Does Internet Use Promote Rural Land Transfer?

—Based on the micro survey data of 8371 households in China

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Keywords: Internet use; Land transfer; Regional differences; Income level difference

Abstract: Based on the micro survey data of 8371 households in China, this paper uses a probit model to analyze how Internet use at the family level will affect farmland changing decisions. The results show that using the Internet can make the family farmland circulation rate significantly increase. After considering the regional characteristics of Internet use, the conclusion remains valid, and compared with the western and central regions, Internet use for eastern farmers' land transfer decision-making more prominent role in promoting. After considering the characteristics of farm household income levels, the conclusion remains valid and compared with low-income farmers, the income level of Internet use on the higher decision-making role of peasant household land mobility is evident. This paper believes that the government could lead to the Internet through farmland transfer activity, strengthening Internet training in rural areas, differentiation policy.

1. Introduction

In China, due to the rapid development of industrialization, the rural labor force of mass flow into the city led to rural land resource reconfiguration. Land to farmers from agricultural productivity is relatively low to farmers' relatively high productivity to improve the utilization efficiency of farmland resources (Jin and Deininger, 2009) [1]. At the same time, our country for a long time to the family as a unit of the division of household contract responsibility system also cause the rural land piecemeal, by land circulation and concentration, to ease the plight of current land management scale is relatively small, the agricultural specialization and medium scale management. The practice has proved that land transfer is beneficial to optimize the allocation of rural land resources, improve labor productivity, and promote agricultural modernization and industrialization in China.

It is stated that theory from rural aging distances from the township or county, farmers' property right system arrangement and security, "Internet + "the new land circulation pattern of land circulation. For example, Lu (2014) found that the closer from the county or township, farmers employment opportunity the more farmers migrant workers to make them more inclined to land circulation[2]. Che Lei al et. (2019) argue that middle-aged farmers, due to the limitation of family conditions and they are own hard to migrant workers, can only be engaged in agricultural production in rural or nearby workers, so the middle age of farm households are more inclined to turn to land[3]. Zhang Ruijuan (2017) found that it was difficult for older farmers to complete agricultural production independently. When these farmers could not complete agricultural production, they would transfer out of the land, so older farmers were more inclined to transfer out of the land[4]. Fan Dan and Wei Jiashuo (2020) believe that since the production efficiency of the non-agricultural sector is higher than that of the agricultural sector, young farmers will usually go out to work, so young farmers also tend to transfer out of the land[5]. Ma Xianlei et al. (2015) found that land property rights security can form production incentive effect, transaction price effect, and transaction cost effect, and the combined effect of the three affects land circulation behavior[6]. However, some studies have shown that the confirmation of ownership does improve farmers' willingness to transfer, but it does not significantly promote land transfer behavior. At the same time, the effect of property rights is determined by individual cognition to some extent. From the

  DOI: 10.25236/emss.2021.065

perspective of property right cognition, Jin et al. believed that village-level circulation regulation is an essential factor to restrain farmers' participation in the land circulation market [7]. Li Wanming et al. (2017) found that the existing online land transfer model has problems such as low quality of land resource information released by online transfer platform, little effect on solving the problem of asymmetric information of land transfer, and lack of guarantee for the interests and security of farmers and land investors[8]. Wang Guanlun et al. (2017) believe that in the form of Internet +, credit provision of e-commerce platforms and policy support from the government accelerate land circulation[9].

Although scholars on the influence factors of farmland circulation have much work, represented by Internet information technology impact of external shocks of farmland circulation has neglected the existing studies have shown that represented by the Internet information technology can positively influence the labor productivity of land productivity and total factor productivity [10]. However, the farmland circulation, as one of the most critical aspects of agricultural resources optimization, there are only around how to build up farmland conversion, which is based on the Internet platform and its efficiency of qualitative analysis, based on the micro-level and the lack of Internet use behavior can influence farmland circulation as well as the mechanisms by which the study of the impact. Therefore, using the dynamic tracking survey data of Peking University (China Family Panel Studies,CFPS), this paper investigates the internal relationship between Internet use and farmers' decision of transferring farmland out through Probit binary regression model, aiming to achieve three results in practice: one is to consider how to promote the transfer of farmland from the perspective of Internet. Second, consider the differences between Internet use and land transfer from the perspective of region and income. The third is to put forward policy suggestions that are beneficial to the circulation of agricultural land.

2. Materials and Methods

2.1 Data sources

The data used in this paper are from the 2018 national survey data of China Family Panel Studies (CFPS) of Peking University. The CFPS is a biennial tracking survey conducted for the first time in 2010 by the China Social Science Survey Center at Peking University. The Chinese Social Science Survey Center of Peking University covered 25 provinces (municipalities and autonomous regions) and adopted a three-stage cluster sampling design with unequal probability. The population of these 25 provinces (municipalities and autonomous regions) accounts for about 95% of the total national population, so that the CFPS numbers sample can be regarded as a national sample with adequate representation.

