Evolutionary Game Path of Law-Based Government in China

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Abstract. Evolutionary game theory has good applicability in the study of law-based government in China. This paper mainly analyzes and studies the frame of the evolutionary game process from two dimensionality of complexity: horizontal process and vertical process. Two evolutionary game modes—horizontal spiral-promotion evolution mode and vertical interactive evolution game mode are discussed in order to prove "Endogenous evolution" rule of law can solve the "power paradox" of government. In the end the evolutionary game path of law-based government in China is put forward.

Introduction

Since the 18th CPC National Congress, Xi Jin-ping, general secretary, repeatedly put forward the era of proposition of legal construction in China. “Legal construction in China” is the upgraded version of the “Ruling the country by law”, and it is the key point of the Chinese dream. The development path of China’s legal government is based on China’s thousands of years of history and culture, is explored continuously from legal practice since the founding of new China, and is the legal construction path with Chinese-style socialism [1]. The law-based government strides forward from low level to high level in the dynamic equilibrium of evolutionary game. The evolution of law-based government which is similar to biology’s survival of the fittest and selecting the superior and eliminating the inferior reaches to a certain degree of game equilibrium. The affinity provides a framework of macro and micro perspective for the establishment of Chinese law-based government.

Theoretical Dimension and Logical Starting Point

Theoretical Explanation of Evolutionary Game Path of Law-Based Government in China

As a branch of western economics, evolutionary game theory combines game theory analysis with dynamic evolutionary analysis. It is based on Darwin's evolutionism and Lamarck's genetic theory and draws lessons from evolutionary theory of the nature. Inspired by the theory of biological evolution thought, Smith and Price introduced the evolutionary thought into the game theory. The Evolutionary Stable Strategy and evolutionary game theory are proposed. Referencing the analytical method of biological evolution theory and the biological behavior law, the dynamic realization process of the game equilibrium can be simulated. The interaction between individual groups is a constantly changing dynamic process about their situation they are in. The game environment and participator are correlative dependence and interplay. Neither side of the game finds the optimal strategy at the beginning; they continuously learn to trial and error, thus find relatively good strategy in the process of game. Just as Darwin mentioned in origin of species, heredity, variation, selection exist in the process of natural selection. With the changes in the law-based government, imitation, continuation is regarded as genetic inheritance; innovation is deemed as variation, and government behavior which obtained the social benefit is considered as natural selection. During the construction of law-based government, the original high-quality gene will continue to hand on with the passing of time, just like “DNA carrying password information” [2]. The process of evolution can actually happen above each hierarchy from nucleic acids, cells,
tissues to creature individual and populations etc. During this progress, between different hierarchies each element influences each other complicatedly. The above level is the environment of the next level. Hodgson said [3]. Therefore, the progress of the evolution of law-based government is not only the progress of continuity, innovation, diffusion caused by competition under bounded rationality, but also the progress of gradual advance.

A Logical Starting Point of Evolutionary Game Path of Law-Based Government in China: the Power Paradox and the Legal "Social Contract" Concept

During modernization of the national management, the power of the government is a "double-edged sword", which is not only the founder of “China miracle”, but also the root of the problem and paradox, which can be considered as "North Paradox" in a concrete embodiment in our country. The paradox is China’s typical government power and the rights of the individual game. From the perspective of the government power paradox, we can have a deep understanding of the progress of China’s law-based government. Because the government is a behavior subject who is in the special position, and is endowed with the coercive power other behavior subjects don’t have. Nevertheless, on the one hand when this constraint is not enough, the government has the motivation to infringe upon the interests of other groups or individuals, On the other hand due to the specific constraints, other groups or individual perform that they are willing to accept the rule of the government, but when this constraints are not enough, other groups will unite together to fight the government. From the above analysis, we can see that "power paradox" is existed: If the government is endowed oversize power to restrain other groups, the abuse of government power will be resulted in; restrain excessively government will weaken the positive role of social governance.

