

2014

# BioTechnology

*An Indian Journal*

FULL PAPER

BTAIJ, 10(21), 2014 [13181-13187]

## Interest coordination analysis and realization strategy on adjustment for industrial structure of regional agriculture

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### ABSTRACT

The essence for the adjustment process of industrial structure of regional agriculture is the process for mutual influence and mutual effect of agents pursuing interests under the adaptive choice. The difference of target orientation existing in many interest agents must cause the conflict and internal friction in the adjustment process for industrial structure of regional agriculture. From the level of adaptive agents in the adjustment process for industrial structure of regional agriculture, the interest coordination mechanism is established to solve regional conflicts in the adjustment for industrial structure of regional agriculture, which is the effective method.

### KEYWORDS

Adjustment for industrial structure of regional agriculture; Interest coordination mechanism; Adaptive agent; Realization strategy.



## INTRODUCTION

In the perspective of complex adaptive system, the adjustment for industrial structure of regional agriculture is the result of joint forces under the adaptive selection of agents. The agent in the adjustment for industrial structure of regional agriculture includes agricultural enterprise (including the agricultural production operator), central government, local government, and the agent forming the system forms a kind of net structure actually, and the agent is like the node of net, and they conduct the exchange of information, matter and energy through the crisscross cable, and the behavior of each agent will not only influence the behavior choice of other agents, but also be influenced by the behavior choice of other agents<sup>[1]</sup>.

In the adjustment for industrial structure of regional agriculture, variables containing in the objective function of each behavior agent are difference, which decides the difference between each behavior agent, and the cooperation, adjustment, competition or deviation not only depends on the expectation interest of personal behavior, but also depends on the expectation for behavior result of other agents. Actually, the process for the adjustment of industrial structure of regional agriculture is the process of mutual influence and effect based on the agent pursuing interest under the adaptive selection, and the adaptive selection of interest pursued by the agent becomes the source power for the industrial structure adjustment of regional agriculture.

### NECESSITY OF ESTABLISHING INTEREST COORDINATION MECHANISM IN ADJUSTMENT FOR INDUSTRIAL STRUCTURE OF REGIONAL AGRICULTURE

The adaptation of agent based on the interest is the fundamental cause for the evolution of industrial structure of regional agriculture, also is the base for the industrial structure adjustment of regional agriculture. So to speak, the process for the industrial structure adjustment of regional agriculture actually is the process of interest relationship change between different interest agents. The existing difference on target orientation between interest agents inevitably leads to the conflict and internal friction in the industrial structure adjustment of regional agriculture. For example, the assimilation phenomenon of inter-zone agriculture's industrial structure, regional blockade with the purpose of protecting the local disadvantaged agriculture, blind pursuit for high-tech industry regardless of objective condition, etc, reflects the discordant aspect in the industrial structure adjustment of regional agriculture. This is the inevitable result caused by mutual effect of competitive mechanism and profit mechanism in market economy. The urgent affair is how to reduce the meaningless consumption in industrial structure adjustment of regional agriculture.

#### Need of guaranteeing effectiveness of agriculture industry policy

Many scholars have discussed the effectiveness problem of industry policy from different point of view. In the article of "*Specific Standards Framework of Effective Industrial Policy*", Xiaowei Han<sup>[1]</sup> indicated that the effectiveness of industry policy should be considered from the formulation and implantation. The formulation of industry policy was the original link for guaranteeing effectiveness of industry policy. In order to guarantee the reasonable effectiveness of formulation of industry policy, the following 3 factors should be considered: (1) The industry policy reflected the changing trend of industrial structure; (2) The industry policy conformed to objective law and trend of industrial development; (3) The self-interest behavior motivation of agent formulating the industry policy (government) should be restrained and the institutional arrangement should be provided for its preference. In the implementation link of industry policy, 3 conditions must be satisfied in order to guarantee the implementation effectiveness of industry policy: (1) The artificial deviation of industrial policy effect should be avoided; (2) The realization of industrial policy goals should have the time benefit; (3) The implementation of industry policy should balance the cost and profit, and consider "negative external effect of policy". In the article of "*Discussion on Effectiveness of Industry Policy*", Huaqing Qi<sup>[2]</sup> thought that the industry policy could be divided into the policy of industrial structure and industry organization policy. The effective policy of industrial structure was determined by the recognition effect of policy, and the abilities of government formulating and implementing the policy of industrial structure (including the abilities of mobilizing funds, getting information and being acquainted with technology, etc.). The recognition effect of policy means that the effect direction for adjustment policy of industrial structure, market behavior and government behavior are consistent basically. This consistency of effect direction can form a kind of bonding force to prompt the smooth realization for adjustment of industrial structure.

