

Competition, Cooperation, and Institution: A Game Theory Perspective

Akira OKADA *

* *Kyoto University, Japan; aokada@kier.kyoto-u.ac.jp*

The interdependence of economic and political players has caused various conflicts over territory, resources, and wealth at the local as well as global level. Humanity today faces several political, economic, and environmental challenges, such as regional wars, monetary crisis, free trade disputes, and global warming. The question is whether we, as players, can cooperate among ourselves to solve these problems and create a peaceful and prosperous society.

Traditionally, economists have scrutinized the role of competition in attaining a socially optimal allocation of resources in the markets. The first fundamental theorem of welfare economics claims that any competitive (or Walrasian) equilibrium results in a Pareto optimal allocation of resources in a market with neither externality nor incomplete information. Although the efficiency of an allocation is a critical factor for the resolution of conflicts, it is not an exhaustive solution. Competition does not necessarily attain a “fair” allocation in the society, even as there is no well-accepted notion of fairness.

A market is a place of cooperation where economic agents such as sellers and buyers, producers and consumers, and managers and workers can jointly create social values. These parties negotiate for an agreement over allocation of the new value. Competition and cooperation are two sides of a market. I believe economic competition is an important element of a broad list of cooperative mechanisms in our non-zero-sum society.

The human society has developed a variety of psychological, social, economic, and political mechanisms through which cooperation and social order can emerge, and are promoted and sustained. The list of cooperative mechanisms includes evolution, kin, friendship, reciprocity, altruism, trust, communication, learning, reputation, social norms, negotiations, agreements, communities, markets, organizations, networks, institutions, and legal systems. These diverse mechanisms should essentially work at multiple levels in a complementary manner.

The general problem of cooperation in the human society is now actively studied in interdisciplinary fields beyond economics. For example, researchers in evolutionary biology, anthropology, and psychology consider a fundamental question: why do humans cooperate? Social scientists ponder whether and how human beings seeking their own private values can cooperate. They examine the roles and limits of the various mechanisms of cooperation in social situations. Specifically, economists consider how economic agents with self-interests

cooperate to attain an efficient and fair allocation. Political scientists consider why wars occur, and how states cooperate to resolve military, economic, and environmental conflicts. Law scientists muse over the roles of legal system and legal order in a cooperative society.

Since the pioneering work of von Neumann and Morgenstern in the 1940s, the game theory has investigated the rational behaviour of economic agents with self-interests. Their main goal was to find the mathematically complete principles of rational behaviour for the participants in a social economy. The problem of cooperation has been the central issue in the game theory. It has been proved theoretically and experimentally that strategic behaviour, moral hazard, and asymmetric information may deteriorate the opportunities of cooperation.

In the 1980s, the game theory reached a new stage of development. Two new branches, the evolutionary game theory and the behavioural game theory, have expanded the traditional model of a rational and selfish player. Game theory is now regarded as a basic analytical framework to investigate both rational and bounded rational behaviour of economic agents with broad motivations, including social preferences. Experimental economics observes that human behaviour is often affected by psychological factors such as fairness, reciprocity, and trust.

It is certainly true that trust is a crucial element of cooperation in the human society. It is, however, not enough for cooperation. It may be fragile in an anarchic state of nature. Cooperation should be supported by strategic incentives. In other words, cooperation should be strategically stable, sustained as a Nash equilibrium of a game (in game theory terminology). Furthermore, some appropriate institutional arrangements are needed to change our economic incentives.

According to North (1991), institutions are “the humanly devised constraints that structure political, economic, and social interaction.” Both informal constraints and formal rules constitute institutions. An institution has a function that limits the freedom of its participants in actions. Specifically, a primary role of an institution is to enforce its participants to choose a collective action.

There is a well-known puzzle in the institutional approach to social cooperation. It is often claimed that since rational individuals with self-interest have an incentive to free-ride on an institution enhancing cooperation, they are likely to fail in forming institutions. Individuals need to cooperate at a higher level of institutional arrangements. Thus, the institutional approach is faced with the same question that it is expected to address. This puzzle may be termed as a “dilemma of endogenous institution formation” (sometimes called as the second-order free-rider problem).

The international society has no central government that regulates the behaviour of states. In such an anarchic state of nature, cooperation and institutional arrangements should be voluntary. To resolve international conflicts of free trades and global warming, any economic analysis must answer the fundamental question of how states seeking their own values can voluntarily create an

institution that constrains their liberties. The question is critical in resolving international conflicts such as global warming.

Recent theoretical and experimental studies pertaining to the game theory present formal models of institution formation in a public goods economy, and demonstrate several results regarding such institution formation. First, rational players can solve the dilemma of endogenous institution formation. They may voluntarily form an institution for providing public goods. Second, institution formation is not always possible. There is a Nash equilibrium without an institution. The success of institution formation depends on players' expectations about the behaviour of other players. Third, the number of participants in an institution may not be the largest one under the assumption of selfish preferences. Experimental evidences, however, show that people have a strong tendency to form the largest and socially optimal institution without free riders. Fourth, trust plays an important role in the success of an institution. Fairness is a critical factor to stabilize trust. People learn to cooperate in the process of institution formation.

To conclude, it is important for us to investigate the general problem of cooperation in the human society. The game theory offers an analytical framework for the study of diverse mechanisms of cooperation in social and economic situations. I hope that game theory can contribute to our better understanding of human cooperation.