
REVIEW ARTICLE

Economic analysis of forestland use rights transfer and forestland welfare change

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ABSTRACT

This paper qualitatively analyzes the connotation of woodland welfare and the changes of woodland welfare that may be caused by the transfer of the right to use, and interprets the welfare improvement caused by the transfer of the right to use of woodland in the ideal state by using the relevant theories and models of microeconomics. Based on the prospect theory and psychological account theory of behavioral economics, this paper analyzes the reasons why the transfer of forestland use right has not been carried out on a large scale in China.

Keywords: Woodland Use Right; Circulation; Woodland Welfare; Behavioral Economics

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1. Introduction

Forest land is an important part of forest resources and land resources. The right to use forest land is a property right separated from forest land ownership, including the right to occupy, use, benefit and dispose of the forest land under certain conditions^[1]. In the 1990s, some provinces (autonomous regions and municipalities directly under the Central Government) of our country made a beneficial attempt to the circulation of forestland use right and achieved some results^[2]. With the deepening of the reform of collective forest tenure system, it has become an inevitable choice to promote and regulate the circulation of forest land use right^[3]. Previous studies on this aspect mainly focus on the following two points: first, the transfer mechanism of forestland use right, and macro-qualitative research on existing problems and countermeasures^[4-6]. The second is the field investigation and research on the circulation of forestland use right^[2,7,8]. However, there is a lack of economic research based on the micro perspective of farmers. But in terms of land transfer welfare, Yuan *et al.*^[9], Liu *et al.*^[10], Gao *et al.*^[11], Xiong *et al.*^[12], Fan^[13] carried out some pioneering studies, which provided important references for the study of forest welfare. Based on the basic theories and methods of welfare economics, microeconomics and behavioral economics, this paper analyzes the benefits of forestland transfer from the perspective of farmers. It also explains the difference between the ideal welfare improvement and the actual transfer situation, and promotes the normalization, marketization, rationalization and efficiency of the use of forestland use rights transfer in our country.

2. Forestland use right circulation and forestland welfare

2.1 Connotation of woodland welfare

In microeconomic theory, welfare is considered to be a reflection of individual or collective preferences or level of satisfaction. Economics generally assumes that agents are rational and its goal is to maximize welfare. Forest land is a rare and precious resource. The multifaceted use of forest land brings a wide range of benefits to people. The main aspects are as follows: (1) economic welfare: farming forest land can obtain forest land economic production, provide farmers with tradable forest economic products, thus generating economic benefits; (2) ecological welfare: forestland can provide water conservation, wind prevention and sand fixation, environment purification, carbon sequestration, climate regulation, wildlife habitat and biodiversity protection and other multi-ecological services; (3) social welfare: for farmers, forest land not only has productive function, but also has non-productive function. Forestland can provide farmers with a series of social welfare, such as production and living guarantee, employment opportunity, social status, psychological comfort, labor preference, inheritance rights for future generation, future development and compensation mechanism guarantee.

2.2 Forest land welfare brought by transfer of forest land use right under ideal state

Under the ideal condition of assuming that the circulation of forest land use rights is smooth and effective, the circulation of forest land use rights can give full play to the allocation function of the market and make full use of idle forest land resources which is an effective measure to deepen the reform of forestry management mechanism and an effective mean to improve forestry productivity. It is conducive to promoting the scale, intensification and efficiency of forestry management, and promoting the realization of the goal of sustainable forest management^[5,14,15]. Generally speaking, the circulation of forestland use right can bring the following benefits: (1) promoting large-scale man-

agement of forest land, revitalize forests with science and technology, and improve the economic welfare of forest land. Household management of forest resources usually results in fragmentation of forest resources and ecosystem. And due to limited human resources and technology, household management is often in a low-level operation. Forestland can make forestland transfer to the main body that has the ability to engage in large-scale intensive management, so as to help realize the centralized production of forestland, unify the operation and form a standardized economy. After acquiring the right to use forestland in the form of paid transfer, the operators pay more and more attention on improving economic benefits by relying on science and technology. They actively hire forestry technical personnel to give guidance, take initiative to understand forestry related laws and regulations, and learn new forestry technologies and achievements actively, so as to promote the application of science and technology in forest management and effectively improve the economic welfare of forest land.

