How Does Farmers' Dependence on Farmland Function Impact Land Transfer? Analysis from the Perspective of Intergenerational Differences

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Abstract. Based on the perspective of intergenerational differences, this article uses the Oprobit model to explore the degree of farmers' dependence on land function in traditional agricultural areas of Sichuan, and analyzes the impact of farmers' dependence on land function in different generations on their land transfer willingness. The results show that: (1) Farmers depend more on land production function and security function, but less on employment function and emotional dependence. (2) Production function dependence, employment function dependence and security function dependence have significant inhibitory effects on farmers' willingness to transfer out of land; Household income and the active degree of land transfer market within the village have a significant promoting effect on farmers' land transfer willingness. (3) According to the group regression of different generations of farmers, employment function dependence has a significant negative effect on the willingness of all farmers to transfer out of their land; The active degree of land transfer market has a significant positive effect on the willingness of all farmers to transfer out of their land; Security function dependence and family income have significant negative effects on the land transfer willingness of middle-aged and older generation of farmers; Therefore, the government should further improve the market mechanism of rural land transfer to increase farmers' trust. On the premise of respecting the will of farmers, targeted policies should be formulated according to the characteristics of different generations of farmers.

Keywords: Intergenerational differences · land transfer · Land function dependence · Oprobit model

1 Introduction

The reform of the "three rights separation" system of agricultural land is the core of the reform of China's current agricultural land property rights system [1, 2]. It is an important direction of China's future agricultural land policy to realize moderate-scale agricultural management through farmland transfer and resolve land fragmentation and decentralized management pattern [3]. By the end of 2020, 532 million mu of family-contracted

farmland had been transferred in China, accounting for about 34.1% of the total. Yet, despite an increase in the number of farmland transfer operations, China's farmland transfer is still plagued by issues such as an inadequate scale of transfer, a slowdown in the growth rate of transfer, a low incidence of transfer, and significant regional differences [4, 5]. Smallholder family management is the main form of agricultural management in China [6]. Their decision on land transfer directly affects the degree of agricultural land transfer in China. The current predicament of rural land transfer in China is closely related to farmers' functional dependence on land. Farmers make sensible judgments regarding the transfer of their land after carefully evaluating the mutual adaptation between their family conditions and land functions [7]. To speed up land transfer, increase land use efficiency, and realize large-scale agricultural operations, it is crucial to investigate the impact of land functional dependence on farmers' willingness to transfer their land as well as to identify the causes and roadblocks in that process.

Land has historically served both economic and social functions, such as providing farmers with food and income [8]. In contrast to the traditional subsistence of farming, the purpose of employing agricultural resources in farming households has changed significantly due to the economic transformation of urban and rural regions as well as the acceleration of urbanization and industrialization [9, 10]. What level of dependence do farmers have on land at this stage? What is the relationship between farmers' land function dependence and land transfer intention? Moreover, given that the degree of difference and variability among farmers within villages is growing [11] farmers in various generations have varying levels of dependency on land functions. What are the commonalities and differences in farmers' land transfer decisions between different generations?

To answer these questions, it is important to analyze the different preferences of farmers for land functions in the light of intergenerational heterogeneity, and the impact of farmers' dependence on land on their willingness to transfer land. There have been a lot of research on the influencing factors of land transfer. Individual characteristics [12, 13], family characteristics [14, 15] and policies [5, 16] will significantly affect farmers' land transfer. These studies pay more attention to the relationship between land circulation and farmers' interests and land policies, but ignore the dependence of people on land function in the man-land relationships. Grubbström & Eriksson [17] revealed the relationship between farmers' emotional bond to land and land transfer. Liu [18] explored the relationship between farmers' land attachment, intergenerational differences and land transfer. However, they only use "yes" or "no" to measure farmers' willingness to transfer land. Such a one-size-fits-all approach is difficult to fully reveal the nature of the problem.

This study investigates the meaning and categorization of farmers' dependency on their land from a generational viewpoint using survey data from traditional agricultural districts in Sichuan Province. In the context of intergenerational heterogeneity, the difference in farmers' dependence on land function and its impact on farmers' willingness to transfer land were examined. It also demonstrates the varied mechanisms and theoretical implications of the family tactics of various farming generations and offers specific recommendations for enhancing farmer welfare and promoting land transfer.