Since the adjustment for industrial structure of regional agriculture was a complex adaptive system, and industrial policy of agriculture from the local governments at all levels was the process of interest adjustment based on the adaptation of agriculture's industrial agent. From the process of industrial policy to the adjustment for industrial structure of regional agriculture, the industrial policy actually acted as means of interest coordination, and it makes the adaptive agent and agent in the adjustment for industrial structure of regional agriculture to finish the adaptive agricultural industry behavior in the process of interest realization by means of influencing the benefit distribution of many different agents in the adjustment for industrial structure of regional agriculture<sup>[2]</sup>, thus it can be seen that whether the interest between agricultural industry agents can be coordinated or not was the key for work of agriculture industry policy. Therefore, the building, establishment and implementation of interest coordination mechanism were the requirement of guaranteeing the effectiveness for industrial policy of agriculture.<sup>[2]</sup>

#### Need of establishing interest coordination mechanism from importance of methodology

The complex adaptive system considered that the agent constituting the system has the characteristic of adaptation, and it will take the corresponding adjustment to the changeable environment and behaviors of other agents based on the consideration of interest. In a system, the adaption motion of agent generally has two states: one is the random movement,

and one is the coordinate movement caused by the mutual correlation of agents. In various external conditions, the position of these two movements in the system is different, when the synergic movement plays the leading role, the system will present the ordered state. The process of system transforming to the ordered state also is its organizational process. In this sense, the collaboration between each agent based on interest is the root of self-organization of system, and the level of collaborative action also determines the order degree of system.

In terms of industrial structure of regional agriculture, the changing process of structure has the indeterminacy and synergy of economic activity. With respect to the whole of system, each behavior agent presents the indeterminacy of economic activity when pursuing the self-interest; while the regional distribution and cooperation makes the economic activity of each agent present the highlight of cooperation caused by the difference at the endowment of agricultural resources and characteristic of economic technology. Both the indeterminacy and synergy reflect the adaptive selection of agent based on interest. Therefore, the overall situation in the adjustment for industrial structure of regional agriculture is disordered or ordered, and its root is the conflict or coordination of interest. The interest coordination is crucial of great importance from the methodology.

### **Need of solving regional interest conflict in adjustment process for industrial structure of regional agriculture**

After the reform and opening up policy, since the central power is weakened, the power of prefecture government is strengthened, and the double deviation of policy and investment is given to the southeast China, the interest conflict between regions aggravates, which leads to problems of repeated construction, regional blockades, etc.<sup>[2]</sup> The interest conflict in the adjustment process for industrial structure of regional agriculture mainly reflects:

### **Convergence for industrial structure of regional agriculture**

Since the reform and opening up policy, the formation and development for interest structure of multiple agents makes the acquisition mechanism of interest change. Because of regional interest, the layout of productivity, characteristics of regional economic advantage and the objective requirement of improving the macroscopic economic benefit are not considered at the respect of production configuration, many regions only consider the regional immediate interest to conduct the blind introduction and investment in the same field. In the situation of unreasonable price, in order to contain the loss of value in the surrounding trade process, the resource regions develop the processing industry with high price and interest, and relatively adopt the method of blocking the resource and market to prevent "benefit spill over". In return, the obstacle of surrounding trade also urges each region to develop its bottleneck industry, thus forming the complete industry system within this region. From this, the independency, closure and integrity of industrial structure of regional agriculture form gradually, and the convergence phenomenon for industrial structure of regional agriculture is very serious. This kind of convergence phenomenon of industry causes the low resource allocation, thus seriously influencing the unified, reasonable distribution for industrial structure of regional agriculture in our country.

