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Interaction Relationship between Agricultural Insurance and Transfer of Land Contract Rights Based on Game Analysis of Farmer Selection

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Abstract

In the new stage of rural reform, faced universal transfer of land contract rights, one of the most important tasks of rural system construction is accelerating development of agricultural insurance in China. However, agricultural insurance does not function efficiently enough to accord effective protection to farmers in land contract rights transfer, and agricultural insurance and transfer of land contract rights become a dual dilemma. To address this difficulty, agricultural insurance is premised to improve the implementation of land contract rights transfer, in which appropriate safeguards are acquired. Thus, the introduction of game theory is necessary and feasible for analyzing the strategy by which farmers select agricultural insurance and land contracts. Based on game analysis, the “players” are the agricultural insurance and land contracts encountered by farmers; “strategy” is composed of agricultural insurance and land contract selection behaviors. Farmer behavior can achieve equilibrium of anticipated profits. Equilibrium then yields the “outcome,” which is the cooperation and win-win solutions that may be achieved between agricultural insurance and transfer of land contract rights. Thus, in the rational selection process of farmers, agricultural insurance and transfer of land contract rights can facilitate positive support, interaction, and development. These will help realize overall progress in system innovation with respect to agricultural insurance.

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1. Introduction

As a foundation of modern agricultural development, agricultural insurance is the key to maintaining the steady improvement of agricultural production, providing additional benefits to peasants, and promoting social stability in the countryside. The Third Plenum of the 17th Central Committee of the Communist Party of China has encouraged the universality of land contract rights transfer in agricultural production and operation. Likewise, the scale of

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agricultural land management has been continuously expanded. As a result, agricultural risks faced by farmers exceedingly increase. Objectively, further requests are raised with regard to the ability of agricultural insurance to counter operation risk. To protect the interests of farmers and strengthen the capacity for withstanding risks in agricultural production and operation, following through on agricultural insurance requires persistent focus. The Agricultural Law of the People's Republic of China stipulates that the state will gradually establish and improve the system of policy-oriented agricultural insurance. *The decision on Major Issues Reform and Development* during the Third Plenum of the 17th Central Committee Communist Party of China puts forward the demand to strengthen policy-oriented agricultural insurance. The Premier Report on the Work of the Government in the 3rd Session of the 11th National People's Congress emphasized accelerating the development of agricultural insurance. Thus, under the encouragement of the state and with the broad participation of farmers in land contract rights transfer, important issues in the establishment of an agricultural insurance system include how to promote agricultural insurance development and strengthen coordination and interaction between agricultural insurance and land contract rights transfer.

In legal science, numerous studies focus on internal perfection and legal construction of agricultural insurance systems; however, immediate attention has not been accorded to the external environment surrounding land contract rights transfer. From a legal research angle, this study is premised on reconciling the “competing” principles of agricultural insurance and land contract rights transfer to determine a correlation between the two, and therefore, maximize this correlation. Furthermore, we explore the interaction between agricultural insurance and land contract rights transfer to encourage positive thinking, thereby promoting coordination between these two fields.

2. Correlation between Agricultural Insurance and Land Contract Rights Transfer

By the end of 2009, the total number of farmers who acquired agricultural insurance reached 133 million, an increase of 48% over last year. In view of the overall situation, however, the current policy-oriented agricultural insurance is still in its initial and exploratory stage, most of farmers didn't select insurance. Compared with enormous demand for the healthy development of agriculture, gaps in various aspects of agricultural insurance exist. Because most of farmers waiving agricultural insurance, 708 million mu accounted for crop disaster areas but only 169 million mu was compensated by agricultural insurance in 2009 [1]. In the practice of land contract rights transfer, farmers impose demanding transfer requests on land contract rights in agricultural production and operation. However, their awareness of participation in agricultural insurance is very weak. Farmers are strangers to agricultural insurance. They refuse to acquire agricultural insurance because they find it unacceptable to pay insurance costs incurred from losses that may not directly affect them. Thus, the mechanism of agricultural risk management in land contract transfers cannot be smoothly established.

The more the farmers refuse to participate in agricultural insurance, the fewer the chances that the transfer of land contract rights can be fully guaranteed. Possibly, this leads to retrogression which influences the processing of land contract rights transfer; consequently, agricultural insurance will not be accepted by farmers. That is, the concentrated representation of mutual restriction on agricultural insurance and land contract rights transfer is affected by the negative perception of farmers as they go through the selection process. From a positive assumption, however, an ideal state exists: the further agricultural insurance develops with the participation of farmers, the higher the chances that transfer of land contract rights can be fully guaranteed. The development of agricultural insurance is then further promoted, coupled with the achievement of protection in land contract rights transfer. That is to say, implementation of agricultural insurance provisions can be improved through the land contract rights transfer, and land contract rights transfer can accord beneficiaries due security via agricultural insurance. Both sides can therefore achieve interactive progress. Thus, under the requirements of farmer selection, a high correlation exists between agricultural insurance and land contract rights transfer; the relationship of cooperation and countermeasure between them also exists. For this reason, introducing game theory into the analysis of relationships between agricultural insurance and land contract rights transfer is essential and feasible.