(2) Promoting the protection and sustainable management of forest resources and enhance the ecological welfare of forest land. The paid circulation of forestland use right makes forestland users pay the cost for using forestland. Therefore, it is the most effective way to motivate farmers' forest land economic activity through interest drive. Driven by the interest mechanism, protecting forest land is to protect a part of their own property rights and interests. They take forest as their own assets and have a stronger initiative to protect forest land, which makes it better protected. In addition, in order to realize the forestland pre-harvest benefits, farmers value the forestland management rights, actively increase the pace of afforestation and greening, strengthen forest tending management, take measures such as watering, fertilizer, disease and insect pest prevention and treatment to improve the level of forest operation and management, promote the sustainability of forest resources, so as to enhance the ecological welfare of forest land.

(3) Widening the forest industry investment channels, promoting labor force shift, improving the social welfare of forest land. The circulation of for-

estland use right revitalizes forestland resources, turning forestland resources into forestland assets, which in turn become forestland capital under the support of financial instruments. Farmers can obtain profits through the circulation of forest land, carry out forest land capital operation through forest tenure mortgage, further expanding the channels of forestry investment. After the circulation of forestland use rights, a good situation has gradually formed in which the whole society runs forestry, and the state, collective and individual investors actively participate in forestry construction. In addition, with the rapid development of non-agricultural and non-forestry industries in rural areas, the opportunity cost of farmers to operate forestry has increased, and the transfer of forestry labor is also very obvious due to the temptation of comparative interests. Through the transfer of forestland use right, more rural surplus labor force can be released from forestland, promoting the non-forestland industry, social transformation and economic development of rural villages, and improving the social welfare of forestland.

Ideally, the transfer of forestland use rights can not only promote the improvement of individual welfare, such as the individuals' economic benefits and social welfare from forest land transfer, but also can promote the overall level of social welfare. Forestland circulation can improve the scale benefit of forestland, promote the transfer of labor force, promote the transformation of ecological conditions and environmental benefits. Certainly, the increase of the overall welfare of the society is not the same as the increase of the individual welfare of farmers. Farmers usually consider the change of their own welfare level when rationally choosing the behavior of forestland transfer.

3. Microeconomic analysis on welfare improvement of forestland use right transfer

From the point of view of economics, farmers are usually assumed to be economic people. The circulation of forestland use right is a rational choice. In the followings, microeconomic theories are used to explain the main welfare improve-

ment brought by the transfer of land-use rights, that is, it can promote the transfer of rural labor force and employment opportunities, and optimize the allocation and scale management of forest resources.

2.2 A shift in employment opportunities

The essence of forestland use right transfer is the transaction process of forestland use right and management right, and also the transfer process between forestry employment opportunities and non-forestry employment opportunities for both parties involved in the transferring process. The non-forest employment income level of the transferring households is the opportunity benefit of transferring out the forest land use rights. Whether there are sufficient non-forest employment opportunities and a high level of non-forest income will greatly affect the willingness and actual behavior of transferring households.

Pareto optimality in microeconomic theory refers to a state of resource allocation. Without making any human situation worse, it's impossible to make somebody's situation better. In the optimal allocation of two given amounts of resources between two consumers, if the satisfaction of each utility (or interest) is maximized, then the state of Pareto optimal of the exchange of resources is reached^[16]. Forestland use rights transfer is a mutual transfer between preference of forestland management behavior and preference of non-forestland management behavior without considering the forestland and non-forestland employment benefits expectations. Through the transfer of forestland use right, the demands of forestland management and non-forestland management of transfer-out party and transfer-in party have been satisfied. Their welfare level has been further optimized. This can be illustrated by the further use of the Edgeworth box diagram (see **Figure 1**).