2   Theoretical Framework

2.1   The Influence Mechanism of Land Function Dependence on Farmers' Land Transfer Willingness

Following the assumptions of "rational man" and "economic man", farmers' land transfer decision is a rational consideration based on a certain realistic basis, which is the most beneficial rational choice for families between retaining and transferring farmland. Agricultural land is the most important means of production that farmers depend on for survival [19]. It has multiple functions. The dependence of farmers on land function studied in this article mainly includes production function dependence, employment function dependence, security function dependence and emotional dependence.

2.2   Intergenerational Difference

Groups of people who experience the same main social events and were born within the same generation are referred to as "generations" or "generation cohorts" [20, 21]. Individuals in the same generation group have stability in value judgment, attitude and behavior, while individuals in different generation groups have differences in values, preferences and other aspects [22–24]. This provides a theoretical basis for exploring the decision of farmland transfer of farmers in different generations. Scholars decompose the influence of intergenerational differences on values and behavior patterns and conclude that the actual differences between different generation groups are the result of the combined effect of time effect, generation effect and age effect on behalf of intergenerational differences [13, 21]. As the time effect refers to the mixed influence of the environment on farmers' values, behaviors and attitudes, which mainly reflects the "mutualization" of different generation groups in society, only the latter two effects are considered in this paper.

The generation effect refers to the difference of social environment changes caused by major historical events in social development on groups of the same age [25, 26]. For instance, the new generation of farmers in China grew up at a time of significant historical events, such as reform opening up, and the establishment of a market economy, which caused them to develop radically different behaviors and personality traits from the older farmers [21]. Age effect, however, has nothing to do with individual experiences, but simply refers to the influence of age difference on characteristics such as maturity in the process of growth. The elder generation of farmers values and relies on the cultivated land considerably more than the younger generation of farmers since they are older and nearing the end of their life cycle [27].

2.3   Intergenerational Differences in the Impact of Land Function Dependence on Farmers' Land Transfer Decisions

This paper takes 60 years old and 45 years old as the age boundary. It divides the inter-generation differences of farmers into three types, namely, the new generation, the middle-aged generation and the old generation, to explore the heterogeneity of land transfer intention of farmers between different generations.

There are generational disparities in the farmer groups' intentions regarding land transfer because of the various comparative advantages of each group's production and level of reliance on the function of the land. The older generation of farmers has more experience in planting land and their survival and employment are more dependent on the land. Having experienced major social changes, they have a stronger sense of property and are reluctant to give up or transfer contracted land easily. However, the labor and employment ability of the old generation of farmers is limited, so transferring the land can relieve the pressure on the elderly farmers and obtain a stable land rent income. Therefore, the degree of influence of land function dependence on the land transfer decision of the older generation of farmers is uncertain and needs further verification. Middle-aged farmers have a strong sense of identity to industrial civilization, but also have a strong local complex. They tend to be flexible in their employment options, such as combining farming with migrant work. They may hold onto some of their lands as a fallback if their jobs fail. For the new generation of farmers, they are reluctant to live in the village when they do not have enough land scale or cannot expand the operation scale by other means to obtain scale benefits [28]. On the contrary, they have more opportunities and the ability to seek jobs in the city. In addition, non-agricultural income and employment opportunities are encouraging them to obtain more urban resources, which further drives the new generation of farmers to actively leave the countryside [21]. Therefore, although the new generation of farmers is closely related to the village, they are qualified to obtain rural collective land. However, its interests have long been separated from the village geographically, and the allocated farmland is generally transferred to relatives and neighbors or left idle.

In conclusion, there are considerable differences in the degree of farmers' dependence on the land throughout different generations, which is directly related to their decisions regarding land transfer. Studying the effect of land functional dependency on multiple generations of farmers' land transfer decisions is therefore extremely important from a practical standpoint.

3 Materials and Methods

3.1 Study Area

Zigong City, which spans an area of 4381 square kilometers, is situated in the southern Sichuan Basin. Low mountains and hills make up the majority of the landform types. It is a typical agricultural production region, with rice, corn, sorghum, potatoes, and other crops as its principal agricultural products. In 2021, the per capita disposable income of rural residents is 20,700 yuan, which is an economically underdeveloped area. According to the results of China's seventh population census, 27.34% of Zigong's population is over 60 years old, indicating a serious aging population structure.

