Interdepartmental Program of Postgraduate Studies in Information Systems (M.I.S)

Master Thesis

Bargaining Games: A Game-Theoretic Approach of strategies and activity of Interest Groups

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In memory of my beloved teacher and friend,

Professor Theodor Economou

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Contents

Abstract

This study examines the activity and the strategies of interest groups in their attempt to influence the governmental decision-makers, using the methodology of game theory. The strategic means that the interest groups can use for the achievement of their goal is the hard measure of threats, and the softer measure of lobbying actions.

In this study, they are formed four different game-theoretic models, which are a result of the potential combination of two period games. From the mix of the single period games G_1 and G_2, are modeled the repeated games G_{11}, G_{12}, G_{21} and G_{22}. The main conjecture from the examination of the four mentioned models is that hard measures like exerting threats are more efficient for increasing reputation than soft measures like exerting lobbying actions, that are useful only for maintain the reputation to the initial level.

Also, it is conjectured that only under specific conditions the strategy of lobbying is appropriate for the increase of reputation. However, lobbying never can completely replace the threat strategy. In addition, when there is an established position for the interest group, just the exertion of lobbying action may be sufficient for convincing the decision-maker. Meanwhile, even though the decision-maker compromise in the lobbying action of the interest group in the first round of the negotiations, it is beneficial for the group to resume with lobbying actions in order to maintain the high level of reputation that has got.

The game-theoretic model, which is described in this study, is very close to the real bargaining situation between the interest groups and the policymaker. There are many cases where the interest group has used the strategies of lobbying and threats, and combinations of them in order to abort or distort statutes that bring forward their interests. In the last chapter of the study, it is represented the case study of Microsoft corporation, showing the direct implementation of the examined models to the real life.

Chapter 1. Introduction

It is commonly accepted that the latter-day political system and the worldwide society in the last decades declines dramatically. The reason of this unpleasant situation is that the social interest is diminished and displaced from the private interests, which have the power to affect key-persons for their benefit. Determinant factor in this situation is the radical influence of the interests groups in the decision-making of important social issues, like health, legal system, taxation, environment, energy and many others.

Interest groups issue, the last 3 decades has occupied a lot of scientists, especially economic and political scientists and their work has received considerable attention. On many of these studies, scientists express their anxiety about the harmful influence of these groups on the quality of democratic regime and claim that the interests of a small group are served at the expense of the interest of the general public (Sloof, 1998). Olson (1982) has provided evidence that interest groups are injurious to society as a whole because their effect on governmental decisions impacts to the real economic growth, generates inflationary trends, and increases unemployment. Furthermore, there is the aspect that the actions of the interest groups lead to decisions and policies, which aim to the redistribution of the wealth, rather than the creation of new wealth. This aspect is fostered by the fact that all these activities demand significant expenditures and economic resources that are socially useful. There is some evidence (Rauch, 1995; Sloof, 1998) that all these influence expenditures belong to the “parasite” economy, and not to the productive economy.

However, there are some supporters of the influence activities of interest groups, arguing about their beneficial influence in the societies. Accordingly to these aspects, interest groups play an important role as a feed of expression of interests, supplementary to political parties. Moreover, it is argued that interest groups make effective of citizens in politics. Wilson (1996) has provided another positive effect of

interest groups, which is the political stability, because the isolation and the alienation of the individual can be avoided. Finally, one more modern opinion about the activity of interest groups is that they provide to the decision-makers of the government useful policy information (Danielian and Page, 1994).

Independently of the positive or negative activity and influence of the interest groups in the society, in the present study it will be examined the way that an interest group attempts to influence the governmental instrument and the preferred strategy that shapes in order to regulate the agencies and achieve the desirable goals. Firstly, it would be necessary to determine what we mean using the terms “activities”, “influence” and “actions” for the interest groups. Interests groups have a wide range of tools and strategies. Most popular and frequently adopted means are campaign contributions, threat actions and lobbying or word pressure. This study focuses on two strategies: threat actions and lobbying. The reason is that these two means of influence present special interest regarding the strategic aspect of the issue.

