Empirical Factors of Farmland Transfer Behavior using Logistic Regression Analysis

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Abstract — **According to behavioral decision prospect theory, on the basic of mechanism of farmland transfer behavior, build theory model of farmland transfer behavior factors. Chongqing under the 5 districts (counties) 32 Town total 86 administrative villages 865 Farmland Transfer Behavior conducted a survey, logistic regression analysis was conducted using the survey data, thereby detecting headed four factors characteristic factors, factors farmer household characteristics, rural organizations and governmental factors and other factors that impact on the farmers land transferred to and behavior. The study found that, Cultural level, the proportion of off-farm incomes, rural social security system is a key factor affecting the behavior of farmers land transfer, and different factors on Farmland Transfer Behavior of direction and degree vary. Finally, the survey results presented that strengthen basic education and training of farmers off-farm employment in rural areas, the establishment of a sound social security system in rural areas, promotion of rural land scale production and management to establish and improve land transfer intermediary organizations to increase efforts to support rural economic development, etc. strengthen the work of the government land transfer policy recommendations.**

Keywords - logistic regression; prospect theory; land transfer behavior; empirical analysis.

I. INTRODUCTION

Urban-rural relations have become the basic economic relations of economic and social development, by the widespread concern. Rural land as an important part of the organization of urban and rural development, not only conducive to the realization of large-scale land management, also contribute to the rational allocation of labor and other related agricultural resources, thus speeding up China's grain base construction and development, So the study of rural land to work to promote the development of China's agricultural economy has great significance. And the farmers as the main part of rural land, their behavior have a profound impact on the implementation of land transfer work. First, farmers as direct participants of land transfer, land transfer requirements will be reflected through concrete acts circulation, therefore, land transfer policy of rationality can be reflected by the degree of matching Farmland Transfer Behavior and policy objectives, and farmers behavior was rural land policy to provide a strong guide, farmers are important participants in the development of China's land transfer system, which determines the behavior of the corresponding land transfer land transfer system. Secondly, the actual flow of work in the process, in order to improve the land transfer efficiency and reduce the cost of land transfer, local farmers to profit from their own perspective, have according to their own specific situation and actual production region, in circulation in practice, through the actual transfer land transfer mode behavior for a bold and innovative, and therefore, farmers behavior is a major source of innovation model of rural land. In summary, the study of Farmland Transfer Behavior for carrying out the work of land transfer has a positive role in promoting. Through the

analysis of Farmland Transfer Behavior Factors of Farmland Transfer Behavior studied the specific method of promoting and countermeasures can effectively improve the efficiency of land transfer, promote the development of urbanization and modernization of agriculture.

II. EVALUATION METHOD OF FACTORS OF FARMLAND TRANSFER BEHAVIOR

A. Variable Select

This article is about the Farmland Transfer Behavior influencing factors, so selecting the user whether the land transfer is interpreted as a variable, it is to choose whether a land flowing out of or into the behavior is interpreted as a variable. Based on the behavior of Decision Sciences in prospect theory, when the farmers during the land transfer decision-making, will select the current income as a reference point, based on the comparison of current income and land transfer after the expected revenue to transfer decision-making behavior. When the income is below the current expected income transfer after facing a profit, most farmers on the land transfer is circumvented; Conversely, when current income is higher than expected income transfer after facing losses, the majority of farmers on the land transfer is preferred. Due to the current income of farmers is relatively stable, Farmland Transfer Behavior decision will depend on the post-transfer income households expected levels. Farmers' income levels expected after the transfer will be subject to the farmers themselves, the combined effects of rural households, the government policy and the situation of rural organizations. Therefore,

the combination of the results of interviews with farmers, the Farmers' Land Transfer Behavior (explanatory variables) are summarized headed characteristic factors, farmer household characteristics factors, government factors and organizational factors in rural areas. Because farmers own situation and family characteristics, determines the profitability of farmers after the land transfer; government action and policy-oriented, determined the profit opportunities of farmers after the land transfer; rural organizations to build the case, the decision by farmers to transfer profits risk factor. Among them, the head of the household characteristics of factors,

including the head of household gender, age and cultural level; farmer household characteristics factors include total household population, the proportion of migrant population and the proportion of off-farm income; rural organizational factors including whether the land transfer intermediary organizations, and administrative full-time institutions; and government factors include the degree of sound rural social security, land transfer policy publicity, agricultural subsidies and agricultural production scale level. Based on understanding and thinking on rural realities Chongqing area, the analysis of the above factors, the variables defined in TABLE 1.