There is just 1.02 mu of arable land per person in Zigong. Small-scale farmers, particularly the elderly, make up the majority of land management. In addition, we found that the transfer of cultivated land in the study area is common, but the level is low. Although a huge number of households participate in the transfer of agricultural land, the majority of the farmers transfer small parcels of land that are difficult to cultivate. To sum up, all conditions of Zigong City are in line with the research purpose of this paper.

3.2 Data Sources

The data in this article are derived from a survey conducted in Zigong City, Sichuan Province from February to June 2022. According to the level of economic development, we randomly selected towns of high, middle and low levels as sample areas. Three villages were randomly selected in each town, and 40 households were investigated in each village. The surveyors distributed questionnaires to the sampled households and instructed them to complete them. A total of 360 questionnaires were sent out, and 343 valid questionnaires were collected, with an effective rate of 95.3%.

3.3 The Oprobit Model

The dependent variable "farmers' willingness to transfer out of farmland" is a five-level Likert scale, which is an ordered discrete data, usually using an ordered logit model and an ordered probit model. However, the assumption of ordered logit is subject to the assumption of proportional dominance, i.e. the coefficients of the independent variables should be identical from one ordinal category to another. In addition, the difference between the results estimates of the Logit model and the Probit model was not significant [29]. The parallelism test for each model was performed by oparallel in stata and the p-value < 0.05, indicating that the model rejected the original hypothesis and the model did not satisfy the parallelism test. Therefore the data in this paper are not suitable for the ologit model and are more suitable for the ordered probit model (oprobit). The formula is as follows:

$$y^* = \beta x + \varepsilon \tag{1}$$

where, $y*$ is not observable and its selection rule is

$$y = \begin{cases} 0, \ y^* \leq r_0 \\ 1, \ r_0 \leq y^* \\ 2, \ r_1 \leq y^* \leq r_2 \\ 3, \ r_3 \leq y^* \end{cases} \tag{2}$$

where: $r_0 \leq r_1 \leq r_2$ are the parameters to be estimated, called "cutoffpoints", which in the estimation results are CUT1 and CUT2 respectively; y denotes the willingness of the farmers to transfer their farmland; x denotes the independent variable that affects the willingness to roll-out; β denotes the coefficient of the independent variable, and ε is the random error term.

3.4 Variable Definition

Dependent Variable
Existing studies usually use binary variables 0 and 1 to assign values to the intention of farmland transfer. However, in the preliminary survey, we found that the incidence of farmland transfer in the study area is high and the average household transfer scale is small. If only "yes" or "no" is used to measure farmers' willingness to transfer out, it

will be difficult to clarify the nature of the problem. Based on this, this paper divides the proportion of the area that farmers are willing to transfer out into five levels according to the intensity of their willingness to transfer farmland, which is: unwilling or very little (0%-20%) = 1; A small percentage (20–40%) = 2; Half (40%–60%) = 3; Most (60%-80%) = 4; The vast majority (80%–100%) = 5.

Core independent Variable

Generational differences. Generational differences. This article divides different generations according to the age of householders. Considering the lag of the "intergenerational effect" and the aging degree of agricultural labor force, we refer to the recognized standards and take the age of farmers at 45 and 60 years old as the dividing point. If the head of the household is less than 45 years old, it belongs to the new generation of farmers, and the Intergen value is 1; If the household head is between 45 and 60 years old, it is the middle-aged generation of farmers, and the Intergen value is 2; If the household head is older than or equal to 60 years old, it belongs to the older generation of farmers, and value of Intergen is 3.

Farmers' land function dependence. Farmers' land functional dependence can be divided into objective functional dependence and subjective emotional dependence on land, which can be specifically subdivided into production function dependence, employment function dependence, security function dependence and land emotional dependence. Set the item "Farming can obtain affordable and healthy agricultural products" to judge the degree of farmers' dependence on the production function; set the item "My main job is farming" to judge the degree of farmers' dependence on the employment function; set the item "Agricultural land can be used as the living security for me when I am unemployed or aged "to judge the degree of farmers' dependence on the security function; set the item "farming is part of my life and has become a hobby and habit" to judge the degree of farmers' emotional dependence [30].

