Social network | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 3.791 | 0.996 |
| Reciprocal norm | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 4.125 | 0.766 |
| Trust in kin | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 4.507 | 0.677 |
| Trust in villagers | Very low = 1, low = 2, average = 3, high = 4, very high = 5 | 4.319 | 0.709 |
| Control variables | | | |
| Gender of household head | Male = 1, female = 0 | 0.953 | 0.213 |
| Age of household head | The actual age of the household head(years) | 60.133 | 11.454 |
| Education of household head | Years of education of household head(years) | 4.265 | 3.245 |
| Household size | Number of household members(person) | 4.130 | 1.629 |
| Per capita income | Total annual household income divided by the number of household members ($10^4$ RMB [a]/person) | 1.767 | 1.235 |
| Proportion of non-agricultural income | Non-agricultural income divided by the total income of the household | 0.748 | 0.361 |
| Farmland area | The actual farmland area of the household (mu [b]) | 4.024 | 2.719 |
| Homestead area | The actual homestead area of the household ($m^2$) | 172.926 | 71.777 |
| Confirmation of homestead right | The homestead has been confirmed = 1; has never been confirmed = 0 | 0.970 | 0.170 |
| Distance from homestead to town government | The actual distance from the homestead of household to the town government (km) | 6.275 | 4.336 |
| Grouping variable | | | |
| Village location | Distance from the village to the county seat (km) | 36.449 | 15.589 |

Notes: [a] During the study period, 1 USD ≈ 6.85 RMB; [b] 1 mu ≈ 667 $m^2$.

(3)  Grouping variables

To further investigate the heterogeneity of village location, the variable of distance from the village to the county seat was introduced. Then, according to the actual distance from the village to the county seat, farmers were divided into three groups: group 1—short distance (within 25 km), group 2—medium distance (25 km~45 km), and group 3—long distance (more than 45 km).

### 3.3. Model Construction

This study aimed to explore the relationship between formal institution/informal institution and farmers' behavior to WRH. The dependent variable was binary in this study, so we used the binary probit model for the analysis [62]. Binary probit model is a kind of generalized linear regression used to analyze individual decision-making behavior [4]. Regarding farmers' WRH, there were two options for decision-makers: have ever WRH or have never WRH. Therefore, the latent variable $Y_i^*$ was introduced, and the model expression is:

$$Y_i^* = \alpha_i X_i + \varepsilon_i \tag{1}$$

where $Y_i^*$ represents farmers' behavior to WRH, which is a continuous but unobservable latent variable; $X_i$ is an observable independent variable; $\alpha_i$ is parameter vector to be

estimated; $\varepsilon_i$ is a random disturbance term that obeys a normal distribution; and $i$ is the number of sample farmers ($i = 1, 2, \ldots, 570$).

The relationship between $Y_i$ and latent variable $Y_i^*$ can be expressed as:

$$Y_i^* = \begin{cases} 1, & if \ Y_i^* > 0 \\ 0, & if \ Y_i^* \leq 0 \end{cases} \quad (2)$$

where $Y_i$ represents farmers' behavior to WRH, which is 0,1 variable.

Given $X_i$, $Y_i$ can be expressed as:

$$P(Y_i = 1, \ X_i) = P(Y_i^* > 0, \ X_i \ ) = \Phi(\alpha_i X_i) = \Phi\left(\alpha_{i0} + \alpha_{if} X_{if} + \alpha_{ii} X_{ii} + \alpha_{ic} X_{ic} + \varepsilon_i\right) \quad (3)$$

where $\Phi$ represents the standard normal distribution function; $X_{if}$ is the variables for formal institutions; $X_{ii}$ is the variables for informal institutions; $X_{ic}$ represents control variables about head household characteristics, family characteristics, and homesteads characteristics; $\alpha_{i0}$ is a constant; $\alpha_{if}$, $\alpha_{ii}$ and $\alpha_{ic}$ are the regression coefficient for each variable, respectively; and the meaning for $Y_i^*$, $\varepsilon_i$ and $i$ are the same as those in Equation (1).