Rousseau in the social contract theory pointed out that Law is to prevent power from violence. Each one of us and all our strength place under the highest guidance of convention and general opinion. Everyone is equal before the law [4]. In this paper, law is regarded as a social contract, which is divided into two levels: the first level, when government abuse power, law will increase other groups and individual institutional cost to boycott government. Efficient supervision restrains the behavior of government, under this circumstance the more effective laws are, the larger institutional cost is. The second level, when the government fulfills their obligations, the law, maintaining social order, will reduce the institutional cost social groups infringe others. At this time, the more effective laws are, the less institutional cost is. In this paper, evolutionary game path of law-based government in China with Endogenous Evolution is to embed the social contract of law into the rules of game.

The Evolutionary Game of Law-Based Government in China: Generation and Development Logic

The evolutionary game of law-based government in China evolves dynamically from two perspectives: transverse process and longitudinal process. The transverse process of the evolutionary game of law-based government in China means that the process of the rule of law evolves according to constitutional government under the rule of law, static-type government under the rule of law, dynamic-type government under the rule of law. The form of the evolution is spiral forward type, the previous phase promote the later one, which is called Horizontal Spiral-propulsion Evolution Mode. The Vertical Interactive Evolution game is that the government and citizen make decision interactively in the way of vertical space. The form of evolution is spatial interaction; there is complexion of message and action between interactive objects, which is called Vertical Interactive Evolution Mode. The evolutionary game mode of law-based government in China is shown in Fig. 1.
Horizontal Spiral-Propulsion Evolution

Huan-Chen Wang has been introduced the conception of “Self-Increasing-Difficulty Systems”, which means the degree of difficulty and complexity in process will increase as time goes by [5]. He also put forward a systematic approach—Spiral Combining Propulsion Principles, or SPIPRO Principles, which held that SPIPRO Principles is a main axis of dynamically track the development of system, stick to apply flexibly a variety of methods and feedback adjustment in time, seek relative and limited optimization in the process. Obviously, as system engineering, the evolution of the law-based government in China belong to the scope of Self-Increasing-Difficulty Systems, the evolution also meets the requirements of SPIPRO Principles. The construction mode of the law-based government in China goes through constitutional government under the rule of law, static-type government under the rule of law, gradually moving towards dynamic-type government under the rule of law. The construction of the law-based government is the game between each participant under limited rationality. Then gradually reached a consensus on the steady state, and continually evolve forward. Horizontal Spiral-propulsion Evolution of law-based government is as follows:

Table 1. Horizontal Spiral-propulsion Evolution of law-based government in China.

<table>
<thead>
<tr>
<th>Law-based government mode</th>
<th>Constitutional government under the rule of law</th>
<th>Static-type government under the rule of law</th>
<th>Dynamic-type government under the rule of law</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
<td>The government is governed by the fundamental rules of law, and the law is the tool of government behavior, bear the supreme characters</td>
<td>Rule is more passive, the constitution and organization law is primary. The government only act according to law.</td>
<td>The rule of law from the formalism to the essentism; focus on dynamic control of administrative behavior; dynamic adaptation to the society; based its valve on freedom and equality</td>
</tr>
</tbody>
</table>

Through the schema we can see, the development of law-based government is a long-term process from low to high, thin to thick, from simple to complexity. The third world countries include China, want to establish a rule of law in order, they must first ensure that the government rule under the law. At this moment, due to the lack and imperfection of the democracy system, the
content and the procedure of the law are still lacking. Secondly, through the accumulation of experience, the law obtained a fixed form. At this moment, the law is perfect from the content and the procedure. Based on this, the depth of the rule of law is reached ultimately. Government ruled by law from static to dynamic is associated with the market economy development. The development of market economy requires relatively strong administration to provide order. However, the strength of the administration power must accompany with corresponding control, restriction mechanism. The rule of law transform from the mechanism in which relatively static constitution, organization law is balance to the new mechanism in which dynamic balance of administrative law and restriction mechanism as the main supplement. The new mechanism of law is largely pushed by democratic new development: To participate in the democracy must turn to the norms and protection of administrative law. The administrative organization law (to standardize administrative affairs management organizations), administrative procedure law (to regulate the government administrative behavior program), administrative review law and administrative litigation act (standardize administrative counterpart to carry out relief and supervise administrative act of government), etc., provide the basic rules for the democratic form, and link up the new democratic form and traditional democratic form, thus new mechanism of democracy is constituted. To compare with the traditional law-based government, the dynamic-type government under the rule of law focuses on controlling static administrative power, and pays more attention to regulate the dynamic administrative act. We can say the country has entered the age of the law-based government only when it not only has a perfect law to control static administrative power, but also has perfect law to regulate dynamic behavior.

