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# Dynamic Research on Rural Land Transfer Based on Prospect Theory

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***ABSTRACT.*** *While rural land circulation promotes the scale of grain production, it also affects the changes in farmers' income in China. To this end, this paper analyzes rural land transfer behavior from the perspective of prospect theory, and considers the impact of farmers' psychological changes on land transfer, and further analyzes the efficiency of rural land transfer in China. According to prospect theory, we can recognize that the value of farmers' land transfer is not expected to be high. Agricultural income is relatively low, agricultural production has seasonal characteristics, and the opportunity cost of farmers' leisure is high. Therefore, the peasant rationality makes the choice behavior of the peasants move between 0 and 1 subjective probability of transferring land, which also explains the reason why most farmers in China adopt the concurrent business.*

***KEYWORDS:*** *Grain price, The transfer of the rural land, Prospect theory*

## 1. Introduction

While rural land circulation promotes the scale of grain production, it also affects the changes in farmers' income in China. General Secretary Xi pointed out that ensuring food production is an important basis for maintaining national security. With the acceleration of urbanization construction and the continuous improvement of rural productivity, the issue of land circulation has become a major issue in the study of China's rural economy. Farmers' psychology is affected by environmental factors and other factors, and there is certain volatility. The volatility of farmers' psychology plays a guiding role in the land transfer of farmers. Therefore, studying how farmers' psychological changes affect land circulation is an important part of solving the optimal allocation of rural land in China.

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## 2. Literature Review

So far, there have been a lot of research results related to the rural land transfer problem, including the classic ones: Wu Yuling, Qufutian (2006) analyzed that the existence of land transfer is the result of induced institutional change, and the improvement of scale operation efficiency is the internal factor of land transfer [1]. Zhong Funing, Wang Xingwen (2010) clarified that farmland transfer market can reduce land fragmentation from the perspective that the transaction cost of exchanging fragmented land among farmers far exceeds its benefits [2]. Wang Chunchao (2011)analyzed the factors influencing the decision-making behavior of migrant workers' employment mobility and concluded that under the circumstance of low overall wages, farmers' unions paid more attention to the level of welfare [3]. Yang Jirui, Wang Rui, Ma Yongkun (2014) linked the income source of rural contracted land property right with farmers' sharing of partial land rent and partial operating profit, discussed the problem that in the process of deepening the reform of farmland property right system, factors such as land, capital and including labor management and other elements on the reasonable realization of ownership in economy which should be taken into account [4]. Ma Xianlei, Qiu Tongwei, Qian Zhonghao (2015) research shows that whether farmers ultimately transfer farmland or the scale of farmland transfer depend on the productive effects of farmland property rights, transaction price effects and transaction cost effects [5]. Zhang Zongyi, Du Zhixiong (2015) pointed out that the degree of land transfer and non-grainization is related to the scale of land transfer, and there is an inverse relationship between the two paerts [6].

According to experts' research, rural land transfer issues include such things as rural land prices and benefits, risk prevention mechanisms, rural surplus labor transfer and rural social security systems, agricultural cycles and risk sharing, as well as transaction carriers, transaction costs, and income distribution systems. And a variety of factors such as policies and regulations, thus promoting the reform and improvement of China's rural land transfer system. We can also see that domestic research on land transfer mainly focuses on the analysis of the causes of farmer's land transfer, ignoring the impact of farmers' psychological changes on land transfer, and the conclusions of the study have certain limitations. Therefore, the use of prospect theory to explain the land transfer behavior of farmers can promote the efficiency of rural land transfer in China, and also provide new ideas for the reform of land transfer system in China.