## 4. Model Results and Analysis

### 4.1. Descriptive Statistics

Figure 3 compares the formal and informal institutions of farmers with WRH and those without. As for the whole sample, the mean values of property rights cognition, trust in village cadres and trust in laws and policies are 2.87, 3.69, and 4.23, respectively, while the mean values of social network, reciprocal norm, trust in kin and trust in villagers are 3.79, 4.12, 4.51, and 4.32, respectively. In the study area, the levels of farmers' formal institutions are lower than that of informal institutions, among which, farmers' cognition of homestead property rights is the lowest, with the mean of the full sample being only 2.87. This illustrates that the rural areas in the study are typical "acquaintance societies" in China. As for the comparison results, the mean values of all dimensions of formal and informal institutions of farmers with WRH are higher than those without.
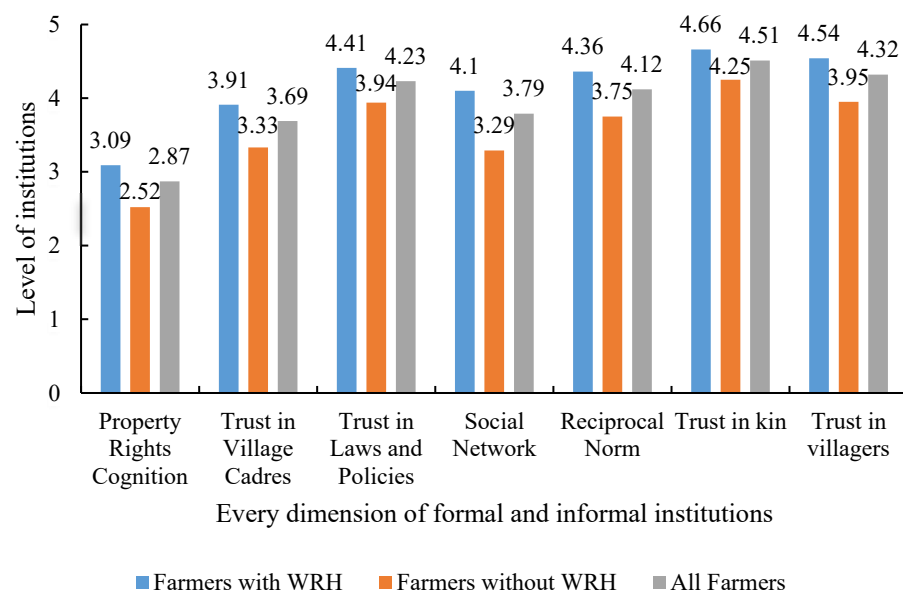


**Figure 3.** Descriptive statistics of the core explanatory variable of farmers who have WRH and farmers who have not.

Further statistics show that for the homestead ownership, use right, qualification right, disposal right, inheritance right and mortgage right, the proportion of sample farmers with correct cognition is 11.58%, 86.67%, 82.81%, 45.09%, 16.67%, and 42.63%, respectively.

Generally, surveyed farmers have strong desires to own land property rights, and their cognition levels of homestead property rights are low, which are more consistent with the study of Chen et al. [3]. Institutional economists see property rights protection as a crucial component of the institutional framework [54] since legally guaranteed property rights and correct cognition of property rights are vital to reducing transaction costs. Therefore, in the policy implications of WRH, one of the most important is to improve farmers' cognition of homestead property rights.