TABLE I STATISTICS DESCRIPTION OF THE EXPLANATORY VARIABLES

Variable name	Definitions of Variable	Type of Variable
Headed characteristic factors		
X1 gender	1= Male；2= Female	Dummies
X2 age	1=20year and below 20 year；2 =21-30 year；3=31-40 year；4= 41-50 year ；5=51-60 year	Dummies
X3 Cultural level	1=Primary and below；2= Junior high school；3= High school, college；4= College and above	Dummies
Farmer household characteristics Factors		
X4 Family population	1=1-3 people；2=3-4 people；3=5-6 people；4=6 people and above	Dummies
X5 Migrant population ratio	The number of migrant workers / family total labor force (%)	Continuous variables
X6 The proportion of non-farm income	Cultivated income / total household income (%)	Continuous variables
Governmental factors		
X7 Rural improve the level of protection	1= Very unsound；2= Compare unsound；3= general；4= Relatively sound；5= Very robust	Dummies
X8 Publicity related policies（Whether the understanding of the relevant policy information）	1= never heard；2= Do not know much；3= Learn Some；4= A better understanding；5= Very Learn	Dummies
X9 Agricultural subsidies	1= Very small ；2= Small；3= General；4=Great；5=Very much	Dummies
X10 Agricultural production scale degree	1= very low；2= Lower；3= General；4= Higher；5= Very high	Dummies
Rural organizational factors		
X11 Is there a land transfer intermediary organizations	1=No；2=Yes	Dummies
X12 Is there a full-time administrative land transfer mechanism	1= No；2= Yes	Dummies

B. Research Hypothesis

1)Headed characteristic factors affect the behavior of Farmland Transfer

① gender. With respect to the possibility of women, men get off-farm income in rural areas outside of the large land revenue, less dependence on the land, while men more hope that through their own efforts (such as operating more land) to improve living standards, it is assumed that male-headed households are more likely to flow into or out of the family land;

② age. On the one hand, older farmers, the more complex love heavy soil, and agricultural production for a long time, making them more adept at management of land, so the greater the likelihood of their own land management.

On the other hand, older farmers due to physical health reasons, are reluctant to operate more land. In view of this, assuming that land outflow and inflow were associated with a negative correlation between the age of the head of household;

③ Cultural level. Currently income of non-farm employment is generally higher than the agricultural income, the higher the cultural level of farmers engaged in non-agricultural work more easily, and therefore the more likely the transfer of land. Meanwhile, the head of the household, the higher the cultural level, the ability to accept new ideas is stronger, more easy to understand the benefits of the land transfer, resulting in transfer behavior. Therefore, this article assumes that land flowing with their cultural levels were positively correlated, while land inflows were negatively correlated with their cultural level.

2)Farmers family characteristics factors affecting Farmland Transfer Behavior

① Household population. The more the number of family labor, on the one hand, the family may face more severe labor surplus, the labor force is not balanced inputs and outputs the larger, family members and non-farm employment pressure faced by relatively large, the urgent need to resolve the land transferred the problem of surplus labor. On the other hand food needs families face greater pressure, but also need more land transferred. Therefore, assuming that land inflows positively correlated with household population was, while the land out of the total population and family negatively correlated;

② The proportion of migrant workers. The larger proportion of migrant families, at home, engaged in agricultural production, the less labor, and therefore easier to land transfer out. This article assumes that household land out of proportion behavior and family outside the home were positively correlated with household land inflow behavior is negatively correlated therewith;

③The proportion of non-farm income. The proportion of non-farm income refers to the total income of rural households in Central Africa the proportion of agricultural income. The larger proportion of non-farm income, indicating smaller proportion of total farm income in household income, then the fewer farmers dependent on the land, but also more likely to turn out the land. Therefore, assuming that the proportion of non-agricultural land and farmers income outflow behavior was positively correlated with household land inflow behavior was negatively correlated;

3)Rural organizational factors impact on Farmers' Land Transfer Behavior

① Are there intermediary organizations. Land transfer intermediary organization's role is to be able to play professional advantages agencies to effectively reduce the transaction costs of land transfer, transaction risk, improve the bargaining position of the land and then get out of party ideal transaction price. Under it is assumed that there are intermediary organizations, the farmers produce land outflow, inflow behavior;

② Is there a full-time administrative land transfer mechanism. Land transfer administrative center full-time agency refers to the land transfer, land transfer value rating agencies and project planning agencies, land transfer arbitration institutions. These institutions not only to simplify the work of farmers in land transfer, but also work to make the land transfer more secure, so this study assume full administrative land transfer mechanism can facilitate Farmland Transfer Behavior.