In **Figure 1**, transfer-out household A and transfer-in household B are the two main bodies of the transformation. Their operating resources are limited. There are two alternative strategies for business behavior, that is, after dividing forest to households, choose forest land management or transfer out forest land to engage in non-forest

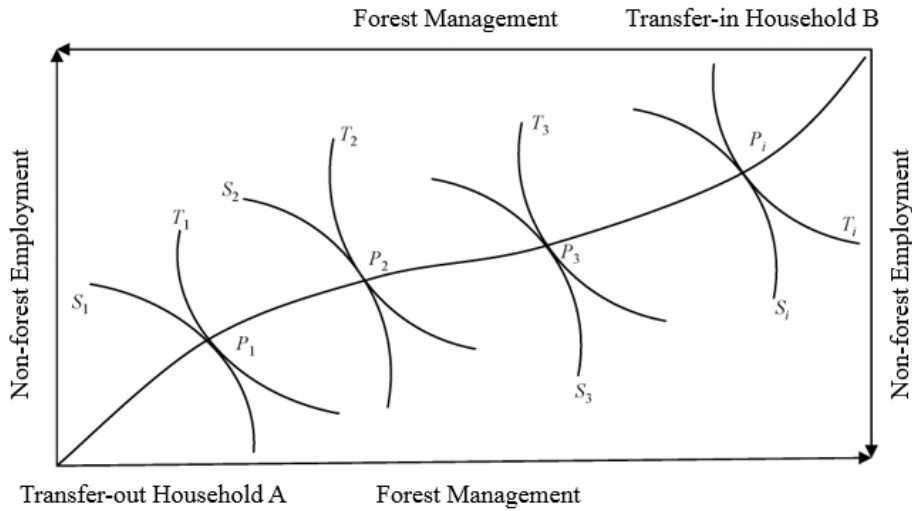


Figure 1. Edgeworth box diagram of conversion between forest management and non-forest employment of transfer-out household A and transfer-in household B.

management behavior. The indifference curve of transfer-out household A is $T = \{T_1, T_2, T_3, \dots, T_i\}$, and the indifference curve of transfer-in household B is $S = \{S_1, S_2, S_3, \dots, S_i\}$. Where, i represents the number of exchanges. The tangent point P_i of the indifference curves of transfer-out household A and transfer-in household B is the Pareto optimal point for resource allocation and exchange, while the curve $P = \{P_1, P_2, P_3, \dots, P_i\}$ constructed by all the tangent point P_i is the contract curve of resource exchange, representing the set of all optimal allocation (Pareto optimality) of two resources between the transfer-out and transfer-in households^[16]. It can be seen from this those points outside the contract curve, the marginal substitution rates of the indifference curves of the transfer-in and transfer-out households are not equal. Both parties to the transaction did not reach Pareto optimal state. In this case, continuing the transaction can improve the situation of both parties and increase the welfare of both parties. Until the marginal substitution rates of the indifference curves of both sides to the transaction are equal on the contract curve, the two-way satisfaction is maximized, and the transaction reaches Pareto optimal state^[16]. For transfer-out households, if there are not enough non-forest employment opportunities to guarantee the income level of farmers, their actual and expected income will decrease, the opportunity cost of circulation transactions will increase, and the willingness of circulation will decrease; for the transfer-in households, if there is no higher expected profit of for-

estland operation after the transfer, the willingness of farmers to transfer forestland will be significantly weakened. Therefore, only when the respective forest-land revenue and non-forest employment revenue of both sides after the circulation are optimized, that is, when each point on the optimal transaction contract curve P is reached, can the circulation transaction reach Pareto optimality.

3.2 Optimizing allocation and scale management of forest land resources

The transfer of forestland use right can effectively solve the fragmentation of rural forestland. The improvement of forest management model will help to realize the scale economy. Mass production can improve the application of production technology, change the input combination of production factors through production technology so as to lower costs and raise the productivity. This paper analyzes the short and long-term production equilibrium curves. As shown in **Figure 2**^[13], short-term marginal cost curve SMC_{ab} and short-term average production cost curve SAC_{ab} represent the production scale of household A and household B under the short-term production equilibrium situation. Due to the small production scale of farmers A and B, it is difficult to rationalize the production cost ratio under the given production scale and production technology, and production costs are also relatively high, so households A and B's optimal point in the short-run production equilibrium is at point a. The production of its counterpart is Q_l . Under the

condition that the existing resources are fully utilized in the long-term and the existing production factors are reasonably allocated, the farmers can produce at most at the lowest point b of the short-term average production cost curve SAC_{ab} , and the output is Q_2 . If the forestland use rights circulation is implemented, making woodland A and B managed by one household, set as household C, then the short-term marginal cost SMC_C and short-term average production cost SAC_C represent the production scale of farmer C. In the long run, because of production factors such as labor input, production technology and production resources have changed and existing of scale economy, household C can produce at the long-term pro-

duction equilibrium point c , which is tangent point between the long-term cost curve LAC and the long-term marginal cost curve LMC, and its yield is Q_3 . Obviously $Q_3 > Q_2 > Q_1$, so the production goes up. Point c is lower than point a , indicating that the cost of centralized production of household A and household B is lower than that of individual production, thus, the optimal allocation of forest resources and scale economy are realized.