Figure 4 compares formal and informal institutions among three groups of farmers with short, medium, and long distances from the village to the county seat. As for formal institutions, with the increased distance from the village to the county seat, farmers' cognition of property rights, trust in village cadres, and trust in laws and policies continue to decrease. As for informal institutions, with the increased distance from the village to the county seat, farmers' social network, reciprocal norms, and trust in villagers continue to increase. In general, with the further distance from the village to the county seat, the level of farmers' formal institutions is lower and lower, while the level of informal institutions is higher and higher.
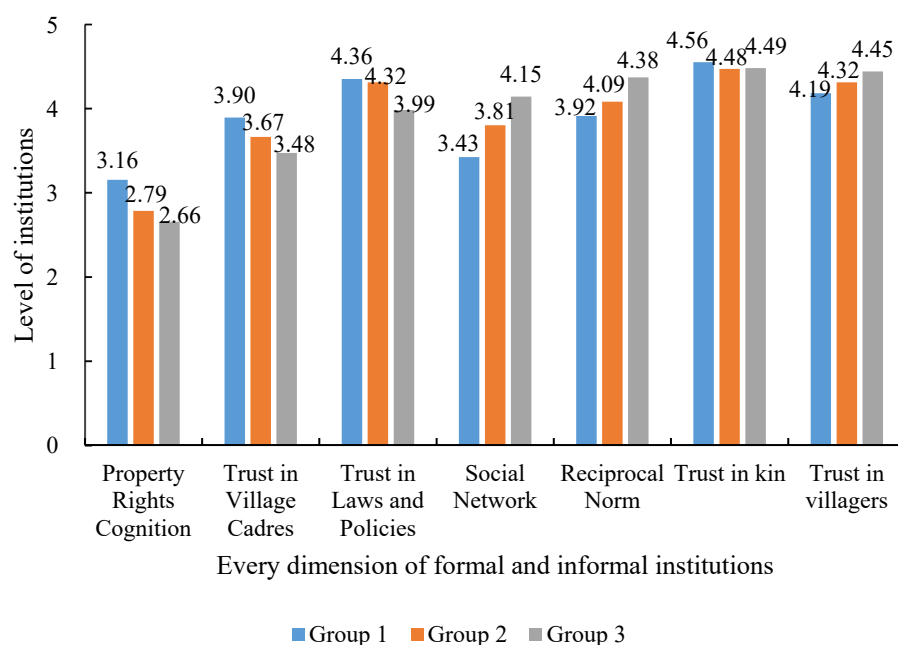


**Figure 4.** Descriptive statistics of focus variables in different village locations.

### 4.2. Empirical Analysis

Before model estimation, all independent variables were multicollinearity tested by the method of variance inflation factor, considering that collinearity may exist among variables. The results show that VIF values of all variables are less than the threshold value of 10 suggested by Kleinbaum [63], which illustrates the absence of multicollinearity.

Then, the binary probit model was used to estimate the effect of every dimension of formal and informal institutions on farmers' behavior to WRH by employing STATA16.0 software. The calculated results are shown in Table 3. To guarantee the robustness of the results, model (1) and model (2) reveal the impacts of formal and informal institutions on farmers' behavior to WRH respectively and model (3) introduces both formal and informal institutions into the model. The coefficients of each variable do not vary significantly across alternative regressions, implying the robustness of our results. In general, the test values of chi2 of model (1), model (2), and model (3) are all significant at the statistical level of 1%, which indicates that the overall fitting effect of each model is good. To further explore the impact of formal institutions, informal institutions and their interactions on farmers' behavior to WRH, the indicators of formal institutions and informal institutions were

calculated by factor analysis method and introduced into the model. The estimated results are shown in Table 4. The test values of chi2 of model (4) and model (5) are significant at the statistical level of 1%, demonstrating that each model's overall fitting effect is good.