The framework of the model is that the interest groups want a “favor” from the governmental agent. Those favors could possibly be the contortion or even the abortion of a law or a regulation. As mentioned above the interest groups choose a strategy between threat action and lobbying. It should be mentioned that only the threat actions attend “cost” for the governmental agent. Lobbying is a less tight and strict behavior and the impact on the agent is “costless”. However, the power of the interest group and the information or the beliefs of the governmental agent are critical for the shape of the strategy of groups and determines in many times the result of the pressure. Powerful groups prefer to use their influence using the threat-action strategy. On the other hand, weak interest groups are not capable to force and prefer the mean of word pressure, attempting to obtain in the near future reputation. Moreover it has to be noted that in order to take place threat-actions the governmental agent should firstly take an unfavorable action. On the other hand, lobbying may take place before the governmental agent takes the decision for his action.

Focusing on the strategic interaction between governmental decision-maker and interest group game theory seems to be the perfect theoretical method for the analysis. Recently, a lot of studies used game-theoretic models in order to examine the strategy and the impact of interest groups on the public policy. Many of these game-theoretic approaches of the issue have resulted useful deductions. The game between interest group and governmental agent is a two-stage sequential (repeated) game.

The objective of the study is the exploration, in theoretical base, of the effectiveness of the means that the interest groups use. Also, it is examined the appropriate strategy that should an interest group choose -accordingly to its power and reputation- in the bargaining game with the governmental agent. Furthermore, it will be explored the best strategy for the interest groups with low power in order to build up reputation, negotiating in next level more efficiently.

In the next chapter it is represented a general literature review concerning the interest groups and the way they operate, as well as a review of the existing game-theoretical models used for the examination of the issue. Chapter 3, contains the methodology of the study starting with some basics of the game theory and the role of reputation in bargaining games which are necessary for the understanding of the model. In the rest of chapter 3 it is represented the model of the study and also are developed the games that will give established answers to the above-mentioned issues. In chapter 4 it is given an algorithmic solution of the structured games of chapter 3. Finally, in chapters 5 and 6 are represented the results of the study and discussion about them, accordingly.

Chapter 2. Literature Review

2.1. Literature Review for Interest Groups

Introduction

Interest groups present an established and crucial element of our modern political societies. Contributing to political parties, endorsing candidates, and informing the public, are just a few of the important roles performed by interest groups. Hence, the influence of these organized active groups is easily observed in the everyday activities of all government branches.

Theoretical and empirical literature around interest group activity has been rapidly growing through the past decades. There are numerous papers which investigate the role and behavior of interest groups in the political sphere. Moreover, in general, practical terms, literature around interest groups can be divided into four main categories in which interest groups play distinctly different roles. These are: (i) groups as a way of categorizing individuals; (ii) groups that enforce norms; (iii) groups with direct influence on decision makers, and (iv) groups that transmit information. Although, research in this area has considerably grown, there are still many unanswered questions (Reuben, 2002).

Even today, interest group activity is usually accounted as a rather negative and skeptical activity. On the contrary, there are some theorists who state that interest group activity is necessary in any organized civil society, as it enables citizens to better monitor and hold their government accountable, contributing to more transparent market practices, efficient governments, and social equity (Sen, 1999; Edwards, 1999). Hence, an organized civil society represented by numerous interest groups is not only desirable, but also essential for the development of countries.

Definition

Lyon and Maxwell (2002) suggest that interest groups can be defined as "Organizations seeking to advance a particular sectional interest or cause, while not seeking to form a government or part of a government", while this definition is often used interchangeably for the pressure group as well (Lyon and Maxwell, 2002). Interest groups usually rely on a variety of campaigning and lobbying methods to influence government policy, but they may also occasionally contest elections as a tactic to influence political parties (Epstein and O' Halloran, 1995)

Interest group literature has grown rapidly in the past decades, but there are many points left uncovered. In order to provide a simpler framework with regards to the examination of interest group behavior, theorists have made some strong assumptions, which are misleading and restrictive, eventually leading to incorrect conclusions.

Assumption 1: A single policymaker determines the policy outcome.

Most of the times, the single policymaker is used for a better representation of how policy is produces. But, governments are far more complex and multifaceted, consisting of bureaucrats, legislators, elected officials, judges etc, which interact one another in order to yield policy outcomes (vanWinden, 1999).

Assumption 2: Interest groups can simply use money to influence policy.

Money can "buy votes", but until today no theorist has been able to prove this satisfactory (Austen-Smith, 1997). Money impact is determinant in its power to affect the decision makers. Snyder (1990) states that -although it is empirically proven- the mechanism of direct money transfer to policy makers is not yet very clear. Moreover, some transactions between interest groups and policy makers do not involve only monetary transfers, but also the provision of goods or services, even voluntary work Denzau and Munger, 1986).

Assumption 3: Agents are rational expected utility maximizers.

