

## **GAME THEORY IN PUBLIC CHOICE**

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### **ABSTRACT**

*Game theory is applied to the situations where there is a total or partial conflict of interests between players and where the final outcome does not depend on the actions and decisions of only one party, but on the actions of all other participants. It is very interestingly and successfully applied in the field of public choice. Just as in commercial markets, where sellers compete for consumers, in political marketplaces candidates compete in elections to win the support of voters and political power. In order to be elected politicians and political parties are forced to compete for votes, whereby they are mainly focused on winning the support of so-called median voters who dominate political market. The scope of this work is an analysis of politicians' behaviour in strategic situations.*

**Keywords:** Game theory, alternative, conflict of interests, public choice, median voter, parties.

### **1. INTRODUCTION**

Public choice theory came into being by merging political theory and economics. The main issues public choice theory deals with are: an individual and his/her position in the society, individual rights and duties, public choice and social decision making mechanism issues, relation between politics, law and economic achievements; that is– the main social rules. However, not only the rules but also their social alternatives are studied and the subject of analysis is the cost of different alternatives and the payoff individuals gain from them.

Each individual has a dual role in society, that is, they have roles in two different marketplaces: commercial and political. Just as in commercial markets, where sellers compete for consumers, in political markets, candidates compete for voters and political power. In order to be elected politicians and political parties are forced to compete for votes, while they are mainly focused on winning the support of so-called median voters who dominate the political marketplace.

In the commercial market individuals are consumers who make choices according to their preferences. If they want to succeed in the marketplace producers and service providers must meet consumers' requirements.

In the political market individuals are voters, that is, those who have electoral power. Political parties and/or politicians have to meet voters' demands if they want to stay in power or to be (re)elected.

According to public choice theory political parties act as companies in the political marketplace, and politicians as entrepreneurs. Politicians and political parties, as suppliers, promote their programmes wherein they offer supply of public goods so as to win the support of as many voters as possible.

### **2. THE BASICS OF PUBLIC CHOICE THEORY**

The main premises of public choice theory while explaining individual behaviour in political life are based on the hypotheses of neoclassical economics.

- *Methodological individualism.* All individuals are to a great extent independent, which means they have freedom of choice.
- *Personal interest.* While making choices individuals are driven by personal interests, both in financial and commercial, and in political marketplaces.

- *Rationality principle.* Homo economicus and homo politicus are one and the same person, so the public choice theory develops attitudes on the parallelism of political and economic rationality, which means that, if an individual displays rational behaviour when it comes to commercial activities there is no reason for him/her to act differently in the political sphere.

When they enter the political marketplace, voters act rationally, that is, while making decisions, they are driven by personal interests. Taking into account the fact that personal interests are very different, all voters try to find the political party with the most kindred views, the one to represent their interests in the most adequate way. Both politicians and political parties are also rational when entering the market and are driven by their own interests. The goal of politicians is to be (re)elected, and to achieve this they are forced to compete for votes. Winning the support of the electorate means gaining a certain degree of political power at the same time. Competition in the political marketplace is a rivalry or conflict between political parties which can get much more serious dimensions than competition of different companies in economic marketplaces. And, as in the economic marketplace a cooperation and creating a monopoly is possible, so is a cooperation and forming coalitions in the political marketplace, which is all done in searching for a way to achieve their own interests and stay in power.

### 3. COOPERATION VS ANTAGONISM

In all its segments (social, economic, political etc.) life is full of situations for individuals, politicians, political parties or states to compete, for either commercial or political domination. The goal of each participant is to become better off. Governed by rationality principle, while choosing their own strategy, each participant has to foresee the rational behaviour of other participants in the same game. They are, however, aware of the fact that the other players in the game will also exhibit strategic behaviour and try to foresee their rational behaviour. While making decisions, the participants in the game can act individually, that is, independently, or they can act cooperatively, that is cooperate with other players. Why to cooperate? In order to agree on cooperation it is necessary for the participants that there basically be an interest impelling such behaviour. Thus, the coalition formed does not represent a simple sum of individuals but a completely new quality, first of all, because even the strategies which players would never be able to use if making decisions individually are available to coalitions. A coalition will be made only if players, becoming coalition members can achieve at least as much as they could if they acted individually. Unless it were so, forming coalitions would be pointless. However, cooperation is hard to achieve in all the cases when there is a conflict of interests, but still not impossible, especially when a game is repeated. Players sometimes truly achieve to reach a mutual agreement, in spite of the fact that each player has an impulse not to respect the agreement. In the political marketplace there is always a battle over the issue of winning the elections. In the system of majority decision making, median voter preferences play a decisive role. According to the median voter theorem the winning party is always the one preferred by the median voter. The median voter theorem is a mathematical result showing that if voters choose one point on a line, and each voter wants the point which is the closest to the one preferred by the median voter, then the majority principle will choose the point, that is, the set of public goods which is preferred by the median voter. In a pluralist party system, due to their aspirations to come closer to the preferences of the median voter, the number of political parties tends to decrease and to reduce to a few, most often two most powerful political parties which propose similar political programmes drawing them closer to the median voter. That is why, in practise the leading political parties win narrow victories - they all respect the interests of the median voter. Finally, the winning party is the one closest to the interests and preferences of the median voter. It is drawing nearer to the preferences of to the median voter that makes political parties cooperate. Similarly, in order to draw nearer to the median voter preferences numerous, minor political parties also form coalitions.