**Table 3.** Results of the effect of formal institutions and informal institutions on farmers' behavior to WRH.

| Variables | Model (1) | | Model (2) | | Model (3) | |
|---|---|---|---|---|---|---|
| | dy/dx | S.E. | dy/dx | S.E. | dy/dx | S.E. |
| Cognition of homestead property rights | 0.051 ** | 0.023 | — | | 0.037 * | 0.021 |
| Trust in village cadre | 0.098 *** | 0.027 | — | | 0.086 *** | 0.025 |
| Trust in laws and policies | 0.029 | 0.027 | — | | 0.010 | 0.024 |
| Social network | — | | 0.083 *** | 0.022 | 0.072 *** | 0.021 |
| Reciprocal norm | — | | 0.073 ** | 0.032 | 0.100 *** | 0.031 |
| Trust in kin | — | | −0.023 | 0.038 | −0.049 | 0.037 |
| Trust in villagers | — | | 0.148 *** | 0.038 | 0.119 *** | 0.038 |
| Gender of household head | −0.122 | 0.089 | −0.082 | 0.085 | −0.074 | 0.080 |
| Age of household head | −0.000 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 |
| Education of household head | 0.020 *** | 0.006 | 0.018 *** | 0.006 | 0.017 *** | 0.005 |
| Household size | −0.046 *** | 0.014 | −0.056 *** | 0.013 | −0.050 *** | 0.012 |
| Per capita income | 0.015 | 0.016 | 0.014 | 0.016 | 0.008 | 0.014 |
| Proportion of nonagricultural income | 0.171 ** | 0.066 | 0.198 *** | 0.064 | 0.168 *** | 0.061 |
| Farmland area | −0.007 | 0.007 | −0.008 | 0.006 | −0.008 | 0.006 |
| Homestead area | −0.001 *** | 0.000 | −0.000 * | 0.000 | −0.000 * | 0.000 |
| Confirmation of homestead right | 0.250 ** | 0.099 | 0.218 ** | 0.100 | 0.179 * | 0.093 |
| Distance from homestead to town government | 0.013 *** | 0.004 | 0.013 *** | 0.004 | 0.011 *** | 0.004 |
| Pseudo R2 | 0.158 | | 0.240 | | 0.293 | |
| LR chi2 | 99.49 *** | | 138.53 *** | | 152.92 *** | |
| Log-likelihood | −318.650 | | −287.465 | | −267.248 | |
| Observations | 570 | | 570 | | 570 | |

Notes: *, **, *** indicate the level of significance of 10%, 5%, 1%, respectively.

**Table 4.** Results of the effect of formal institution, informal institution, and their interactive term on farmers' behavior to WRH.

| Variables | Model (4) | | Model (5) | |
|---|---|---|---|---|
| | dy/dx | S.E. | dy/dx | S.E. |
| Formal institution | 0.527 *** | 0.086 | 0.155 | 0.528 |
| Informal institution | 0.890 *** | 0.090 | 0.587 | 0.437 |
| Formal institution × informal institution | — | | 0.492 | 0.670 |
| Control variables | √ | | √ | |
| Pseudo R2 | 0.271 | | 0.273 | |
| LR chi2 | 125.80 *** | | 144.10 *** | |
| Log-likelihood | −275.606 | | −275.112 | |
| Observations | 570 | | 570 | |

Notes: *** indicates the level of significance of 1%; √ indicates that the corresponding variable has been introduced into the model.

### 4.2.1. Effect of Formal Institutions on Farmers' Behavior to WRH

In model (1) and model (3), the effect of farmers' cognition of homestead property rights was positive and significant, consistent with Hypothesis H1a and the view of Fan & Zhang [35]. The effect of farmers' trust in village cadres was positive and significant, consistent with Hypothesis H1b. As Sun & Zhao [17] argue, the improvement of trust levels can promote farmers' WRH. The marginal effect of farmers' trust in village cadres was greater than that of farmers' cognition of homestead property rights. The effect of farmers' trust in laws and policies on farmers' behavior to WRH was insignificant. In model (4), the

effect of formal institution on farmers' WRH was positive and significant, and the marginal effect is 0.527, which is consistent with Hypothesis H1. Generally, formal institutions positively impact farmers' behavior to WRH. In formal institutions, the cognition of property rights and the degree of trust in village cadres play essential roles in the decision-making of farmers' WRH.

### 4.2.2. Effect of Informal Institutions on Farmers' Behavior to WRH

In model (2) and model (3), the impacts of social capital, reciprocal norm, and trust in villagers were positive and significant, consistent with Hypothesis H2a, H2b, and Hypothesis H2d. The marginal effects are, in descending order, trust in villagers, social capital, and reciprocal norm, while the effect of trust in kin on farmers' behavior to WRH is insignificant. In model (4), the effect of informal institution was positive and significant, consistent with Hypothesis H2. The marginal effect of informal institution on farmers' behavior to WRH was 0.890, which was higher than that of formal institution. Generally, informal institution positively impacts farmers' behavior to WRH. In informal institutions, the social network, reciprocal norms, and trust in village cadres play essential roles in the decision-making of farmers' behavior to WRH.