4)Governmental factors affecting the behavior of Farmland Transfer

① Social security situation. When the social security system is not perfect, farmers often will land as a last resort to protect life, and therefore do not want to turn out the land, and want to get more revenue through the transfer of land. Therefore, this article assumes that the degree of social security system and improve the land flowing with farmers behavior was positively correlated with household land inflow behavior was negatively correlated;

②Land transfer policy publicity. Land Transfer publicity related policies mainly through farmer understanding of the situation related to the land transfer policies to reflect. Farmers on the land transfer policy for a deeper level, the better illustrate the effect of government propaganda. Government propaganda, the better, the higher the farmers on the land transfer policies to understand the extent of the land transfer of knowledge and more scientific and objective. Therefore, assuming that government propaganda effect has a positive impact on farmers land transfer behavior;can reduce the burden of farmers engaged in agricultural production, increase farmers' income. Therefore, this article under the assumption that there are agricultural subsidies, the farmers more inflow of land, but when there is no more out of the land of agricultural subsidies to farmers;

③ Whether to support the scale of production. Scale production will help improve agricultural productivity, increase agricultural income. Therefore, in support of the scale of production, the farmers produce more land inflow behavior, on the contrary, it is more likely to have land outflow behavior.

C. Model

In the paper, the dependent variable is the Farmland Transfer Behavior, it is divided into circulation and without circulation categories, they are dichotomous variables, so select Binary Logistic Regression to get on regression analysis. According to the literature [1] found that, Logistic model is very suitable for the analysis of individual decision-making behavior, the probability function is:

$$P = \frac{Exp(Z)}{1 + Exp(Z)} \qquad (1)$$

In the Formula, Z is a linear combination of variables $X_1, X_2, \cdots, X_i$;

$$Z = b_0 + b_1 X_1 + b_2 X_2 + \cdots + b_n X_n = b_0 + \sum_{i=1}^{n} b_i X_i \quad (2)$$

In the statistical analysis, , Assume P explained variable represents the probability of 1, P get on Logit changing, it can get as following:

$$LogitP = \ln\left(\frac{P}{1-P}\right) = b_0 + \sum_{i=1}^{n} b_i X_i \qquad (3)$$

It is Linear expressions of Probability function and argument. Because it does not exist multiple collinear between the 12 explanatory variables of this article, and it is no linear relationship between the explanatory variables, so according to the object and purpose of this study, the specific model was constructed as follows:

$$\ln\left(\frac{P_{\text{Outflow}}}{1 - P_{\text{Flow into}}}\right) = b_0 + \sum_{i=1}^{11} b_i x_i + \varepsilon \quad (4)$$

$$\ln(\frac{P_{\text{Outflow}}}{1-P_{\text{Outflow}}}) = b_0' + \sum_{i=1}^{11} b_i' x_i + \varepsilon' \quad (5)$$

Among them，$P_{\text{Flow into}}$ and P_{Outflow} explained variable represents the probability of 1, that is the probability of farmers into land and out of the land; b_i and b_i' $(i = 1, 2, \ldots, 11)$ explained Regression coefficients Explanatory variables X_i ; X_i $(i = 1, 2, \ldots, 11)$ is Explanatory variables，It shows the influence of factors of type i ; b_0 and b_0' explained constant，it is intercept of the regression model；ε and ε' are a random disturbance term.

D. Data Acquisition

The study from December 2014 to May 2015, took six months, to Qijiang, Jiulongpo, Nanping, Wanzhou District of Chongqing Nanchuan and other five cities (counties) of farmers conducted a field survey covers a total of 32 town 86 administrative villages. In the villages of choice, the research group fully consider the economic situation, traffic conditions administrative villages, and strive to choose the observation point that is able to represent the average level of Chongqing can cover various types of administrative villages. n the selection of the sample of households, the research group classification using random sampling method, each administrative village into a category, set the number of samples of each administrative village should be drawn in accordance with various administrative villages proportion of the number of households, and then in the administration village simple random sampling. The use of a standardized questionnaire survey as a tool, using the method headed households access to their own situation, rural households, as well as farmers for and evaluation of government policy of rural land organization gathering information. The survey questionnaires were distributed and 865, excluding incomplete questionnaires 47, eventually collected 818 valid questionnaires parts, where the land transfer has not occurred for 375, accounting for 45.8% of the total, while the occurrence of land transfer 54.2 %, including only land inflows 213, only 185 out of the land and existing land flows into another land out of the 45.