Control Variables

The control variables in this paper include four dimensions: (1) household head characteristic variables. The gender, education level and risk aversion attitude of household head affect the decision-making of farmland transfer behavior. Generally highly educated and male heads of households are seen as having better access to off-farm employment and are therefore more likely to have a stronger desire to transfer out of land. (2) Family characteristic variables. The size of household population determines the land area contracted by farmers. The increase in household population will increase the supply of agricultural labor force and the demand for rations, thus affecting the willingness to transfer land. In addition, annual household income is also an important index that may affect farmers' land transfer willingness. (3) Characteristic variables of cultivated land resources. Fragmented land is not conducive to the use of agricultural technology, and depends on human input, so it is more likely to occur transfer. (4) village characteristic variables. The overall situation of a village reflects the resource status, economic level and information source of farmers to a certain extent, so village-scale factors will have an impact on farmers' land-use behavior decisions. The situation of land transfer within the village, the level of transfer price, the advantages and disadvantages of the geographical environment, the distribution of cultivated land resources and traffic conditions all affect

Table 1. Variable definition and descriptive statistics.

Variable	Min	Max	Mean	S.D.
Willingness	1	5	3.09	1.12
Act	1	5	2.79	1.47
Age	27	78	53.1	13.7
Generation	1	3	2.1	0.81
Gender	1	2	1.31	0.46
Education	1	5	2.37	1.11
Risk aversion attitude	1	5	2.79	0.98
Household income	0.3	20.3	10.7	3.8
Household Size	1	10	4.93	1.74
Land resource endowment	0.6	9.3	3.95	1.22
Active degree of land transfer market	1	3	2.4	0.72
Traffic conditions	2	3	2.69	0.46
Dispersion degree of cultivated land	1	3	1.51	0.52
Production function dependence*	1	5	4.04	0.88
Employment function dependence	1	4	2.26	1.33
Security function dependence*	1	5	3.31	1.34
Emotional dependence*	1	5	2.64	1.49

Note: The items were designed in the form of Likert five-level scale from "completely disagree to strongly agree", with values of 1 to 5 respectively

the decision-making behavior of farmers on the transfer of cultivated land. All variables are defined as shown in Table 1.

4   Results and Analysis

4.1   Descriptive Statistical Analysis

Table 1 shows the definitions of variables and descriptive statistics. Farmers' intentions regarding the transfer out of land are greater than their actual behaviors, showing that their desires have not been fully met. The sample farmers' average age is roughly 53 years old, and their average level of education is poor. This is consistent with the fact that China's rural labor force is elderly and has poor cultural quality [31]. In terms of family management characteristics, the average family population is 5.5, the average number of the labor force is about 3.3, and the average number of the agricultural labor force is 1.3. This is generally consistent with the outflow of the rural labor force in Zigong City, indicating that the sample is representative to a certain extent. In terms of land function dependence, farmers' dependence on land production function is the strongest, with an average value of 4.04, followed by security function dependence, with an average

Table 2. The willingness of different generations of farmers to transfer out of the land.

Generation	1	2	3	4	5	Total
New generation	1.70%	2.30%	7.00%	13.40%	4.40%	28.90%
Middle-aged generation	2.30%	6.70%	9.90%	12.20%	2.60%	33.80%
Older generation	5.20%	13.10%	10.20%	7.60%	1.20%	37.30%
Total	9.30%	22.20%	27.10%	33.20%	8.20%	100.00%

value of 3.31. The average performance of farmers' dependence on agricultural land employment function and emotional dependence is not strong.

Table 2 shows the willingness of different generations of farmers to transfer out of the land. It can be found that with the growth of the generation of farmers, the proportion of farmers with a high willingness to transfer out of land gradually decreased, while the proportion of low willingness increased.

4.2 Analysis on Influencing Factors of Farmers' Willingness to Transfer Farmland

The multicollinearity test was conducted on all independent variables. VIF values of independent variables were all less than 5, indicating that there was no serious multicollinearity relationship between them [32]. The regression results of the benchmark model are shown in Table 3. After the land function dependent variables were introduced into model II, the overall explanatory degree was improved and the goodness of fit was better.

As shown in Table 3, employment function dependence has the strongest effect on farmers' land transfer willingness, followed by security function dependence and production function dependence. However, the impact of land emotional dependence on farmers' land transfer intention fails to pass the significance test. Table 4 shows the marginal effects of the key independent variables. When the degree of employment function dependence, production function dependence and security function dependence increases by one unit, the probability of farmers choosing not to transfer out their land increases by 4.15%, 3.54% and 3.4% respectively; while the probability of farmers choosing to transfer out most of their land decreases by 5.41%, 4.62% and 2.38% respectively (Table 4). This indicates that when making land transfer decision, farmers will make a comprehensive decision according to their functional dependence on land.