Because this paper studies the influence of Internet use on farmland transfer, the family is usually the unit to make a collective decision on whether to transfer farmland. Therefore, this paper studies this issue at the household level and limits families' sample from collective distribution to land. After screening, the final sample is included in the final sample, including 8,371 families surveyed in CFPS2018.

2.2 Variable selection

2.2.1 Dependent variable

Land transfer refers to the transfer of land management rights by farmers with land contract rights to other farmers or economic organizations. Retain contract authority, namely, make overuse right. Based on the practice of Zhang Jingna and Zhang Xuekai (2020) [11], this paper sets land transfer as a discrete binary variable, and according to the question in the questionnaire, "whether to rent land to others?" is defined as "letting" if the land is given to someone else for use, whether or not rent is charged. If the answer is yes, the value is 1; otherwise, it is 0.

2.2.2 Independent variable

Internet use. This paper uses the practice of Zhou Guangsu and Liang Qi (2018) [12]for reference

and uses the Internet usage of householders as a measure index of household Internet utilization. Use the question "Are you mobile online?" from the 2018 questionnaire. "And" Is there a computer online? "If the answer is no, then define the Internet usage value as 0. Otherwise, it is 1.

2.2.3 Control Variable

Drawing on the research of Zhang Jingna and Zhang Xuekai (2020) [11], Qian Long [13](2017), this paper selects individual and family-level control variables. The individual level's control variables include age, age square, gender, years of education, political status, and state of health. Indicators, household-level's control variables include household property income, see Table 1.

Table 1 Explanation of variables

Type	Name	Definition
dependent variable	land transfer	land circulation is assigned to 1. Otherwise, it is assigned to 0
Core independent variable	Internet use	According to the question "Do you surf the Internet on mobile? "And" Is there a computer online? "If the answer is no, then define the Internet usage value as 0. Otherwise, it is 1.
control variable	the householder age	The householder age.
	age square	Age square
	gender	man=1;woman=0
	education years	Primary school = 6,Junior high school = 9,High school = 12,University = 16,Master = 19,Dr = 22.
	politics status	The party members' = 1,Non-party people = 0.
	state of health	The definition was based on the questionnaire "whether was hospitalized due to illness in the past 12 months". If the answer was no, the value was 1.Otherwise, and it was 0.
	household property income	All income earned by a family member other than farming

2.3 Research methods

As the explained variable in this paper is a binary variable of farmland transfer, and the data obey normal distribution, the Probit model is selected to test the relationship between Internet use and farmland transfer. The Probit model has a latent variable Y^* when $Y^* > 0$. The explained variable takes the value of 1; otherwise, it takes the value of 0. Based on theoretical analysis, the expressions of the underlying variables and the benchmark model are respectively determined:

$$P(Y_{it}=1)=P(Y^*>1)=\varnothing(\beta_0+\beta_1 Internet_{it}+\beta_2 X_{it}+\mu_{it}) \quad (1)$$

$$Y_{it}^*=\beta_0+\beta_1 Internet_{it}+\beta_2 X_{it}+\mu_{it} \quad (2)$$

In the equation, Y_{it}^* represents the dummy variable of whether the I family in the t year has land circulation, $Internet_{it}$ is the binary dummy variable of whether the family uses the Internet, and X_{it} is the characteristic variable of the household head of family level.

3. Empirical analysis

3.1 Baseline regression result

To explore the influence of Internet use on land circulation, this paper adopts the Probit model, and the results are shown in Table 2.

The Internet coefficient is 0.042, indicating that Internet use has a positive impact on land transfer. First, the reasons may be as follows: First, Internet use, as a job skill, can increase the probability and stability of non-agricultural employment of rural labor, thus driving the transfer of rural land. Second, the Internet is used to broaden the channels of information. On the one hand, it is conducive to the agricultural land transfer contract agreed. Then, it broke the farmland circulation mainly in the limitations of the "acquaintance society."

On the other hand, reduced Labour market information asymmetry increases concurrent-business rural labor force is engaged in the production or the possibility of migrant workers, thus indirectly promote farmland circulation. Thirdly, the Internet is conducive to farmers' accumulation of social capital. As a social resource with the social network as the carrier, social capital can directly promote agricultural land transfer and indirectly affect the decision-making of agricultural land transfer by promoting non-agricultural employment.