In a majority voting the equilibrium will be reached when the preferences are single-peaked, that is when the level of usefulness is a function of the level of expenditure on public goods, that is, when each individual has one maximum on their interest curve. These are usually preferences connected to one public good and to expenditures meant for that specific public good. They can be set within a range varying from those opting for the highest to those opting for the lowest values. The equilibrium in a majority voting system, if there is any, reflects the preferences of the median voter. The median voter is one in the middle and decides on the level of expenditures for public goods. The outcome of a

majority voting corresponds to the preferences of the median voter. Thus, if social (public) choice is to be understood, attention must be directed to the median voter and the way he/she is influenced by a certain policy. Equilibrium in a majority voting most often does not lead to an efficient offer of public goods, because it is either insufficient or superfluous.

#### 4. GAME THEORY APPLICATION IN PUBLIC CHOICE

Game theory is a mathematical formalisation and analysis of the process of rational decision-making when the interests of players coincide, when their interests are either conflicted or partially conflicted, as well as in the risky and hazardous situations. All these are the situations where the final outcome does not depend only on one participant (player) who makes a decision but also on the decisions of all other participants. The environment within which a decision is to be made is unpredictable and subject to changes. Additional complexity of the decision making problem which is the subject to game theory comes also from the fact that the interests of the participants in the game are directly opposed. Thus, rational players, when choosing their own strategies, and driven by personal interests, must be able to foresee the other players' rational behaviour. Game theory has important applications in public election process, because politics is not only the process of finding the facts and identification of truth but, primarily, the solution of conflicts between individuals. It is natural to assume that each politician or political party wants to win the elections and accordingly, having in mind the standpoints of their opponent, to maximize their own payoff. Political, as well as business life is full of examples of strategic interactions of rational players. Strategic thinking of the participants in political life (politicians, political parties, syndicates, and the state) is to outwit their opponent, well aware of the fact that the opponent wants to do the same. Therefore, political agents create the game. In the optimisation process – the process of searching for the best possible solution, and with the supposed actions of the opponents, political players can act either cooperatively or non-cooperatively. Examples of such behaviour in game theory are known as “prisoner’s dilemma” and “trust game”

a) **Prisoner’s Dilemma** The game “Prisoner’s dilemma” is an illustration of an antagonistic cooperation. The existence of the choice model in the situation of parliamentary democracy presupposes at least two parties (DPS and SNP) which have antagonistic interests and compete for votes.

Table 1: Prisoner's dilemma

| Parties | DPS                |                           |
|---------|--------------------|---------------------------|
|         | cooperate          | do not cooperate          |
| SNP     | cooperate<br>(5.5) | do not cooperate<br>(1.6) |
|         | cooperate          | do not cooperate          |
|         | (6.1)              | (2.2)                     |

Table 1 shows the payoff (the number of voters) gained by the parties in case of cooperation, as well as the payoff gained if they do not cooperate. As it can be seen from the results in Table 1, from the public (social) point of view the best solution appears to be cooperation, because in that case the mutual result is 10 (5.5). However, it is also necessary to spot that the best mutual outcome is not the best one for each player (party) taken individually. Both players, in case of non-cooperation would achieve a better outcome individually, that is (1.6) and (6.1) respectively. Regardless of the prior agreement on cooperative behaviour, if any of the players supposes that the opponent might play non-cooperatively, then it is better for them to play non-cooperatively as well. And then they “fall” into the Nash equilibrium. (2.2). Each non-cooperative game has at least one equilibrium point. Thus, none of the players can make their outcome better without exposing themselves to the risk of being deceived and gaining less than they had previously.

b) **Trust game** («giving one another a helping hand»). In a cooperative game, players can sign binding contracts enabling them mutual strategy planning. Respecting cooperation strategy leads not only to the individual optimum for each player separately, but also to the optimum for the whole society, that is the game as a whole. As it is shown in Table 2, the individual payoffs of the game, that is, the payoffs for each player separately, in this case for SNP and NS political parties, (becoming partners in order to confront the policy of DPS) when they obey the cooperation strategy is 3, which is

better than any other possible outcome, and the mutual outcome is 6 (3+3), which is, also better than any other mutual outcome. None of the players, that is, political parties has interest in leaving the cooperation strategy because it would lead it into the state of Pareto optimality.

*Table2: Trust game*

| Parties | NS               |                  |       |
|---------|------------------|------------------|-------|
|         | cooperate        | do not cooperate |       |
| SNP     | cooperate        | (3.3)            | (2.1) |
|         | do not cooperate | (1.2)            | (0.0) |

The players are in the Nash equilibrium. If governed by the logic of personal interest the players have no better alternative. None of the players individually can be better off than if they comply with the accepted rules, that is, play cooperatively – collaborate. None of the players can break the rules without that resulting in the worsening of their own position. It is, however, to be admitted, that not only economic but social situations in general characterized by such an impetus structure and where the optimal solution for all their participants is reached spontaneously, are rare [6].

## 5. CONCLUSION

Public choice theory is a relatively new scientific discipline, originated in the last two decades which refers to the application of neoclassical economics to political decision making. The Nash model is an example of situations where individuals are not able to become better off by any of their independent, one-sided action. On the other side, all kinds of egoistic behaviour will lead to an equilibrium, and all equilibria are Pareto optimal. In this sense, the Nash equilibrium can be called Pareto-optimal. There are no improvements, in Pareto's sense, in the situations where one of the partners cheats and the other acts according to the arrangement. This approach has strong implications on the understanding of politicians and their role in society. In fact, the main principle of the public choice theory explains that the acting of the state (society) can be explained as the result of the rational actions of individuals in their personal interest and their reaction to the "political" game rules. Instead of trying to find optimal solution to a problem, they should focus on finding the rules for making the right decisions which will be accepted as a solution by both individuals and political groups. They are, therefore, connected by means of an arrangement or a choice-making situation. They can make their own decisions, that is, act independently, or act cooperatively, i.e. cooperate.

## 6. REFERENCES

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