Regarding control variables, the education of the household head and the proportion of non-agricultural income have positive and significant impacts on farmers' behavior to WRH, and household size has a negative and significant impact. The larger the homestead size, the lower the farmers' tendency to withdraw, and when the homestead is confirmed and the distance to town is long, farmers' tendency to WRH is strong.

### 4.2.3. Interactive Effect

The results of model (4) show formal and informal institutions' effect on farmers' behavior to WRH is significantly positive when all other conditions are certain. To determine whether there are any interaction effects between the impacts of formal institutions and informal institutions on farmers' WRH, the interactions between formal and informal institutions were introduced, as shown in model (5). The estimated result for the interaction term failed to pass the significance test, indicating that formal and informal institution do not have a joint impact in promoting farmers' behavior to WRH from the whole sample.

### *4.3. Heterogeneity Analysis*

The results of the previous section show that for the whole sample, both formal and informal institutions promote farmers' behavior to WRH, and the interaction effect of them is not significant. In order to further investigate whether there is heterogeneity of village location in the impacts of formal institution, informal institution and their interaction terms, the estimated results of the impacts of formal institution, informal institution and their interaction term on farmers' behavior to WRH under different groups are shown in Table 5. The test value of chi2 of each regression model is significant at the statistical level of 1%, indicating the overall fitting effects are good.

**Table 5.** Results of the effect of formal and informal institution on farmers' behavior to WRH under different groups.

| Variables | Group 1 | | Group 2 | | Group 3 | |
|---|---|---|---|---|---|---|
| | Model (6) dy/dx (S.E.) | Model (7) dy/dx (S.E.) | Model (8) dy/dx (S.E.) | Model (9) dy/dx (S.E.) | Model (10) dy/dx (S.E.) | Model (11) dy/dx (S.E.) |
| Formal institution | 0.983 *** | 0.494 | 0.300 ** | −1.073 ** | 0.508 *** | 3.518 *** |
| | (0.131) | (0.465) | (0.151) | (0.523) | (0.167) | (0.805) |
| Informal institution | 0.512 ** | 0.049 | 0.764 *** | −0.478 | 1.020 *** | 3.183 *** |
| | (0.211) | (0.493) | (0.126) | (0.431) | (0.146) | (0.536) |
| Formal institution × informal institution | — | 0.678 | — | 2.055 *** | — | −3.567 *** |
| | | (0.656) | | (0.711) | | (0.924) |
| Control variables | √ | √ | √ | √ | √ | √ |
| Pseudo R2 | 0.350 | 0.351 | 0.306 | 0.337 | 0.368 | 0.429 |
| LR chi2 | 84.23 *** | 84.90 *** | 63.44 *** | 73.58 *** | 42.47 *** | 65.19 *** |
| Log-likelihood | −83.726 | −83.525 | −87.638 | −83.688 | −73.325 | −66.165 |
| Observations | 186 | 186 | 209 | 209 | 175 | 175 |

Notes: **, *** indicate the level of significance of 5%, 1%, respectively; √ indicates that the corresponding variable has been introduced into the model.

For group 1, the positive effects of formal and informal institutions on farmers' behavior to WRH in model (6) were significant and positive, and the marginal effects were 0.983 and 0.521, respectively. In Model (7), the effect of the interaction between formal and informal institutions does not pass the significance test. For farmers whose villages are close to the county seat, the levels of formal institutions are relatively high and informal institutions are relatively low. In this case, both formal and informal institutions promote farmers' WRH, and formal institutions have a more significant effect. However, informal institutions cannot jointly affect farmers' behavior to WRH with informal institutions by shaping or offsetting it.

For group 2, the positive effects of formal and informal institutions on farmers' behavior to WRH were significant in model (8), and the marginal effects were 0.300 and 0.764, respectively. In model (9), the positive effect of the interaction term of formal and informal institutions passed the significance test. For farmers whose villages are of a medium distance to the county seat, the levels of formal and informal institutions are all medium. In this case, formal and informal institutions promote farmers' behavior to WRH, and informal institutions have a more significant effect. Informal institutions can effectively offset the shortcomings of formal institutions, they play complementary roles in the effect on farmers' WRH.