Household income also has a significant impact on farmers' land transfer. With the increase of annual household income, farmers' willingness to transfer land is gradually enhanced. Because most farmers' household income comes mainly from non-farm employment. They are more inclined to invest productive resources in the non-farm sector, so may be more willing to transfer out of the land. In addition, the level of land transfer within the village will also have a significant impact on farmers' land transfer intention. The more land transferred within the village, the stronger the farmer's willingness to transfer out of the land will be. As shown in Table 4, farmers' willingness to transfer most of their land out increases by about 6% with each unit increase in the local

land transfer level. The more frequent the land transfer within the village, the higher the trust and acceptance degree of farmers on land transfer, so farmers are more willing to transfer their land out.

Table 3. Regression results of the benchmark model.

Variable	Model I	Model II
Production function dependence (x1)	-	−0.196* (0.115)
Employment function dependence (x2)	-	−0.342*** (0.066)
Guarantee function dependence (x3)	-	−0.292*** (0.103)
Emotional dependence (x4)	-	−0.114 (0.082)
Gender (k1)	0.356*** (0.126)	0.207 (0.128)
Education (k2)	0.287*** (0.059)	−0.240*** (0.084)
Risk aversion attitude (k3)	−0.029 (0.070)	0.160** (0.072)
Household income (k5)	0.100*** (0.022)	0.076*** (0.023)
Household Size (k6)	−0.059 (0.048)	−0.067 (0.048)
Land resource endowment (k7)	−0.022 (0.060)	0.024 (0.060)
Land transfer scale in the village (k8)	0.373*** (0.080)	0.376*** (0.087)
Traffic conditions (k9)	0.010 (0.130)	0.105 (0.133)
Dispersion degree of cultivated land (k10)	−0.109 (0.120)	−0.011 (0.118)
Prob > chi2	0.0000	0.0000
Pseudo R2	0.0827	0.2008
Wald chi2	76.45	162.17

Note: Robustness standard error is reported in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Marginal effects of major independent variables.

Willingness	dy/dx				
	Production function	Employment function	Guarantee function	Household income	Active degree
Y = 1	2.38%* (0.014)	4.15%*** (0.009)	3.54%*** (0.012)	−0.92%*** (0.003)	−4.57% (0.011)
Y = 2	2.30%* (0.014)	4.01%*** (0.008)	3.42%*** (0.012)	−0.89%*** (0.003)	−4.41%*** (0.011)
Y = 3	0.69% (0.004)	1.21%*** (0.004)	1.03%** (0.004)	−0.27%*** (0.001)	−1.33%*** (0.004)
Y = 4	−3.10%* (0.018)	−5.41%*** (0.011)	−4.62%*** (0.016)	1.20%*** (0.004)	5.95%*** (0.015)
Y = 5	−2.27%* (0.014)	−3.96%*** (0.009)	−3.38%*** (0.012)	0.88%*** (0.003)	4.36%*** (0.011)

Note: Robustness standard error is reported in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3 The Effect of Land Function Dependence on the Willingness to Transfer Out the Land Among Different Generations of Farmers

Farmers of different generations have significant differences in their willingness to transfer out land and their functional dependence on land. To further explore the intergenerational heterogeneity of the effect of land function dependence on farmers' land transfer intention, this paper conducted grouping regression for Model II. Based on the generation of farmers, and obtained the new generation regression model III, the Mesozoic regression model IV and the old generation regression model V. Model III, Model IV, Model V, and the marginal contributions of the main variables in each model are shown in Tables 5 and 6, respectively.

New generation of farmers
Production function dependence and employment function dependence have significant inhibitory effects on the land transfer intention of the new generation of farmers. For each unit increase of farmers' dependence on land production function, the probability of farmers choosing to transfer half of their land will increase by 4.4%, while the probability of farmers choosing to transfer most or most of their land will decrease by 3.9% and 6.1% respectively. And the probability that the proportion of land area willing to transfer out is less than 20% will increase by 3.14%. But the effect of functional dependence on production on the willingness to transfer only a small part of the land is not significant. With the increase of one unit of employment function dependence, the probability of the new generation of farmers choosing to transfer most or most of their land decreases by 5.8% and 10.1%. This indicates that the employment function dependence of the new generation of farmers on land will inhibit their intention to transfer most of their land, while the security function dependence and land emotional dependence have no

significant effect on the intention of the new generation of farmers to transfer most of their land.