## 3. Theoretical Analysis Based on Rural Land Transfer Prospect

Kahneman and Tversky (1979) in order to study the economy of individual psychological judgement and choice, discussed under the condition of the uncertain economic decision-making behavior, individual's experimental first assume that agents are rational, and a complete cognitive and computing capacity, then the decision-making process can be divided into editing stage and evaluation stage, which is on the basis of the traditional prospect theory proposing. According to the

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experimental data, this theory points out that even in the same environment, people will have different reactions due to their different profit andthe different performance of the welfare state. In order to strengthen the explanatory power of the society as a whole, many scholars added the capacity probability into the traditional prospect theory, which partially solved the problems of strong dominance and multiple results, and later developed the cumulative prospect theory in the form of cumulative function. The basic form of prospect theory is $U = \sum(p_i)u(\Delta x_i)$, where $u(\Delta x_i)$ representing the expected income when people choose, $p_i$ represents the psychological probability when the behaviors occur, and the product of the two represents the weighted value of all expected returns obtained when behaviors is represented by value function and weight function [7].

Hypothesis:

Ha.When carrying out land transfer, farmers pay more attention to the wealth change and utility change brought by land transfer, rather than the land wealth itself. The income and loss of the farmers are measured by taking the expected income of farmers' land transfer as the reference point.

Hb. In the value function, the same amount of income than the same amount of loss flat. This hypothesis indicates that the farmers believe that the pain is caused by the loss of land circulation is far greater than the happiness brought by the gain. In other words, the same amount of the loss will bring farmers higher sensitivity than the same amount of gain,that is, farmers have loss aversion.

Hc.The marginal value of farmers' land circulation loss and income increases with the increase of loss and income respectively.

### *3.1 Analysis based on value function of the rural land circulation*

According to the traditional prospect theory, the people's choice behavior is related to the product of the subjective expectation, the subjective income and the psychological probability. It is not difficult to find that the level of utility that farmers can obtain affects land transfer, and grain income is the most direct economic income of the farmers, as well as the source of rural basic welfare income of the farmers. And the grain price directly affects the farmers' actual income level has the most critical factor to decide farmers' land transfer decision. Therefore, we can apply the prospect theory, and take the grain price as a variable, and bring it into the study of rural land transfer, to investigate the mechanism of the effect of grain price on rural land transfer. By adding human psychological factors into the analysis of the decision-making behavior of farmers' land transfer, it is assumed that the factors related to the prospect of farmers' land transfer include the fluctuation of grain price, the efficiency of grain production and the psychological expectation caused by land transfer, etc., so as to set up the theoretical model of the fluctuation of grain price on rural land transfer.

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The prospect P of farmers' land transfer is expressed as $(p_1, x_1, p_2, x_2, p_3, x_3, p_4, x_4, p_5, x_5)$, where $x_1$ represents the income obtained by farmers' land transfer and grain, and $p_1$ represents the probability of obtaining such income. And so on, $x_2$ on behalf of the food prices to decrease the revenue probability $p_2$ (probability for rising food prices rising incomes $(1-p_2)$, $x_3$ represents the probability of grain productivity is $p_3$, $x_4$ said because food prices fell as the probability of food buyers for $p_4$, $x_5$ on behalf of the land circulation and farmers work caused by the instability of the probability of psychological anxiety status is $p_5$. Assuming that the utility function is concave, the model can be described as follows:

$$CPT(\mathrm{p}_1, \mathrm{x}_1, \mathrm{p}_2, \mathrm{x}_2, \mathrm{p}_3, \mathrm{x}_3, \mathrm{p}_4, \mathrm{x}_4, p_5, x_5) = \sum_{i=1}^{c}\left[\theta^{+}(\mathrm{p}_1+\cdots+p_c)\right]U(\mathrm{x}_i)+\sum_{j=c+1}^{5}\left[\theta^{-}(\mathrm{p}_j+\cdots+\mathrm{p}_5)\right]U(\mathrm{x}_j) \quad (1)$$

In (1), the value function CPT brought by land transfer is composed of loss utility and surplus utility caused by food price fluctuation, and it is the same direction variation function of loss or income. Value function U is used to describe the subjective total value brought by land transfer, and is a strictly continuously increasing utility function. The change of total utility brought by the probability change of each event is described by the probability weight function $\theta$, $\theta^{-}$ representing the probability weight of loss and the $\theta^{+}$ representing the probability weight of surplus.