3. Game Relationships of Agricultural Insurance and Land Contract Rights Transfer

Game theory contends that behavioral subjects use the information they have, choose options, take action, and obtain corresponding results by optional strategy simultaneously or sequentially, one or more times under specific

conditions and regulations. This method has a vital role in conflict resolution and coordination development of social problems. The realistic contradiction between agricultural insurance and land contract rights transfer under the desires of farmers in the selection process can be reconciled in game analysis.

Game theory pays attention to interdependent relationships of players in a group [2], and creates logical connections with the behavioral objectives of subjects, behavior, and corresponding results; thus, the behaviors in specific conditions are the strategies and the results of the strategies are described as outcomes, in which the structure is evaluated based on the available utility of players [3]. Because of the interdependence between agricultural insurance and land contract rights transfer, it is assumed that the players, as rational behavior subjects, are the agricultural insurance and land contract rights transfers faced by farmers. The strategies are the agricultural insurance and land contract selection behaviors. The actions and results of both sides can correlate with interior relationship in logic. Based on the interpretation above, this research can establish the game relationship between agricultural insurance and land contract rights transfer. The relationship can show the behavior strategies as agricultural insurance and land contract rights transfer assume the role of players, in which the game is played as required, an equilibrium state is engendered, and the structure of the outcomes can be obtained. The outcome may be a Nash Equilibrium, zero game, or positive game, which has a unique utility based on evaluation.

4. Game Strategies of Agricultural Insurance and Land Contract Rights Transfer

Although the system improvement of agricultural insurance is the focus in theoretical study, it has poor development in the practice of land contract rights transfer. On the other hand, land contract rights transfer spontaneously progresses according to the voluntary selection of farmers. However, the issue of risk in agricultural production and operation has not been addressed with effective solutions. Once extreme climates continuously occur, natural calamities occur frequently, and farmers who do not have agricultural insurance cannot earn income but suffer huge losses, far beyond common losses incurred before land contract rights transfer has been implemented. Farmers lose confidence in land contract rights transfer, policy-oriented agricultural insurance is not considered a qualitative breakthrough, and agricultural insurance and transfer of land contract rights becomes a dual dilemma. Agricultural insurance and transfer of land contract rights seem irreconcilable, even if the two behaviors have the possibility of developmental interaction. Therefore, the strategies of both sides require investigation.

4.1. Strategy Evolution of Agricultural Insurance and Land Contract Rights Transfer

As a precise public article, agricultural insurance can diffuse risk and organize compensation for land contract rights transfer. Thus, agricultural insurance should be based on the general attention and participation of farmers; it demands appropriate public action. The responses of the government to the suffering caused by agricultural risk depend on the pressure exerted on them [4]. Agricultural risk stimulates extensive attention from the government, and the government should provide essential support in land contract rights transfer because the support reflects the non-profit character of agricultural insurance. In the process of commercial operation, however, this character is restricted by the negative effect resulting from the pursuit of maximum profits by insurance companies. Thus, in the design of agricultural insurance programs, strategies can be crafted during the course of achieving interest equilibrium, and adjustments can be continuously made for strategy optimization. Mixed strategies or strategy groups can be employed in agricultural insurance to promote the development of land contract rights transfer.

Land contract rights transfer can transform agricultural production and operation, increase the income of farmers, and stimulate comprehensive relevance system construction—it is a practice that has clear social utility. Meanwhile, agricultural insurance is the primary guarantee for operation security and risk prevention in land contract rights transfer. Moreover, it is the logical responsibility of security in transfer. Thus, the adoptable strategies and behavior paths of land contract rights transfer can achieve agreement with those of agricultural insurance.

4.2. Game Process of Agricultural Insurance and Land Contract Rights Transfer

As mentioned earlier, agricultural insurance can promote transfer of land contract rights with equilibrium of interests, and land contract rights transfer requires various system guarantees, among which, agricultural insurance is the key. However, their strategies are not absolute. Under the condition in which the interests under agricultural

insurance cannot achieve aims in an ideal manner, the situation becomes opposed to land contract rights transfer. When land contract rights transfer measures correlative system construction, it could emphasize aspect development but temporarily stop the development of agricultural insurance. Thus, in the relationship between agricultural insurance and land contract rights transfer, both can take different strategies according to their respective purposes. In the assumption where they assume the role of players, agricultural insurance and land contract rights transfer can create behaviors that produce desired effects. Naturally, this assumption becomes absolutely essential because the rights of formal structure in game theory contains the rights of free selection. If there is no such hypothesis, the rights bring forth no results, and the behavior hypothesis can connect with players in different fields [5].