Middle-aged generation of farmers
Land emotional dependence, land security function dependence and employment function dependence have significant negative effects on farmers' land transfer intention in the middle-aged generation of farmers. The willingness to transfer most of the land decrease by 7.65% and the probability to transfer most of the land decrease by 4.86% for each unit increase in the emotional dependence on land of Mesozoic farmers. The probability of farmers' willingness to transfer most of their land will decrease by 5.47% and the probability of farmers' willingness to transfer most of their land will decrease by 3.47% with the increase of one unit of their dependence on land security function. The probability of farmers transferring most of their land will decrease by 4.87% and the probability of farmers willing to transfer most of their land will decrease by 3.09% when their dependence on land employment function increases by one unit.

Older generation of farmers
The dependence of the old generation of farmers on the function of land security and employment will significantly reduce their land transfer intention. When the old generation of farmers' dependence on land security function increases by one unit, the probability of their willingness to transfer most of their land decreases by 10.18%, and the probability of their willingness to transfer less than 20% of their land area increases by 12.55%. When employment function dependence increases by one unit, farmers' willingness to transfer most of their land decreases by 5.56%, and the probability of farmers' willingness to transfer less than 20% of their land area increases by 6.58%.

5 Discussion and Conclusions

This paper constructs an analytical framework of "intergenerational farmers - farmland function dependence - farmland transfer intention". Based on the survey data of farmers in traditional agricultural areas of Fushun County, Sichuan Province, the Oprobit regression model was used to analyze the impact of farmers' land function dependence on their land transfer intention and the intergenerational differences. The research findings are as follows:

(1) In terms of agricultural land function dependence, cultivated land resources still bear a strong production function and security function, but farmers' employment function dependence and emotional dependence on land are weak. There are differences in the land function dependence of three generations of peasant households. The older generation of farmers has the highest dependence on the production function and security function of land, and the strongest emotional dependence on land. The land function dependence of Middle-aged farmers is the second, and that of New generation farmers is the weakest.

(2) Farmers are generally willing to transfer distant and low-quality land out of cultivated land resources. With the improvement of the generation of farmers, the scale of farmers' willingness to transfer out of the land gradually decreases. There is a

Table 5. Grouping regression results of different generations of farmers.

Variable	Model III	Model IV	Model V
Production function dependence (x1)	−0.329** (0.166)	0.042 (0.195)	−0.366 (0.243)
Employment function dependence (x2)	−0.494*** (0.175)	−0.316*** (0.101)	−0.426*** (0.128)
Guarantee function dependence (x3)	−0.053 (0.248)	−0.355** (0.156)	−0.780*** (0.260)
Emotional dependence (x4)	−0.394 (0.280)	−0.497*** (0.191)	−0.155 (0.177)
Gender (k1)	0.463** (0.218)	0.519* (0.274)	−0.066 (0.254)
Education (k2)	−0.059 (0.140)	0.057 (0.183)	−0.575*** (0.160)
Risk aversion attitude (k3)	−0.234 (0.149)	0.352** (0.147)	0.204 (0.131)
Household income (k5)	0.051 (0.045)	0.126** (0.054)	0.101*** (0.033)
Household Size (k6)	0.055 (0.099)	−0.115 (0.083)	−0.217*** (0.078)
Land resource endowment (k7)	−0.113 (0.137)	0.131 (0.138)	0.108 (0.093)
Land transfer scale in the village (k8)	0.331** (0.155)	0.504*** (0.146)	0.320** (0.136)
Traffic conditions (k9)	0.167 (0.270)	−0.317 (0.203)	−0.016 (0.265)
Dispersion degree of cultivated land (k10)	−0.069 (0.242)	−0.067 (0.215)	0.060 (0.201)
Obs	99	116	128
Prob > chi2	0.0000	0.0000	0.0000
Pseudo R2	0.1126	0.2542	0.2896
Wald chi2	43.64	68.68	126.80

Note: Robustness standard error is reported in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

certain degree of deviation in farmers' intention and behavior of land transfer and the intention of land transfer has not been fully transformed into actual land transfer behavior.

(3) In terms of the factors affecting farmers' willingness to transfer land, the higher the degree of farmers' dependence on the production function, employment function and security function of land, the smaller the scale of their willingness to transfer land. And there are differences between generations. The employment function

Table 6. The marginal effect of different functional dependence on different generations of farmers.