E. Data Processing

Before regression analysis, the first is to deal with Explained variable in the Land inflow and outflow model as following[8]:

Inflow model: the dependent variable value rules, when farmers inflow behavior occurs land (including land only inflow and the inflow and outflow both), a value of 1; On the contrary, the farmers have no land inflow behavior occurs, take A value of 0.

Outflow model: the dependent variable value rules, occurs when farmers land outflow behavior (including only land outflow and inflow and outflow of both), a value of 1; On the contrary, the farmers have no land outflow behavior, take A value of 0.

With the above manner, the survey data by SPSS12.0 Logistic regression analysis, based on the test results, and gradually eliminate insignificant variables, regression again, until all variables are statistically significant at the 5% level and above.

III. FACTORS FINDINGS AND ANALYSIS OF FARMLAND TRANSFER BEHAVIOR

It get on Logistic regression analysis through survey data by SPSS12.0, regression results shown the following TABLE 2, in TABLE 3:

TABLE II LAND OUT OF MODEL PARAMETER ESTIMATION RESULTS

Argument	Flow out model		
	Regression coefficients	Test value	Odds ratio
	B	Wald	Exp(B)
X2 Age	-0.132**	9.001	0.146
X3 Cultural level	1.003***	3.132	0.821
X4 Family population	-0.119**	6.007	0.735
X6 The proportion of non-farm income	4.876***	48.606	0.072
X7 Rural improve the level of protection	1.330***	1.516	1.138
X8 Publicity related policies（Whether the understanding of the relevant policy information）	0.241**	6.780	0.891
X9 Agricultural subsidies	-0.167**	7.800	0.764
X11 Is there a land transfer intermediary organizations	0.602***	24.985	1.898
X12 Is there a full-time administrative land transfer mechanism	0.031**	5.743	1.032
Constant term	-0.884*	3.693	0.413

Note: *、**、*** express inspection significant at the 10%, 5% and 1% significance level respectively.

TABLE III PARAMETER ESTIMATION RESULTS OF LAND INFLOW MODEL

Argument	Land inflow model		
	Regression coefficients	Test value	Odds ratio
	B	Wald	Exp(B)
X2 Age	0.162*	3.312	1.237
X3 Cultural level	1.868***	0.219	0.031
X5 Migrant population ratio	0.083	0.643	1.205
X6 The proportion of non-farm income	-0.194***	149.174	41.320
X8 Publicity related policies（Whether to understanding of the relevant policy information）	0.387**	12.102	0.521
X9 Agricultural subsidies	0.951**	23.103	0.871
X10 Agricultural production scale degree	0.843**	4.901	1.349
X11 Is there a land transfer intermediary organizations	0.289***	10.643	1.205
Constant term	-2.843***	43.425	0.058

Note: *、**、*** express inspection significant at the 10%, 5% and 1% significance level respectively.

A. Impact Analysis of Characteristics of head of household for Farmland Transfer Behavior

1) Age.

Age factor in land outflow and inflow model regression coefficients were -0.132 and -0.368, and are at the 5% significance level. That head of household age factor and land outflow and inflow negatively correlated older person more reluctant to transfer land. This is consistent with the previous assumption because older persons, on the one hand due to the physical conditions, do not want to turn the land; on the other hand, love heavy soil conditions, land transfer will not easily go out.

2) Cultural level.

Suppose the same as before, the farmers land outflow behavior and cultural level of the head of household was positively correlated, the regression coefficients in the model of land out of 1.003, a significant level of up to 1%. Explain the higher cultural level of the head of household, the more willing the hands of the land transfer out. But the cultural level of the head of household in the land transferred to the model did not pass the significance test, indicating that the previous hypothesis is different from the behavior of household land flows into its level of culture there is no direct relationship. This may be because no matter the level of culture, farmers can be transferred by way of land, increase income.

B. Impact Analysis of Farmer household characteristics for Farmland Transfer Behavior

1)Total number of family population.

In the land out of the model, total household population reached 5% significance level, and the impact of land out of the negative direction, indicating the total number of household population, the more small farmers out of the land of possibility, which is due to family population, the greater the demand for grain farmers reasons. In the land flow into the model, the family of the population regression coefficients did not pass the significance test, indicating that although the more the number of family members, the greater the pressure on food demand, but by no means necessary to address this inflow of land pressure.

2) Proportion of off-farm income.