To sum up, under the ideal state, the transfer of forestland use rights promote the conversion of labor force and employment opportunities in rural areas, and the realization of scale economy of forestland, thus realizing the improvement of individual welfare and overall social welfare.

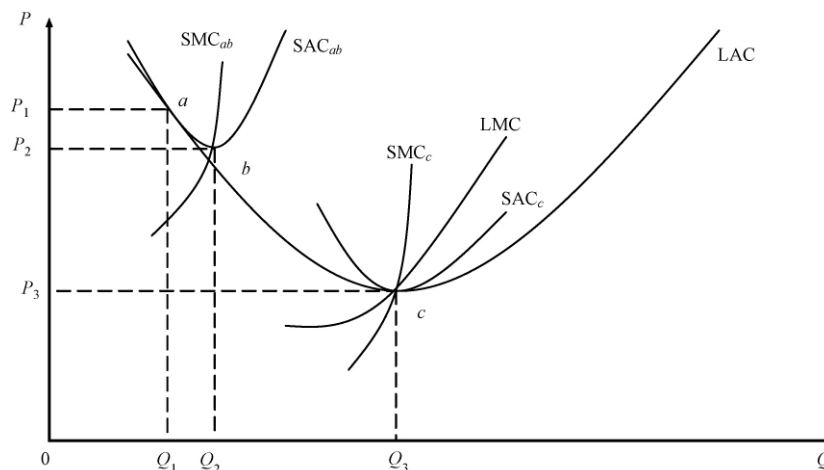


Figure 2. Utility of forest scale management.

4. Behavioral economics analysis of current situation of forestland use right transfer

Currently, the macro social and economic environment in our country has greatly changed, property rights further clarified, market economy system has improved a lot, social economy develops relatively fast, and non-agricultural income of farmers increased constantly. However, in practice, the large-scale transfer of existing forest land does not occur as expected as the ideal state analyzed above. From September to November 2007, the Economic Development Research Center of the State Forestry Administration conducted a survey of circulation of forest land use rights in 9 counties of four representative provinces of the national collective forest rights system reform (city): Jiangxi, Fu-

jian, Liaoning and Yunnan, 18 townships (towns), 32 administrative villages, 305 rural households, 292 valid questions were obtained. The results showed that the occurrence rate of farmers' forest land transfer was still low, but significantly increased after the forest reform compared to the pre-forest reform. Farmers' forest land transfer has not reached a certain standard scale, and there is still a long way to go before the real forestry scale operation^[17]. The reasons behind are worth investigating

In September 2009, the author organized a research team to conduct a questionnaire survey to the 180 typical sample farmers in Tonggu county and Jing'an County of Yichun City, Jiangxi Province. In December 2010, a total of 212 typical sample peasant households were investigated in Shaowu (county-level city) and Youxi County of Sanming in

Nanping, Fujian province. A total of 366 valid investigation papers were obtained, with an effective rate of 93.4 %. The investigation indicated that the farmers who were willing to transfer out accounting for 26 %, farmers who were not willing to transfer out accounting for 74%. This shows that under the current policy environment and income conditions, the majority of farmers choose to manage their own forest land, and there is a certain but not extensive mass base for forest right transfer^[18]. 60 households of the investigated households once transferred in forest rights, accounting for 16%; 30 households once transferred out forest rights, accounting for 8%; 14 households once transferred in and transferred out forest rights, accounting for 4%; 262 households, accounting for 72%, did not transferred forest rights. The results also indicate that forest rights transfer has not been widely carried out in the sample areas.

The following uses the theory of behavior economics to analyze the behavior of farmers' forestland transfer, and the deeper and more realistic reasons why forestland transfer did not happen on a large scale. From a behavioral economics perspective, the main reason why farmers do not want to transfer out forestland use rights on a large scale is that their economic behavior is largely influenced by survival ethics, endowment effect, expectation effect and mental accounting, etc.^[11].