### **Regional protectionism and market block**

With the change of buyer's market to seller's market in regional market, the constraining force of regional market becomes the key aspect of improving the local fiscal revenue and developing the regional agriculture economic. Under the drive of regional interest, some local governments implement the regional protectionism and block starting from local fiscal revenue and economic benefit,<sup>[3]</sup> and the main characteristics are (1) pertinence of industry. The protection of industry mainly is stabilizing the social industries and local support industries with high benefits; (2) pertinence of region. It means the protectionism of a specific region is in allusion to another specific region. The industrial structure of agriculture in these two regions is repeated, similar, which easily causes the mutual block and respective protection of two regions; (3) The main method adopted is interposing the circulation of agricultural products and commodities through administrative means.

## **GAME ANALYSIS OF AGENT UNDER INTEREST COORDINATION MECHANISM**

The following content will state the significance of establishing interest coordination mechanism in the adjustment process for industrial structure of regional agriculture by means of game analysis.

### **Hypothesis of the model**

(1) Participants. For the industrial structure adjustment of regional agriculture, the hypothesis in the model has two kinds of participants: one kind is the central government, and another kind is local government A and local government B. The central government starts from the interest of the whole, so its behavior is long-term and welfare; and the local government starts from the regional interest, so its behavior is short-term and profitable.

(2) Action: The central government has two kinds of action selection: encourage and discourage; and the action of local government: enter into or not enter into.

(3) Information. The market with complete information is assumed.

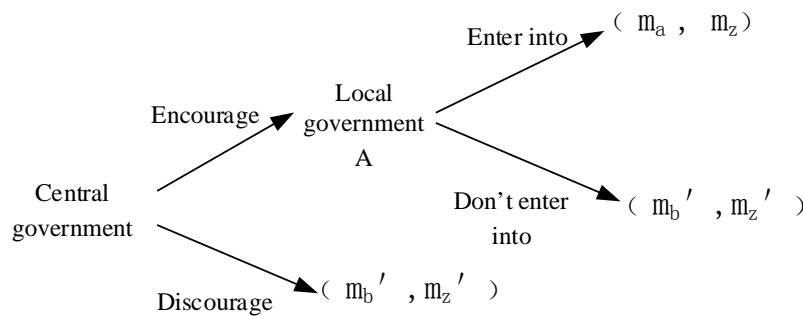
(4) Function setting: industry A and industry B is assumed, the local government will enter or not enter into A or B. The industry A is the superior industry of local government A, the profit margin of industry is  $m_a$ , and this industry has the stronger positive externality. The industry B is the superior industry of local government B, the profit margin of industry is

$m_b, m_a < m_b'$ , and the positive external benefit brought by the development of industry A to the local government B and central government is  $m_1$  and  $m_2$  respectively. If the local government A or B goes against to choose the industry development, its benefit will be  $m_b'$  and  $m_a'$  respectively, and  $m_a' < m_a < m_b' < m_b$ ,  $m_b' < m_a + m_1$ .

**Game analysis between central government and local government**

**(1) Game analysis under the general conditions**

The macro-control role of central government determines that it encourages developing the industry with stronger positive externality in the industrial structure adjustment of agriculture. The following is the game analysis between the central government and local government A by means of a two-stage game model. In the first stage, the central government issues the industry policy to encourage or discourage the development of industry A; in the second stage, the local government A makes the choice: enter into or not enter into. The game result is shown in the figure 1:



**Figure 1: Game between central government and local government without interest coordination mechanism**

For the distribution of interests in the figure 1,  $m_z$  is the total revenue of local government A that enters into the industry A from the perspective of country,  $m_z = m_a + m_1 + m_2$ ,  $m_z'$  is the total revenue of local government A that doesn't enter into the industry A, and  $m_z = m_b', m_z > m_z'$ . In the condition without the interest coordination mechanism, the local government A will go against its advantages to choose the industry B with higher industry profit rate, although the overall revenue will decrease ( $m_z' < m_z$ ) but  $m_b' > m_a$ , which is accord with the interest choice of local government. Thus it can be seen that the encouragement of policy will not be enough if the industry with stronger externality and lower profit margin needs to be developed.

**(2) Game analysis under the condition with interest compensation mechanism**

In the game model of central government and local government A, if the central government gives the certain interest compensation and sharing while the local government develops industry A, the hypothesis is  $m$  ( $m \leq m_1 + m_2$ ), the benefit of local government becomes  $m_a + m$ , as long as  $m_a + m \geq m_b'$ , the local government will be encouraged to enter into industry A, and finally the best strategy combination can be realized (encourage, enter into).