Table 2 Regression results of the influence of Internet use on farmers' decision-making on farmland transfer

Variable categories	Model (1)
Internet use	0.042***(0.047)
control variable	Yes
N	6703
LR chi2	101.720
Prob> chi2	0.000
Pseudo R^2	0.015

Note: ***, **, * indicate significant at the level of 1%, 5% and 10% respectively. All reported coefficients are marginal coefficients, and robust standard errors are shown in parentheses.

3.2 Heterogeneity analysis

3.2.1 Regional heterogeneity analysis

The Internet infrastructure in different regions of China is different, and the role of Internet use in promoting farmers' land-transfer decisions is likely to show regional characteristics. In this part, the samples are subdivided into three regions: the eastern, central, and western regions and Probit regression is conducted respectively based on the sample data of the three regions, and the regression results are shown in Table 3.

Table 3 shows that farmers in eastern and central provinces can promote farmland transfer through Internet use, but the marginal coefficient of Internet use of farmers in eastern provinces is greater than that of farmers in central China. It indicates that rural households in eastern China can better use the Internet to realize rural land transfer, while households in western provinces have no significant impact on rural land transfer due to incorrect or unhealthy Internet use. The main reason is that in the rapid development of the Internet, the eastern region relatively perfect infrastructure, which provides farmers with the use of the Internet and hardware facilities. Meanwhile, the eastern region's economic development level is high. The Internet provides farmers with more employment information, and farmers have more employment opportunities, thereby enhancing the wishes of farmers' land circulation, but lack the Midwest these conditions, so the Internet for promoting land circulation effect is lower than the east.

Table 3 Regression results of the influence of Internet use in different regions on farmers' decision-making on farmland transfer

Variable categories	Eastern part	Middle part	West area
Internet use	0.063***(0.022)	0.052***(0.025)	0.011(0.019)
control variable	Yes	Yes	Yes
N	2481	1938	2283
LR chi2	67.800	24.110	36.390
Prob> chi2	0.000	0.002	0.000
Pseudo R^2	0.026	0.012	0.018

Note: ***, **, * indicate significant at the level of 1%, 5% and 10% respectively. All reported coefficients are marginal coefficients, and robust standard errors are shown in parentheses.

3.2.2 Heterogeneity analysis of income level

The level of regional economic development in China presents the characteristics of imbalance, and the family income difference is likely to show the difference in the decision-making of farmers'

land transfer. In this part, the samples are subdivided into three levels: high income, middle income, and low income, and Probit regression is conducted respectively based on the sample data of the three levels, and the regression results are shown in Table 4.

The results in Table 4 show that high and medium-income households can promote farmland circulation through Internet use, but comparatively speaking, the marginal coefficient of Internet use of high-income households is greater than that of medium-income households. It indicates that high-income farmers can better use the Internet to realize agricultural land transfer, while low-income farmers have no significant impact on their agricultural land transfer due to poor Internet infrastructure and other reasons. The main reasons are as follows: low-income farmers mostly depend on agricultural income, the function of agricultural land production factors is essential, the dependence on agricultural land is strong, and agricultural land circulation is low.

Table 4 Regression results of the influence of Internet use on farmers' decision-making on farmland transfer under different income levels

Variable categories	Low-income level	Median income level	High-income level
Internet use	-0.004(0.024)	0.044**(0.0200)	0.051**(0.023)
control variable	Yes	Yes	Yes
N	2228	2214	2269
LR chi2	77.420	22.18	12.100
Prob> chi2	0.000	0.002	0.097
Pseudo R^2	0.038	0.011	0.005

Note: ***, **, * indicate significant at the level of 1%, 5% and 10% respectively. All reported coefficients are marginal coefficients, and robust standard errors are shown in parentheses.

4. Conclusions

This paper discusses the impact of Internet use on rural land transfer from the household level and heterogeneity was examined. The results show that as the most important carrier of information technology, the Internet has a significant impact on the transfer of agricultural land, which is indispensable for an objective and comprehensive assessment of the impact of informatization on "agriculture, rural areas and farmers." This conclusion is still valid after considering the regional characteristics of Internet use. The promoting effect of Internet use on farmers' land-transfer decision in the eastern region is more evident than that in the western and central regions. This conclusion is still valid after considering the characteristics of household income level. Internet use has the most significant promoting effect on land transfer decisions of households with higher income levels.

The promoting effect of Internet use on rural land transfer indicates that the Internet can be an intermediary to activate and improve the rural land transfer market. First, we should guide the agricultural land transfer activities based on the Internet, add new impetus to the agricultural land transfer, promote the appropriate scale of the agricultural operation to guarantee the sustainable development of China's rural economy. Secondly, it is necessary to strengthen the Internet training for the rural labor force, break through the "bottleneck" that the education level is too low to use the Internet effectively, and promote the other play of the Internet's scale economy. Finally, because the use of the Internet has regional differences and income differences, different measures should be formulated for different regions and farmers' income groups.

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