4.1 “Safety first” and “risk avoidance” survival ethics

According to the prospect theory of behavioral economics, the decision-making process is mainly determined by the value function and the decision weight function, while the value function depends on the change of wealth and is expressed by the gain or loss relative to a reference point. People tend to be risk-averse when facing the prospect of profit^[19]. For a long time, Farmers in China have been at the bottom of the society, forming the survival concept of “safety first” and “risk avoidance”, and the purpose of farmers' economic behavior is not to pursue “efficiency” but for life. Farmers do not pursue the maximization of interests in economic rationality, but take survival protection as the starting point and prefer to reduce the proba-

bility of loss. In the farmers' consciousness, land is the guarantee for their survival due to the uncertainty of their future life and living period, and being separated from the soil means the risk of survival. The behavior decision of farmers for land must be based on survival and security. Therefore, under the survival principle of “safety first” and “risk avoidance” of farmers, although the living environment of farmers is still improving and forestland transfer has more economic benefit of scale, forestland transfer may not get the positive response from farmers^[12].

4.2 Endowment effect and expectation effect

The endowment effect, which Thaler discovered in 1980, suggests that people value what they own so much that it takes a lot for them to give it up^[19]. After the implementation of the land household contract responsibility system in China, farmers and people enjoy the contracted management rights and use rights of forest land, and can lease the forest land at a lower price or without compensation. In a sense, it can be considered that forest land has become a source of resources for farmers and family wealth. For farmers, the transfer of forestland use rights means that their original family resource endowment and means of production have changed, and the contracted forestland has changed from existence to non-existence, and farmers have lost the opportunity to obtain sustainable forestry benefits. In particular, with the advancement of property rights reform, the introduction of various preferential policies, and the decreasing cost of occupying and managing forestland, the endowment is even more obvious. In addition, with the improvement of forestry production level, people's environmental awareness and demand for environmental products and services is increasing day by day, and the potential value of forest land is also rising. Today, though, non-forest income of farmers in many areas is sufficient to sustain their livelihoods., the scale transferring of forest land is not occurring as expected. The important reason is that: farmers believe that the current transfer price of forestland use right is low and forestland value will continue to rise in the future. In addition, the uncertain expectation of future life makes them more in-

clined to retain forestland. On the one hand, they seek safety protection, and on the other hand, they expect to transfer forestland at a higher price in the future. Therefore, because of the endowment effect and the expectation effect, farmers are not willing to transfer out the forest land.

4.3 The influence of mental accounting

The mental accounting was developed by behavioral science professor Richard Thaler of University of Chicago. Whether it is an individual, a group or a company, there exists one or more explicit or potential account systems. These account systems tend to follow some underlying psychological operation rules that are contrary to the rules of economic operation and influence individual economic decisions^[19]. In rural areas, farmers generally regard the right to contract forestland they enjoy and the forestland they contract as part of their assets, regardless of the form in which the forestland is retained, they are used to regard it as their own assets and form their own “mental accounting”^[12]. Considering the uncertainty of future economic benefits, farmers will have a stronger sense of psychological panic after the loss of forest land use right. Farmers are more willing to entrust their idle forestland to members of the village group or relatives and friends for management without an agreed term, because there is no psychological impact on the final possession of the forestland contracted by the farmers, so they can take it back when necessary, and not lose the forestland psychologically. Therefore, the private management of off-site forest land between village members or friends is the main way of forest land transfer in practice.

5. Enlightenment

Farmers are directly involved in the transfer of forestland and their behavior decisions directly affect the smooth transfer of forestland. Therefore, the government should consider the gap between theory and practice in the process of formulating forest land policy and promoting forest land circulation. Farmers are limited rational subjects in the practice of forestland use right transfer. It is necessary to take a behavioral economic perspective, pay attention to farmers’ “economic rationality” and

“non-economic rationality” double conduct research. Focusing on households behavioral decision habit, understanding their real willingness to transfer, adding the related policy to transferring, stabilizing forest land management system, establishing and improving social society system, eliminating farmers’ psychological worries, appropriately guiding households’ economic behavior, so as to promote the formation of stable psychological expectation and mental accounting. Only in this way can we effectively promote the transfer of forest land use rights, and finally promote the effective improvement of forest land economy, ecological condition and social welfare.

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Conflict of interest

The authors declare that they have no conflict of interest.

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