In the view of game between local governments, if the local government B gives the certain interest compensation to the government A, the complementary advantages of regional industry development will be realized. If the compensation amount is  $\Delta m$ , the matrix of receipt and payment is as figure 2:

		Local government B	
		Don't enter into	Enter into
Local government A	Enter into	$m_a + \Delta m, m_b + m_1 - \Delta m$	$m_a, m_a'$
	Don't enter into	$m_b', m_b$	$m_b', m_a'$

**Figure 2: Game of local governments under interest coordination mechanism**

As long as  $m_1 - \Delta m \geq 0$ ,  $m_a + \Delta m \geq m_b$  can be met, the local government A and local government B can development its competitive industries. This not only realizes the optimum of partial interest, but also realizes the global optimum.

From the game analysis between agents under interest coordination mechanism, we can get the following conclusions: the interest coordination between industrial agents is the key for the effectiveness of regional industry policy. If the industrial policy is without interest coordination, the upgrade and transformation of industrial structure completely depend on spontaneous force, which will be difficult to be realized; the agricultural industry policy under the implementation of interest coordination may realize the rationalization for evaluation of industrial structure of regional agriculture. The essence of various economic relationships between regions is economic interest relationship, and in order to mitigate or solve the regional interest conflicts, the agent of economic activities should conduct the cooperation or coordination according to the certain benefit principle. The establishment of interest coordination mechanism is the effective means of solving the regional conflict in the industrial structure adjustment of regional agriculture.

**Game analysis between local government A and local government B**

According to the foregoing hypothesis, the game result of local government A and local government B is shown in the figure 3:

		Local government B	
		Don't enter into	Enter into
Local government A	Enter into	$m_a, m_b + m_1$	$m_a, m_a$
	Don't enter into	$m_b, m_b$	$m_b, m_a$

**Figure 3: Game of local governments without interest coordination mechanism**

Obviously, the local government A and local government B don't enter into industry A, which is the optimal strategy. The result is that the industry A with lower profit margin develops insufficiently, and the industry B with higher profit margin develops redundantly. Thus it can be seen that the reasonable distribution and development for industrial structure of regional agriculture can't be realized depending on the force of market consciousness merely.

**POSSIBLE CHOICES OF ESTABLISHING INTEREST COORDINATION MECHANISM**

The interest coordination in the adjustment process for industrial structure of regional agriculture is very significant for the effective implementation of agriculture's industry policy, rationalization and development of industrial structure of regional agriculture. In the view of complex adaptive system, the essence of interest coordination is the interest adjustment between adaptive agents, and also is the reflection for adaption of agent. The following content will consider the interest coordination from the level of adaptive agents in the industrial structure adjustment of regional agriculture. **Interest coordination at central government level**

The central government formulates the industrial policy of agriculture to guide the industrial structure adjustment of agriculture from the overall interests. As a mean of interest coordination, if the industrial policy of agriculture just starts from the overall interests and ignores the interest goal for agents of other economical activities and the regional interest difference, the effectiveness of policy will reduce greatly. As the adaptive agent, the control object of policy will evaluate the implementation result of policy agent respectively, and compare with its "mental account", and then take the action choice. Since the asymmetry of information and the indirectness of control to the implementation means of policy exist, and the monitoring for the changing conditions on industrial structure of regional agriculture that deviates from the policy goal has the time-lag, many established facts going against the policy goal will appear caused by the change of agricultural industry structure. The central government needs to take the interest coordination from the aspect of macroscopic.