Generation	Variable	Y = 1	Y = 2	Y = 3	Y = 4	Y = 5
New	Production function	3.14%* (0.019)	2.62% (0.016)	4.79%* (0.025)	−3.97%* (0.022)	−6.57%* (0.035)
	Employment function	4.71%** (0.018)	3.93%** (0.019)	7.19%** (0.031)	−5.96%** (0.025)	−9.87%*** (0.037)
	Guarantee function	0.50% (0.024)	0.42% (0.020)	0.77% (0.036)	−0.64% (0.030)	−1.06% (0.050)
	Emotional dependence	3.76% (0.028)	3.13% (0.025)	5.73% (0.042)	−4.76% (0.037)	−7.87% (0.056)
Middle-aged	Production function	−0.39% (0.018)	−0.50% (0.023)	−0.17% (0.008)	0.65% (0.030)	0.41% (0.019)
	Employment function	2.94%*** (0.011)	3.77%*** (0.012)	1.26%** (0.007)	−4.87%*** (0.016)	−3.09%*** (0.011)
	Guarantee function	3.30%** (0.015)	4.23%** (0.020)	1.41%* (0.008)	−5.47%** (0.025)	−3.47%** (0.016)
	Emotional dependence	4.61%** (0.020)	5.92%*** (0.022)	1.98%** (0.010)	−7.65%*** (0.028)	−4.86%** (0.021)
Older	Production function	5.89% (0.039)	3.08% (0.023)	−2.91% (0.021)	−4.78% (0.032)	−1.28% (0.009)
	Employment function	6.85%*** (0.022)	3.59%** (0.014)	-3.39%*** (0.012)	−5.56%*** (0.018)	−1.49%** (0.006)
	Guarantee function	12.55%*** (0.046)	6.57%*** (0.022)	−6.21%*** (0.021)	−10.18%*** (0.034)	−2.72%*** (0.012)
	Emotional dependence	2.50% (0.028)	1.31% (0.016)	−1.24% (0.014)	−2.03% (0.023)	−0.54% (0.006)

Note: Robustness standard error is reported in brackets; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

dependence of all generations of farmers inhibited their land transfer intention, while the production function dependence only inhibited the new generation of farmers, and the security function dependence weakened the land transfer intention of the Middle-aged and older generation of farmers. All farmer generations had a declining tendency for emotional dependence on the land, but it only prevented Middle-aged farmers' intentions to transfer their land. In addition, the increase in household annual income or the active degree of land transfer in the village will positively promote the intention of farmers to transfer land.

However, there are still some deficiencies. The independent variable "agricultural land function dependence" and the dependent variable "land transfer intention" both reflect the subjective attitude of farmers. But the transformation of farmers' subjective will to objective behavior remains to be explored. The survey data prove that

farmers' land transfer intention has not been fully transformed into actual transfer behavior. Therefore, in future research, it is necessary to further explore the restrictive factors in the process of transforming farmers' land transfer intention into transfer behavior, to promote land transfer work more effectively.

6 Policy Recommendations

Based on the above findings, we propose the following policy recommendations:

(1) In order to fully release the potential of land transfer market, it is necessary to establish and perfect the market mechanism of rural land transfer. Targeted policies should be implemented according to the differences in the active degree of land transfer market in different villages.

(2) Respect the will of farmers, alleviate the intensity of farmers' dependence on land. The steady promotion of land transfer should be based on the protection of farmers' rights and interests. Therefore, when promoting rural land transfer, differentiated policies should be formulated according to the characteristics of farmers of different generations to reduce their dependence on land. For the new generation of farmers, based on employability training, employment guidance services will be provided to farmers to improve their competitiveness in the labor market. For the middle-aged generation of farmers, the government should create a loose institutional environment for them to move freely between urban and rural areas. We can support them to work in cities and become citizens, and encourage them to return to their hometowns to start businesses and start farms. For the older generation of farmers, it is to provide better security. Therefore, it is necessary to integrate rural public service resources, promote agricultural socialization service, improve the "self-supporting" ability of the old generation of farmers, and reduce their "self-supporting" pressure. At the same time, we should improve rural social assistance, medical insurance and endowment insurance systems, effectively relieve their high dependence on the land security function, and encourage farmers to release their land.

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