For group 3, the positive effects of formal and informal institutions on farmers' behavior to WRH were significant in model (10), and the marginal effects were 0.508 and 1.020, respectively. In model (11), the negative effect of the interaction of formal and informal institutions passed the significance test. For farmers whose villages are far away from the county seat, the levels of formal institutions are lowest, and informal institutions are highest. Formal and informal institutions promote the occurrence of farmers' WRH, and informal institutions have a more significant effect. However, formal and informal institutions have a joint negative effect on these farmers' behavior to WRH. When formal institutions are relatively lacking and their role is weak, informal institutions can replace them to a certain extent. They play substitutive roles in the effect on farmers' WRH.

*4.4. Endogeneity Test*

It is conceivable that there could be unobservable characteristics and measurement errors that cause formal and informal institutions to be associated with random disturbance terms, and formal institutions/informal institutions and farmers' behaviors to WRH might interact as both cause and effect. Therefore, we replicated our analysis by using the instru-

mental variable to solve the endogenous problems that may exist in the variable of formal institutions and informal institutions. One of the important ways to find instrumental variables is to refer to the aggregated data at the regional level [64]. Therefore, we chose "the formal institutional level of other farmers in the village" and "the informal institutional level of other farmers in the village" as the instrumental variables of formal and informal institutions, respectively. We used the ivprobit model to analyze based on the Newey two-step method. The endogeneity test results of farmers of the whole sample, group 1, group 2 and group 3 are shown in Table 6. The F-statistics in the first stage were all higher than the critical value of 10 for each model, suggesting no problem of weak instrumental variables. The Wald test of exogeneity (chi2) in the two-step method was significant at the 1% level for each model, which meant that formal and informal institutions are assumed to be the endogenous variables and it is vital to use instrumental variables to control endogeneity problems. Table 6 shows that the coefficient direction and significance of formal institutions, informal institutions and their interaction terms are more consistent with the above regression results based on the probit model in each sample group, indicating that the results in the above study are still robust after solving the endogenous problem. Also, the results in Tables 4 and 5 above show robustness to a certain extent.

**Table 6.** Results of the endogenous test (ivprobit model).

| | Variables | Coef. | S.E. | Coef. | S.E. | Coef. | S.E. |
|---|---|---|---|---|---|---|---|
| Total samples | Formal institution | 6.284 *** | 0.764 | √ | | √ | |
| | Informal institution | √ | | 9.083 *** | 0.866 | √ | |
| | Formal institution × informal institution | — | | — | | 4832.019 | 49,149.99 |
| | Control variables | √ | | √ | | √ | |
| | F of the first-stage | 28.65 *** | | 31.51 *** | | 1120.58 *** | |
| | Wald test of exogeneity(chi2) | 64.37 *** | | 92.89 *** | | 108.76 *** | |
| | Prob > $\chi^2$ | 0.000 | | 0.000 | | 0.000 | |
| | Observations | 570 | | 570 | | 570 | |
| Group 1 | Formal institution | 12.650 *** | 2.310 | √ | | √ | |
| | Informal institution | √ | | 6.661 *** | 1.887 | √ | |
| | Formal institution × informal institution | — | | — | | −153.933 | 98.285 |
| | Control variables | √ | | √ | | √ | |
| | F of the first-stage | 10.96 *** | | 11.29 *** | | 333.46 *** | |
| | Wald test of exogeneity(chi2) | 28.90 *** | | 9.54 *** | | 31.30 *** | |
| | Prob > $\chi^2$ | 0.000 | | 0.002 | | 0.000 | |
| | Observations | 186 | | 186 | | 186 | |
| Group 2 | Formal institution | 7.125 *** | 1.694 | √ | | √ | |
| | Informal institution | √ | | 15.260 *** | 2.674 | √ | |
| | Formal institution × informal institution | — | | — | | 165.908 ** | 69.753 |
| | Control variables | √ | | √ | | √ | |
| | F of the first-stage | 11.52 *** | | 10.72 *** | | 470.32 *** | |
| | Wald test of exogeneity(chi2) | 22.88 *** | | 49.03 *** | | 42.13 *** | |
| | Prob > $\chi^2$ | 0.000 | | 0.000 | | 0.000 | |
| | Observations | 209 | | 209 | | 209 | |
| Group 3 | Formal institution | 6.668 *** | 1.439 | √ | | √ | |
| | Informal institution | √ | | 9.276 *** | 1.487 | √ | |
| | Formal institution × informal institution | — | | — | | −168.571 ** | 80.646 |
| | Control variables | √ | | √ | | √ | |
| | F of the first-stage | 10.50 *** | | 10.78 *** | | 499.87 *** | |
| | Wald test of exogeneity(chi2) | 21.40 *** | | 23.53 *** | | 26.00 *** | |
| | Prob > $\chi^2$ | 0.000 | | 0.000 | | 0.000 | |
| | Observations | 175 | | 175 | | 175 | |