Through the research, it is found that the rural migrant labor force is not able to bear long-term unemployment due to the lack of urban residents' minimum living security and unemployment insurance. With the increasing pressure of life and employment, the lack of the social security and satisfaction brought by the income of the transferred labor force leads to the low expectation of the prospects after the land transfer. Second, because the farmers in the land circulation due to the loss of land, and a large proportion of the land circulation is still belong to the informal circulation, farmers due to the concerns of the land circulation after the influence of psychological factors, such as utility levels due to land circulation in the continuous decline, the risk of basic life are difficult to secure the psychological burden of farmers.

Through the above analysis, we can see that although the land circulation, the farmers can get higher income migrant workers, an $x_1$ and $p_1$ will increase thereby, but due to the social and economic development, farmers must assume a certain risk of unemployment, coupled with the land circulation caused by psychological stress, as well as food prices fluctuate, the uncertainty of peasant's income. All of these

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things suggest that the value of $x_5$ and the probability of $p_5$ occurrences are large. For farmers, after the transfer of land, their grain productivity $x_2$ will decline. In the case of a certain level of the agricultural technology, the probability of grain productivity decline $p_2$ will increase due to the decrease of farmers' land area. Although the benefits of land outweigh its transaction costs, most farmers may go from being sellers of grain to being buyers of grain in a larger sense, so $p_3$ is bigger.

As farmers are more sensitive to loss than gain,the decision weight is an increasing function of probability weight. Moreover, people value not only the absolute amount of wealth, but also the change of wealth. Therefore, the result of land transfer X is in descending order as $x_1 \le x_2 \le x_3 \le x_4 \le x_5$ . According to the traditional perspective theory, people's choice behavior can be expected under different risk expectation conditions. The transfer of land by farmers depends on the change of their own welfare level. If the current situation of farmers without land transfer is set as 0 as the reference point, we can see that the result of farmers' land transfer is negative and the income is less than 0.

At present, farmers either transfer the land out, completely outside employment,or transfer a small amount of land or farm it all yourself. Therefore, whether peasant households transfer land or not depends on the choice between peasant households as rural labor force transfer and total dependence on agriculture.

### *3.2 Analysis of rural land transfer based on weight function*

According to the traditional prospect theory, the decision weight function $\partial$ is generated by $\theta^+$ and $\theta^-$ ,the probability weight and the properties of the decision weight function are as follows: first, the decision weight is a strictly increasing function within the interval of [0, 1], and $\partial(0)=0, \partial(1)=1$. Secondly, the decision weights are sub-deterministic, which is characterized by the subadditive function p (p) for low-probability events. Thirdly, the decision weight has a subscale property, which indicates that, in the process of decision making, farmers tend to assign a higher weight to events with low probability and a lower weight to events with high probability. Therefore, we can get:

$$\partial_m = \begin{cases} \theta^+(\mathrm{p}_1+\cdots \mathrm{p}_m)-\theta^+(\mathrm{p}_1+\cdots+\mathrm{p}_{j-1})\cdots m \le c \\ \theta^-(\mathrm{p}_1+\cdots \mathrm{p}_n)-\theta^-(\mathrm{p}_{j+1}+\cdots+\mathrm{p}_n)\cdots m > c \end{cases} \tag{2}$$

Therefore, CPT can also be expressed as: $CPT(\mathrm{p}_1,\mathrm{x}_1,\mathrm{p}_2,\mathrm{x}_2,\mathrm{p}_3,\mathrm{x}_3,\mathrm{p}_4,\mathrm{x}_4)=\sum_{i=1}^{4}\partial_i U(\mathrm{x}_i)$

Marxism holds that "people decide what the ideas and thoughts to produce by themselves, restricted by the productive forces and the corresponding communication (including the most remote form of communication)". Before the

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reform and opening up, China was mainly an agricultural society. After the reform and opening up, although farmers can freely cross the dual economic structure and flow to non-agricultural fields, the attitudes and habits of Chinese farmers formed in the long-term daily production and life form a conservative force and tend to overestimate the uncertain risks. When farmers are faced with the benefits of land transfer, they are highly sensitive to the losses they will suffer. Therefore, farmers' behavior choice of land transfer is usually risk-averse. According to a large number of empirical tests conducted by Kahneman and Tverskey, compared with the decision making of deterministic events, the decision makers prefer the decision making with certainty, so the farmers give a small subjective expectation of the possible benefits brought by the transfer, and the sum of the decision weights of the risk events of land transfer is small.