(1) The self-adaption of policy should be strengthened at the aspect of policy formulation. Once the industrial policy of agriculture is formulated, it has characteristics of stage, stabilization and generality, while the implementation of policy faces the dynamic environment that is filled with chance factors and mutual effect from many adaptive agents, so the dynamic nature of policy environment requires the policy should have the certain adaption. On the one hand, the adjustment mechanism of policy-information feedback is should be built, and the policy formulation should be changed to a dynamic adaption process. On the other hand, the industrial policy of agriculture should be regionalization. The industrial structure adjustment of regional agriculture should be practical and realistic, and adjust measures to local conditions. Our country has a vast territory, the regional conditions have the big difference, and the geographic position, resource advantage, economic foundation and development level of each region is different. The adjustment for industrial structure of regional structure should not be divorced from the local area and its objective conditions.<sup>[3]</sup>

(2) The benefit sharing and compensation mechanism should be established to change the expectation of interest agent. From the view of change of absolute interests, the adjustment process for industrial structure of regional agriculture can

realize Pareto improvement. But from the view of relative interests, the Pareto improvement is difficult to realize. The difference on dynamic structure of different regions and difference on the profit margin of different industries determines the position between each region in the pattern of benefit distribution. Under the drive of regional interest maximization goal, some adjustment policies of industrial structure from the central government will be difficult to reach the expected effect caused by the interest obstacle. If the unreasonable problems in the adjustment for industrial structure of regional agriculture are solved truly, the interest relationship between central government and local government, local government and local government must be adjusted well. The benefit sharing and compensation mechanism is established to make all agents participating in the industrial structure adjustment of agriculture gain the benefit from the structure adjustment jointly.

(3) The standards of government performance examination should be improved. Since the local government has the special position in the adjustment for industrial structure of regional agriculture, how to encourage or constrain the behavior of local government officials will be the key factor of influencing or determining whether the adjustment direction for industrial structure of regional agriculture will be consistent with the goal of industrial policy. The structure adjustment in economic increase of regional agriculture should be put into the government performance evaluation in order to improve standards of government performance examination.

### **Interest coordination at local government level**

From the view of local government, on the one hand, the regional interest coordination requires that the cooperation of regional agriculture economic should be strengthened under the domination of government, the long-term cooperation between regions should be established, and the expectation of local government in structure adjustment should be changed to form long-term behaviors in the industrial structure adjustment of regional agriculture; On the other hand, although the regional cooperation can complement each region's advantages, make both sides to share the benefit from cooperation. However, the position of each side is different in cooperation system, the obtained benefit from cooperation of each side is different, and the benefit of cooperation is larger than benefit without cooperation, which doesn't mean the distribution of added interest is equal between difference agents. Therefore, in order to ensure the long-term goal of cooperation and the harmonious development of inter-zones, the negotiation mechanism of regional interest needs to be established when constructing the regional cooperation in order to realize the unification of "efficiency" and "fairness" between local governments in the adjustment process for industrial structure of regional agriculture.

### **Interest coordination at agricultural enterprise (agricultural production operator) level**

The agriculture enterprise, agricultural production operator is the microcosmic agent, under the premise of market transactions, and both sides of transactions mostly take the disposable actions or short-sighted actions. Both sides of transactions consider the maximization of partial interests respectively, and both sides start from their own positions, observe and adapt the change of environment rapidly, but it will be difficult to reach the coordination of both sides' actions.<sup>[4]</sup> Therefore, in order to guarantee the reasonability for behaviors of agriculture enterprise and agricultural production operator in the adjustment for industrial structure of regional agriculture, the conditions should be created positively, and the organic cooperation of regional enterprises should be strengthened, and the long-term and stable cooperation should be built between regional enterprises.

The successful experiences of transnational corporation can be used for reference, in the industrial structure adjustment of regional agriculture, the regional investment, purchase, merger and reorganization of enterprises and integrated development of regional enterprises should be encouraged to build the micro-foundation for harmonious development of regional industry structure. The coordination mechanism for integration of regional agricultural enterprises can be analyzed from the following two respects: firstly, the cross-regional investment of agricultural enterprises, agricultural production operators can promote the improvement of comparative advantage. The cross-regional expansion of agricultural enterprises and agricultural production operators transforms the industrial division of traditional regional agriculture to industrial division within enterprises, and the scale economy formed by this division can make the competitive edge of agricultural enterprises to be more obvious. In this process, on the one hand, the regional division of labor and cooperation can be deepened and the scale economic can be realized, one the other hand, difference regions can share the interest from the division of labor and cooperation. Secondly, the integrated agricultural enterprises or agricultural group organization can break through the administrative barriers effectively, break the segmentation of trap and block, and promote the resource, production factors to flow freely and configuration optimize configuration between regions, eliminate obstacles of inter-industry and inter-industry business combination as well.

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