Notes: **, *** indicate the level of significance of 5%, 1%, respectively; √ indicates that the corresponding variable has been introduced into the model.

## 5. Discussion

Many scholars have studied the driving factors of farmers' behavior to WRH [4,6,18,24], but only a few have paid attention to institutional factors. For example, Fan & Zhang [35] analyzed the effect of property rights cognition on farmers' WRH, and Sun & Zhao [17]

explored how social capital affects farmers' participation in WRH. Unlike these studies, this study is the first one that systematically analyzed the effects of formal and informal institutions on farmers' behavior to WRH from a multi-dimensional perspective, and it also investigated the interaction effects of formal and informal institutions. Referring to the relevant study of the business community [39,40], this study also explored the effect of formal and informal institutions on farmers' behavior to WRH in different village locations. This paper mainly has the following contribution points that can fill in the gaps of previous studies:

First, the study results demonstrate that the cognition of homestead property rights promote farmers' behavior to WRH, which is more consistent with the view of Fan & Zhang [35]. The study results of Sun & Zhao [17] show that the improvement of trust levels, including institutional trust and interpersonal trust, can promote the occurrence of homestead withdrawal. The more detailed results of this study show that the trust of village cadres and villagers have significant positive effects on farmers' behavior to WRH, while the trust in laws and kin have no significant impact. The possible reason is that farmers' trust in the laws and kin is high, and there is little difference between different farmers, and these two factors have not formed a significant impact on farmers' WRH. Social networks promoted farmers' behavior to WRH in study area, which is consistent with the conclusions of Sun & Zhao [52]. The results of this study also showed that the high level of reciprocal specification can restrict farmers' behavior and promote farmers to make decision of homestead withdrawal. This study analyzed the effect of formal institutions and informal institutions on farmers' behavior to WRH from multiple dimensions, which complements the existing study.

Second, in the total sample, the dimensions of formal institutions and informal institutions after factor analysis significantly promote farmers' behavior to WRH, and the marginal effect of informal institution is large. For rural areas in developing countries, informal institutions play a greater role than formal institutions [48], and informal institutions play an irreplaceable role in regulating individual behavior [33]. In fact, China's policy of WRH is a new policy implemented by the government to improve land use efficiency from the macro level [22]. In face of the new policy, farmers will worry and avoid unknown risks psychologically. Therefore, this policy is inseparable from the guidance and promotion of the government. However, in the "acquaintance society" of rural China [33], relying only on the guidance of the government, that is, the formal institution, this policy is often difficult to achieve good results. The decision-making and behavior of farmers depend more on the power of informal institutions they usually rely on. For example, social network and social trust are the most common approaches for farmers to accumulating social capital to buffer natural or social risks [33], which can help farmers alleviate their concerns and doubts in the decision-making process of WRH. Reciprocal specification will restrict their behavior, and guide them to do what they should do, i.e., WRH. However, in the total sample, there is no interaction effect between formal institutions and informal institutions on farmers' WRH.

