Study on the Influencing Factors of Farmers' Land Transfer: An Empirical Study based on CFPS2016

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Abstract. The transfer of land is an important way for farmers to re-allocate production factors and realize the production development and better-off lives. In order to optimize land transfer decision-making and improve the welfare of farmers, this paper uses Logit model to analyze farmers' land transfer incentives based on China Family Panel Studies (CFPS). The study found that present value of agricultural machinery, land value and agricultural subsidies are the main incentives for farmers to transfer land. Non-agricultural employment and urban income level can significantly affect farmers' land transfer.

Keywords: farmers; land transfer; Logit model.

1. Introduction

As farmland is an important guarantee for farmers' production and life, the research on the situation and influencing factors of farmland transfer has become one of the important areas of scholars' attention. The incentives of farmland transfer in related studies can be summarized into three categories: the first is natural environment, resource endowment and other factors, such as cultivated land resource endowment and topography [1]. The second category is macro-economic factors, such as economic development and non-agricultural employment [2][3][4], land ownership stability [5], preferential agricultural policies, the cost of farmland transfer and so on. The third category is the micro-level characteristics of farmers' families, such as farmers' age, education level, income level[6], farmers' occupation and economic differentiation[7] and so on. In addition, some scholars have made a comprehensive analysis of the influencing factors on the transfer of agricultural land. The above-mentioned research has analyzed the influencing factors of farmland transfer in detail from many aspects, but it does not involve the feedback effect of farmers' welfare changes on the decision-making of farmland transfer.

Based on this, this paper fully considers the influencing factors of farmland transfer.This paper uses the latest data set of the National Family Tracking Survey (CFPS) in the large sample micro-database (2016 data) to analyze the difference of influencing factors of farmers' land transfer decision-making, in order to provide policy proposal for the government to reasonably regulate the farmland transfer and improve the welfare of farmers.

2. Research Design

2.1 Data Sources

The data used in this study are from the China Family Panel Studies (CFPS) database of Peking University, which is organized and implemented by the China Social Science Survey Center (ISSS) of Peking University. It is a nationwide, large-scale and multidisciplinary social tracking survey project. In 2016, the database surveyed 25 provinces, municipalities and autonomous regions in China, with a sample size of 14 033 households.

2.2 Research Methods

Before applying the propensity score method to sample matching, we first estimate the parameters of the decision equation of farmland transfer, so as to obtain the covariates of the propensity score matching model. The data set includes 7173 sample households (985 transferred households and 6188 non-transferred households) and 6752 transferred households (564 transferred households and 6188 non-transferred households). Based on Logit model, the decision-making equation of farmers' participation in land transfer is constructed, such as formula (1):

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 age_i + \beta_2 age_i^2 + \beta_3 eyear_i + \beta_4 nag_{-1i} + \beta_5 \ln mac_{-1i} + \beta_6 \ln land_{-1i} + \beta_7 lnsub_i + \beta_8 \ln debt_i + \beta_9 par_i + \beta_{10} \ln dep_i + \beta_{11} time_i + \beta_{12} \ln inc_i + \beta_{13} gdp_i + u_i \quad (1)$$

Of these, i=1,2, ... n means farmer, $p_i=P(T_i=1|X_i)$ is the probability that farmer I participates in farmland transfer. The explanatory variable vectors include age, age squared (age2) and education years of the head of household(eyear); the family economic characteristic variables: the proportion of non-agricultural income (nag), the logarithm of agricultural machinery value (lnmac), the logarithm of land value (lnland), the logarithm of agricultural subsidy (lnsub) and the logarithm of financial liabilities (lndebt) of the last household. Family social capital variables: whether the family members (par); village characteristics variables: the logarithm of village per capita cash deposit (lndep) and the time from the village to the business center (time); macro environmental variables: the logarithm of urban per capita income (lninc), the province's second and third industry added value index (gdp).

2.3 Descriptive Statistics

In order to analyze the influencing factors of farmers' participation in land transfer, we listed in Table 1 the mean values of all-important indicators and the significance test of the differences between non-participating and participating farmers. As shown in Table 1, both transferring in farmland and transferring out farmland have significant roles in promoting the welfare of farmers. The differences of per capita income between transferring and non-transferring households is 1383.5 yuan, and that between transferring and non-transferring households is 1726.4 yuan; the difference of per capita cash deposit between transferring and non-transferring households is 949.3 yuan; the difference of per capita cash deposit between transferring and non-transferring households is 1165.1 yuan; There are significant statistical differences between the indicators of the sample of transferring households and non-transferring households, which helps us to analyze the influencing factors of farmers' land transfer decision-making.

3. Results

3.1 Householder Characters

As shown in Table 2, with the growth of age of the head of household, the farmers significantly inclined to transfer in land and reduce the transferring out of land, while the square age of the head of household would impact conversely on the transfer of land. It shows that older household heads with weaker non-agricultural employment ability have a greater dependence on agricultural production and they are more inclined to transfer in land, but when they are too old to engage in agricultural production, they will become more inclined to transfer out land; while younger household heads who have stronger non-agricultural employment ability tend to transfer out land, but with the growth of their age and decline of their non-agricultural employment ability, at some point, they would also tend to transfer in land.