Farmers rationally believe that although the income obtained from migrant work meets the needs of farmers themselves, it may be affected by various impacts, such as economic system and education level, and the imperfect social security system makes the income from migrant work highly uncertain. From the perspective of the existing farmland system, the income from land transfer reduces the risk brought by land transfer for farmers, provides stable wealth (or income) for farmers, and greatly increases the motivation for farmers to transfer. There is also certainty about falling productivity and the cost of buying food. Therefore, the land is the most secure guarantee for their livelihood. It is very risky to completely transfer out of the land, and the subjective probability of completely transferring out of the land is close to 0. The sensitivity of farmers' reliance on land transfers is low compared with the cost of higher food prices. It can be seen that farmers have a certain "status quo bias". When facing losses, they attach greater decision-making weight to the risks brought by land transfer. They are not willing to give up the certain benefits brought by land transfer, and are more inclined to give greater value to the land they already own.

According to the nature of the weight function, the probability evaluation of farmers is prone to abrupt changes in the boundary zone where they approach the behavior of holding the land completely. The probability evaluation of this deterministic event is very low, and it will give very little weight to this behavior. This also provides a scientific explanation for the majority of rural households in China to implement part-time employment. That is to say, in the decision-making of land transfer, the main factor determining the direction of farmers' decision-making behavior is the size of their subjective probability. When the subjective probability is close to both sides, farmers will become very sensitive.

## 4. Conclusions and Suggestions

Optimizing the resource allocation of land is to improve the utilization efficiency of rural land in the country, and it is particularly important to deal with the problem of rural land transfer. This paper takes the grain price as the entry point and studies the farmers' land transfer behavior, mainly explaining the following viewpoints: First, the fluctuation of grain prices leads to the uncertainty of farmers' income. At the same time, due to the influence of economic system and the degree of education

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of farmers, the rewards of farmers as rural labor transfer show great uncertainty; secondly, because farmers are more sensitive to losses than to income. After the farmers transfer the land out, the purchaser of the grain will suffer certain losses. The change in the price of the grain does not bring high value fluctuations to the farmers. Once again, due to the decline in the efficiency of agricultural production, the farmers will also Expected incomes to become lower. China has long been an agricultural country. Farmers are always influenced by past thoughts and are always risk averses, giving higher weight to certain outcomes. According to prospect theory, we can recognize that the value of farmers' land transfer is not expected to be high. From another point of view, agricultural income is relatively low, agricultural production has seasonal characteristics, and the opportunity cost of farmers' leisure is high. Therefore, the peasant rationality makes the choice behavior of the peasants move between 0 and 1 subjective probability of transferring land, which also explains the reason why most farmers in China adopt the concurrent business.

In the process of deepening the reform of rural land property rights system, the government should use modern information and Internet technology to establish and improve the information flow network of rural contracted land, and better collect, organize, publish and manage various information related to rural land transfer. Provide timely and accurate information services, actively guide the rural contracted land transfer intermediary organizations to develop steadily, build a new trust mechanism, reduce transaction costs in land transfer, and increase the income that farmers can obtain from contracted land circulation. Give full play to the role and functions of the market in terms of price discovery and resource allocation, and stabilize domestic food prices and balance domestic grain supply and demand by adopting several policy measures such as agricultural subsidies, minimum food purchase prices, grain reserves and import and export trade regulation. Increase investment in rural social security funds, establish and improve rural social security systems, improve farmers' risk prevention capabilities, attach importance to cultivating farmers' personal qualities and human capital levels, accelerate the pace of rural labor transfer and urbanization, and upgrade rural areas. The transfer efficiency of the contracted land.

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