Farmers family characteristics factors nonfarm income share of all the factors affecting the most significant factor in the land outflow and inflow model, its significance level were up 1%, Wald test values and the regression coefficient is also the largest. This fully shows that the proportion of non-agricultural income of farmers decided to land flowing into or out of a very important role, which is the same as the previous hypothesis. Effect of non-agricultural income of the land out of proportion is positive, the regression coefficient is 4.876, for land inflows influence is positive, the regression coefficient is -3.797, indicating that the greater the proportion of off-farm income, the possibility of farmers land flowing more small, and the greater the likelihood inflow land.

C. Impact Analysis of Rural organizational for Farmland Transfer Behavior

1) Whether there is land transfer agency.

Land transfer agency regression coefficients in the model of land out of 0.602, and the status quo level of up to 1%. That land agencies to help farmers land outflow behavior. This is because the role of intermediary in the land, not only reduces the risk of land transfer, and can provide a satisfactory outflow price. But with the previous hypothesis it is different, land transfer agency and no significant impact on the farmers' land inflow behavior. It shows that farmers will not be in land flows because the land in the land transfer intermediary role.

2) Whether there is a full-time administrative land transfer mechanism.

And land transfer agency, as a full-time administrative land transfer mechanism to stimulate farmers' land flowing behavior, regression coefficients in the model of land out of

0.031, significance level of 5%. This is due to land transfer administrative allied institutions such as the land transfer center, land transfer value rating agencies and project planning agencies, land transfer arbitration institutions not only simplifies the work of the farmers land transfer, but also reduces the risk of transfer of the land's sake. However, full-time administrative agency also did not significantly affect the inflow of land for farmer behavior.

D. Impact Analysis of Governmental factors for Farmland Transfer Behavior

1)Social Security System case.

Suppose the same as before, the land out of the model, the social security system of environmental factors by 1% significance test and regression coefficient is positive. The social security system more robust, smaller land as a farmer last living security features, the farmers more willing outflow land; the land flows into the model, the social security system in the case of factor significance level of 5%, and a negative correlation with the land inflows. It shows that, with the improvement of the social security system, it is weaker of Willingness of farmers to land inflows. This may be because low agricultural income, farmers are more willing to increase income through social security's sake.

2)Related policies publicity.

Related policies publicity significant level in land outflow and inflow model is 5%, and the regression coefficients were 0.241 and 0.087. That policy advocacy related to the better, the more obvious the Land Transfer Behavior farmers. This is because in the case of farmers on the land transfer policy is not clear, there will be a lot to worry about, blindly expanding the land transfer of risk awareness, and therefore reluctant to land transfer. When they have a thorough understanding of the land transfer policy, its land transfer behavior will naturally be more apparent.

3)Whether to provide agricultural subsidies.

Whether to provide agricultural subsidies have a negative impact on farmers' land flowing behavior, and the impact is extremely significant, significant levels of up to 1%, indicating that the government provides agricultural subsidies conditions, the burden of farmers engaged in agricultural production can be reduced, but also increased the income, so farmers do not want out of the land. The impact of agricultural subsidies on land flows into the model is positive, indicating that the farmers in the case of agricultural subsidies support, hope inflow of more land.

4)Whether to support the scale of production.

Does the Government support large-scale production significantly affects the behavior of farmers land inflows, the significance level at 5%, and for the positive effect. Description Due to the size of production to achieve economies of scale, improve farmers' agricultural productivity and achieve a significant increase in income, so the strong willingness of farmers inflow land. But it supposes the difference is that if government support scale production on farmers' land flowing behavior did not significantly be effected.

IV. CONCLUSIONS AND RECOMMENDATIONS

Measures to promote land transfer work based on farmer behavior

Farmland Transfer Behavior headed mainly effected by cultural level, total household population, the proportion of non-agricultural income, sound degree of social security system, Publicity related policies, the degree of agricultural production scale, land transfer and land transfer administrative agency dedicated agency.

For the above factors, the paper proposed measures to promote the land transfer work. from three aspects of farmers themselves, government and rural organizations. First, to strengthen basic education and training for rural non-farm employment of farmers, raise the cultural level of farmers, improve farmers' vocational skills. Second, to establish a sound social security system in rural areas, speed up the reform of the household registration system and the improvement of legislation, eliminating worries of farmers out of the land, so farmer tools and equal employment opportunities for urban residents, the real integration into the towns. Third, increase agricultural subsidies to promote large-scale land operation, to ensure and improve the economic efficiency of agricultural production income, increase farmers' enthusiasm inflow land. Fourth, it should establish and improve the land transfer intermediary organizations and administrative services institutions, provided with supporting professional services adapted according to the objective requirements of the market economy.

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