Third, this study reveals that there is a certain heterogeneity of village location in the effect of formal institution and informal institution on farmers' behavior to WRH. For farmers in different village locations, the effects of formal and informal institution on farmers' WRH are different, and the interaction effects of formal and informal institutions are also different. There is a complementary relationship between formal and informal institutions in farmer' WRH for villages of a medium distance to the county seat, and a substitution relationship for villages far away from the county seat. Whether formal and informal institutions complement or replace each other depends on the location of the village and the level of the two. When the level of informal institutions is low, there is no interaction between formal and informal institutions. Only when informal institutions reach a certain level can it complement the formal institution. When formal institutions are low and informal institutions are high, informal institutions can replace formal institutions and inhibit the function of formal institutions.

As is the case with any research study, the present study has some limitations to be addressed in further studies. On the one hand, formal and informal institutions contain many factors, and future research can verify and enrich the research conclusion with more accurate measures of both. In addition, this study focused on the WRH in the Jinzhai region of China. Future research could include more pilot areas of WRH such as Deqing in Zhejiang, Luxian in Sichuan, and Pingluo in Ningxia, or non-pilot areas to deeply prove whether the findings of this study have broader applicability.

## 6. Conclusions

Based on field survey data from 570 farmers in Jinzhai County, Anhui Province, this study used a binary probit model to analyze the impacts of formal institutions, informal institutions, their interactive terms on farmers' behavior to WRH and the difference in these impacts in different village locations. The main results can be summarized as follows: (1) In formal institutions, farmers' cognition of homestead property rights and trust in village cadres significantly promote farmers' behavior to WRH. In informal institutions, social network, reciprocal norms, and farmers' trust in villagers significantly promote farmers' behavior to WRH. (2) The effect of formal and informal institutions on farmers' behavior to WRH are significantly positive, and the effect of informal institutions is greater. The effect of the interaction term between formal and informal institutions on farmers' behavior to WRH is insignificant, indicating that formal and informal institutions do not have a joint impact in promoting farmers' WRH from the whole sample. (3) The effect of formal and informal institutions on farmers' WRH have the heterogeneity of village location: for villages close to the county seat, formal and informal institutions do not have a joint impact on promoting these farmers' behavior to WRH. For villages of a medium distance to the county seat, formal and informal institutions have a joint positive impact on promoting these farmers' behavior to WRH, that is, formal and informal institutions play a complementary role. For villages far away from the county seat, formal and informal institution have a joint negative impact on these farmers' behavior to WRH, that is, informal and formal institutions play alternative roles.

The results reveal how formal and informal institutions in rural China interact and influence farmers' behavior to WRH, providing essential policy relevance in the new round of the implementation of WRH policy and during rural revitalization in China. The main policy implications are as follows. First, increasing farmers' cognition of homestead property rights and trust in formal institutions is essential. A clear understanding of property rights is conducive to clarifying the scope and boundary of their ownership. However, at present, farmers generally have a vague or even wrong understanding of homestead property rights, which leads to a strong sense of privatization of rural homesteads and hinders the process of farmers' participation in WRH. The local government should increase the publicity of corresponding legal information to improve farmers' cognition of the rights and interests of the rural homestead and to improve farmers' trust in grass-roots governments (such as village cadres) and relevant laws and regulations, making formal institutions play adequate roles in WRH policy. Second, it is necessary to cultivate social capital and inspire the vigor of informal institutions in rural areas. The emergence of informal institutions is based on social identity and shared cognition, which is the most important way to regulate human society, especially in rural areas. When formal institutions are flawed and difficult to function, informal institutions complement them to some extent. However, when informal institutions are too powerful, they are a threat to the formal institutions. Therefore, it is vital to control the informal institutions within a reasonable range and actively guide them to play their role effectively, avoiding the conflicts between informal and formal institutions. Third, there are differences between the level of formal and informal institutions in villages in different locations, and the impacts of formal and informal institutions on farmers' behavior to WRH also have the heterogeneity of village location. Therefore, in the new round of the reform of homestead institutions, we must consider the location differences in villages so that the institutions can play effective roles

in different villages. For villages close to the county seat, the guiding role of the formal institutions is crucial, while, for more remote villages, the role of informal institutions is more important. However, special attention should be paid to guiding informal institutions to avoid them becoming inconsistent with the policy.

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