**Vertical Interactive Evolutionary Game Mode**

The construction of law-based government adopts the mode of government-leading propulsion at present. The government planned and implemented major issues concerning law-based government through its own public authority from top to bottom. But in the long run, as a system project, a law-based government is not only dominated by government, but also is the result of various powers gaming with each other. The construction of the law-based government in China involves the interaction of decision preferences between different departments within the government, government and citizen, and different modes of a law-based government. To explore the game process will benefit for solving various decision conflicts, ultimately achieve the consistency of group opinion, and promote the construction of the law-based government in China.

Table 2. Game matrix of government and citizen.

<table>
<thead>
<tr>
<th>citizen</th>
<th>Government</th>
<th>negotiation</th>
<th>antagonism</th>
</tr>
</thead>
<tbody>
<tr>
<td>negotiation</td>
<td>D,D</td>
<td>C-T,C+T</td>
<td></td>
</tr>
<tr>
<td>antagonism</td>
<td>C+T,C-T</td>
<td>C,C</td>
<td></td>
</tr>
</tbody>
</table>

The traditional and evolutionary game theories generally take participators’ strategies as given to analyze the strategy choice of Nash equilibrium and evolutionary stability. In the evolutionary process of the law-based government, we assume that there is an abstract game, and two participators: government and citizen. When the government and citizen who are in a state of confrontation game with each other, both sides gain benefit of the C; when the government and citizen who are in a state of negotiation game with each other, both sides get D units of benefit. Economic effects under negotiation state will greater than the economic effect under confrontation state. So, D>C is supposed. The two economic subjects (government and citizen), one’s behavior is
negotiation, one’s behavior is antagonism. The negotiation-based behavioral subject transfer T cost of system to opposite side, and gain C-T units of benefit. At the moment, the antagonism-based behavioral subject received the interest transference of T unit, totally get C+T units of benefit. Therefore, we can get the payoff matrix of the whole game process. (See Table 2) Government and citizen will adjust their behavior by means of Nash equilibrium strategy in accordance with their own benefit. Based on the results of dynamic replication, the group will eventually tend to evolutionary stability state (ESS). The construction of the law-based government in a certain period is such a balance. The change of governance conception led to the change of participants’ benefits, thus incur the new change of game equilibrium. The evolution of the law-based government can be understood as a kind of equilibrium moving to another equilibrium. Rules are guidelines used to direct game process. If gamers want to maximize their own interests, they must take the interests of game objects into account, obey the common rules, consequently, achieve a Nash equilibrium.

**Conclusion**

The law-based government requires after multiple game, government and citizen will gradually formed a set of social contract. Modern government must adopt the thought and means of the rule of law to solve the contradiction and conflict, choose the strategy of “consultative behavior”, in the process of continuously having power game with citizen, from initial non-cooperative game to cooperative game, reach to an ESS, promote the market effective operation, so as to establish the government of a statutory duties, efficient, honest, and law-abiding. The evolutionary game mechanism above has the characteristics of circulation dynamics, "survival of the fittest, natural selection", and ultimately to the steady state of dynamic convergence, this state is considered to be the necessary conditions of the formation of the Chinese government. The construction of legal system pushed by Administrative power must fit in with the endogenous demand of legal order in society, must have organic interaction with the promotion of civic legal sense, which should be the most fundamental strategic path. The "universality" of the rule of law does not exist in the world. For the social transition period of China, blindly westernized rights and demands may be more haste less speed, the genetic factors we can’t take away—the traditional Confucian culture and the state machine controlling society make the process of our law-based government to be a construction process of Chinese characteristics, embodies a kind of interactive balance spirit. Therefore we should adopt a gradualism strategy, establish legal order which root in the native land.

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**References**