Table 1. Descriptive Statistics on the Differences of Economic Indicators between Transferred and Non-Transferred Farmers in 2016

Explanatory Variables		Non Transfer Household	Transfer-in Farmers	Significance Test	Transfer-out Farmers	Significance Test
Variable		Mean (A)	Mean (B)	Difference(B-A)	Mean (C)	Difference(C-A)
Welfare Indicators	income	13513.74	14897.23	1383.49**	15240.12	1726.38**
	cash	5803.61	6752.94	949.33***	6968.71	1165.10***
Householder Characters	age	50.10	47.90	-2.20**	51.46	1.36**
	eyear	6.32	6.97	0.65**	6.76	0.44*
Family Characteristics	nag	63.70	52.70	-11.00***	71.90	8.20***
	mac	1845.24	3263.46	1418.2***	1363.96	-481.3**
	land	35110.19	61239.07	26128.88***	22956.64	-12153.55***
	sub	368.77	407.53	38.76***	296.52	-72.25*
	debt	12063.14	14969.83	2906.69**	13797.96	1734.82*
Village Characteristics	dep	5508.74	5207.39	-301.35***	7543.61	2034.87**
	time	36.24	33.31	-2.93***	23.35	-12.89***
Economic Environment	inc	19482.04	18471.76	-1010.28*	21361.23	1879.19***
	gdp	107.00	106.97	-0.03	107.18	0.18*

Household education years have a significant impact on the decision-making of land transferring in and transferring out. With the transformation and upgrading of China's economy and the improvement of job remuneration, there are also higher requirements for the education level of the employees. Some farmers with relatively high educational level, which means they have more opportunities to achieve non-agricultural employment, tend to transfer out their farmland. Similarly, some professional farmers or returning home entrepreneurs with high educational level and strong learning ability can obtain higher agricultural income than ordinary farmers through the development of characteristic farming and livestock industry and industrialized management, they also have more enthusiasm to transfer in farmland.

3.2 Family Characteristics

As shown in Table 2, the proportion of household non-farm income has a significant impact on the transfer of farmer land. With the increase of proportion of household non-farm income, the farmers significantly inclined to transfer out land and reduce transferring in land. Because of the comparatively low income of agriculture, non-agricultural employment has become an important channel for farmers to support their families. Generally speaking, the stronger the farmer's non-agricultural employment ability is, the more likely it is for them to transfer out farmland; otherwise, they will be more dependent on farmland and more likely to transfer in land.

The value of household land and agricultural machinery can significantly increase the possibility of farmers' transferring in of land, but reduce the possibility of farmers' transferring out of land. Land or agricultural machinery is an important mean of agricultural production for farmers, whose value level largely reflects the scale of production and operation of farmers. The greater the value of farm machinery and land owned by farmers is, the easier it is for the farmers to apply the scale effect, which would reduce costs, improve returns and boost the transfer in of land; on the contrary, the higher the sunk cost of land transfer out is, the less the possibility of land transfer out is.

3.3 Village Characteristics

The per capita cash deposit in villages has a significant impact on the decision-making of farmland transfer. With the increase of per capita cash deposit, the farmers significantly inclined to transfer out land and reduce transferring in land. Villages with more cash deposits per capita tend to have developed non-agricultural industries or more migrant workers, which can provide and exchange more information on non-agricultural entrepreneurship or employment, and promote more farmers to transfer out land.

The length of time costed for the farmers to depart from their village to reach the nearest commercial center has a significant negative impact on the decision-making of farmland transfer. Generally speaking, the closer the village is to the city, the easier it is for farmers to get non-farm employment opportunities, reducing the cost of non-farm employment and expanding urban social network, thus the farmers tend to move out of the rural area to work in the city.

3.4 Economic Environment

The income level of cities in each province and the value-added index of secondary and tertiary industries have a significant positive impact on the transfer of farmland. Higher urban income level enhances the comparative income of non-agricultural production and operation activities, thus the possibility for farmers to transfer out their farmland and turn to non-agricultural production increases. Most of the farmers who work in cities have entered the secondary and tertiary industries in economically developed areas [8]. Therefore, favorable development situation of the secondary and tertiary industries can encourage more farmer households to transfer out their farmland and go to cities for employment.

Table 2 .Estimated Results of Farmland Transfer Equation

Index Type	Index Name	Transfer-in Equation		Transfer-out Equation	
		coefficient	Odds Ratio	coefficient	Odds Ratio
Householder Characters	age_i	0.0604**	1.0623**	-0.1017***	0.9232***
	age_i^2	-0.0006**	0.9994**	0.0009***	1.0009***
	$eyear_i$	0.0295*	1.0279*	0.0079*	0.9921*
Family Characteristics	nag_{-1i}	-0.2436***	0.7564***	0.5614***	1.7631***
	$lnmac_{-1i}$	0.4036***	1.4972***	-0.4185***	0.6513***
	$lnland_{-1i}$	0.6443***	1.9048***	-0.3961**	0.6731**
	$lnsub_i$	0.1560**	1.1687**		
	$lndebt_i$	0.0563*	1.0579*		
Village Characteristics	$lndep_i$	-0.0839*	1.0876*	0.3793**	1.4613**
	$time_i$			-0.8652***	0.4210***
Economic Environment	$lninc_i$			0.5453*	1.7251*
	gdp_i			0.0380**	1.0387**
Statistical Tests	LR	352.0216***		236.5751***	
	Pseudo-R^2	0.1487		0.1146	
	Sample Size	7172		6750	

4. Conclusion

There is an inverted U-shaped relationship between the age of the head of household and the decision-making of land transfer. That is to say, with the increase of the age of the head of household, at some point, the direction of the role of the head of household in the decision-making of land transfer will be reversed, which is consistent with the research results of Chen Zhiguo. The educational level of household heads has a positive impact on both transferring in and transferring out of land, which is consistent with the research results of Chen Fei. In addition, the value of farm household land and agricultural machinery has a positive effect on the transferring out of farmland, but the proportion of non-farm income and the cash deposit per capita of villages have a significant negative impact on the decision-making of land transfer; the income level of cities in each province and the value-added index of secondary and tertiary industries have a significant positive impact on the transfer of

farmland. The length of time costed for the farmers to depart from their village to reach the nearest commercial center have a significant negative impact on farmers' land transfer.

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