In agricultural insurance and land contract rights transfer, strategic measures can be created to a certain extent, and dominated strategies can be rejected. “A dominated strategy is one that yields a lower payoff than another (dominant) strategy, regardless of what other players do” [6]. However, agricultural insurance and land contract rights transfer can agree at a certain agreement in strategy; thus, the dominated strategy might not always be rejected in both “precisely because a player does not absolutely use a strategy if he has the conviction that his strategy is inferior to that of the opposite side, the other players should recognize the circumstances and think these over when they decide how they intend to implement strategies” [7]. In this situation, a Nash equilibrium does not exist between agricultural insurance and land contract rights transfer because at this point, the optimal behaviors of the participants are indeterminate and the result of strategy must include this indeterminacy [8]. Thus, to achieve “cooperation and win-win,” it is inevitable that profits must be abandoned to a certain extent in agricultural insurance; its constructive role of “imperfect nonprofit publicity” must be played so that it can promote and become the guarantee in the transfer of land contract rights. Land contract rights transfer, on the other hand, can substantially show its inherent logic responsibility, that is, advancing the system construction of agricultural insurance.

5. Game Outcome and Evaluation of Agricultural Insurance and Land Contract Rights Transfer

5.1. Game Outcome

After the Third Plenum of the 17th Central Committee of the Communist Party of China, the country actively promoted innovation of agricultural production and operation through land contract rights transfer. It likewise strengthened constructive efforts of supporting the guarantee system, and emphasized farmers’ subjective position achievement within the idea of people-oriented, farmer-respectful independent thought in behavior selection in agricultural insurance and land contract rights transfer. In view of the overall situation, policy-oriented agricultural insurance in China has gained an impressive promotion. Compared with the aim of establishing an agricultural insurance system however, differences still exist. All kinds of difficulties are present. Although land contract rights transfer has become a significant trend, it needs significant breakthroughs in the follow-up system construction to synchronize the development of agricultural insurance and land contract rights transfer. In the process of selecting agricultural insurance and land contract rights transfer, farmers can obtain results through pure and mixed strategies, once or numerous times in the game. This is the outcome, in which every player has a corresponding strategy, while the solution of the game is the outcome of the rational combination of players [9]. Through negotiations and communication, under “threat” and implemented counter threat of players, a stable result can be achieved. Through repeated experience of the game, agricultural insurance and land contract rights transfer cannot obtain the same result, although there is reason to believe that players can discover a way to coordinate with each other, and achieve a result that coincides with the Pareto efficiency [10]. Therefore, the outcome of the game is the equilibrium from farmers’ rational selection as they participate in agricultural insurance and land contract rights transfer.

5.2. Evaluation of Game Outcome

Because the solution of the game should be concordant with rational expectancy of negotiators, the expectancy can be achieved according to proper negotiations. Thus, there is an effective anticipation, which can produce a mutually satisfying quantity under the expectation of both players [11]. In the game of agricultural insurance and land contract rights transfer, satisfying quantity means dual selections of farmer. If the agreement is looked upon as a “high spot,” there is a watershed in farmer selection of agricultural insurance and land contracts in the watershed

game because the tendency is toward several equilibria in relation to elapsed time. Inevitably, the Pareto equilibrium is achieved. As for the outcome, the explanation of behavior game theory is based on players' uncertain behaviors [12]. In the game of farmer selection, if agricultural insurance can be recognized and accepted, the guarantee problem in land contract rights transfer will have an excellent solution plan. Farmers can substantially benefit financially under the condition of transfer security, and promote transfer in a larger rural scope. This achievement will transform the material guarantee for participating in agricultural insurance and extend positive influence. The imminent correlation between agricultural insurance and land contract rights transfer will achieve the outcome of "cooperation and win-win." Often, the game of agricultural insurance and land contract rights transfer becomes the synthesis of pure and mixed strategies, constituting a continuous and uninterrupted game chain, in which every joint is one game and outcome stability is much higher. When the entire game chain depends on each outcome of a single game, stability is relatively weaker. The outcome of the successive combination of stability and instability will form the state of positive interaction after farmer selection of agricultural insurance and land contracts.

Agricultural insurance and land contract rights transfer achieve stable equilibrium in pure strategy. This is a temporary "cooperation and win-win" situation. Based on the process, both can achieve long-term cyclic interactive strategy using mixed strategies. In this state, reciprocal development between agricultural insurance and land contract rights transfer can achieve the objective of establishing a comprehensive system of agricultural insurance, to completely and successfully apply it in practice. Furthermore, land contract rights transfer will be characterized by efficient guarantee. Thus, the game of agricultural insurance and land contract rights transfer is not a zero game, in which one side of agricultural insurance and land contract rights transfer is at the bottom and the other is at the top; rather, it is a cooperative and positive game.

6. Conclusion

Using methods of game theory to analyze the relationship between agricultural insurance and land contract rights transfer enables the achievement of promoting "cooperation and win-win," interaction, and symbiotic improvement in both sides. Agricultural insurance and land contract rights transfer certainly can achieve a "cooperation and win-win" situation, in which farmers can participate in a synchronous manner. This state is characterized by a mixed strategy in the long term because outcome cannot excessively emphasize achievement of "cooperation and win-win" in a short period. Ultimately however, on the premise of Pareto effect, an ideal situation can be achieved after numerous games during a given period. As a result, agricultural insurance and transfer of land contract rights can engender positive support, interaction, and development. In addition, both can realize the overall progress of system innovation with respect to agricultural insurance.

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