The rationality assumption is being revisited in practically all fields in economics. There is evidence that individuals diverge from rational behavior in significant and non-negligible ways. Therefore, this assumption may be questioned in the interest group literature as well. Critical factors in politics, which may boost this assumption are:

- cognitive limitations in the agent's effort to calculate the complex relationships that determine the consequences of a proposed policy

- social norms, such as fairness, which are so prominent in political discourse would also affect political behavior

- emotions, which are very common and critical in politics (van Winden, 1999).

Assumption 4: Interest groups behave as unitary actors.

Literature usually holds the assumption that the group behaves as an individual, which has neither theoretical nor empirical background (Barron, 1989). Furthermore, experimental evidence provides a mixed picture regarding group behavior in comparison with individual behavior. Sometimes groups do take the same decisions as individuals but also, they can act differently (Cox and Hayne, 2002; Bornstein and Yaniv, 1998).

Interest group behavior must be modeled in order to understand under what conditions and in what ways do groups and individuals behave differently. Interest groups are much more heterogeneous than other corporate or social agents such as firms, and therefore this assumption might be even more challenging when applied in the political scene.

Assumption 5: Interest groups are better informed.

One of the most common assumptions is the power of information, which interest groups are holding, and which further provides them with the competitive advantage against the policy makers. This assumption is usually justified saying that interest groups either are experts acquiring information or simply aggregate the information given to them by individual members. If it is a matter of expertise, it is not very reasonable that there are not enough qualified experts for the government to select one with whom it shares similar preferences over policy.

More realistically, if the interest group has more information because it acquires it from its members, then the way information is obtained might be especially important. Network structures for information transmission are bound to have a vital role. Conclusively, it is critical that the way information is acquired and received by interest groups should be explained more thoroughly (Van Winden, 1999).

Assumption 6: Interest groups already exist.

Perhaps the most important limitation of these models is that it is simply assumed that interest groups exist (Van Winden, 1999). For this reason, interest group formation is briefly discussed in the following chapter.

Interest group formation

A very large gap in interest group literature is how interest groups are internally formed. Reuben (2002) significantly states "We need to understand how and why people are organized into groups and act collectively" (Reuben, 2002). The incentives to do so are clear, but the mechanism by which this is accomplished is still not justified.

Nevertheless, not modeling group formation would leave a big gap in understanding interest group activity and many important questions unanswered. More insights are needed to answer basic questions such as:

- Why some sectors of society are represented by interest groups and others are are not?
- Does the threat of currently unorganized groups that can suddenly organize affect the behavior of the current ones and the behavior of policy makers?
- How did nonexistent movements, such as the currently strong environmentalist lobby, form?
- Why are interest groups that concentrate only on one or two issues while others cover a wide variety of interests?
- What are the incentives needed to promote the formation or dissolution of interest groups?
- Why do only some interests get organized, or are provoked to do so by policymakers?
- What are the nature, cause, and impact of the decision-making procedures maintained by organized interests?
- How do government policies feed back into the development of groups?

Without such knowledge, interest group models will be limited to explaining short term, static situations in which interest groups neither form nor expire but simply exist (Reuben, 2002). Van Winden (2003) additionally notes that research needs to go beyond the common assumption of exogenously given groups that are of fixed size and behave as unitary actors. The formation, dynamics, and internal politics of interest groups are badly neglected topics in interest group literature (Van Winden, 2003).

Interest Group Strategic Choices

Epstein and O' Halloran (1995) state that there are two emerging views regarding the role of interest's groups in congressional–bureaucratic relations. The first view holds that interest groups help legislators monitor bureaucracy. Legislators design a system of rules, procedures and informal practices, which enable citizens and organized interest groups to examine administrative decisions. According to this view, if an agency takes actions that are not to the interest group's liking, the group can sound a "fire alarm" to alert the Congress that remedial actions are needed.

The second view holds that interest groups, congressional committees and agencies form an "iron triangle", or in less colorful terms a subgovernment. The essence of subgovernment politics is that policy is tailored to the needs of the special interest, which is then inspired to give generously to the legislators' campaign funds, which in turn appropriate healthy budgets for the agency. All actors within this triangle are happy with this arrangement and all actors outside the triangle are either actively prevented from intervening or are simply too disinterested to care.

As a result, there are two conflicting accounts of the interaction between interest groups, legislators and bureaucrats. While the "iron triangle" assumes away the problem of asymmetric information by positing that all parties have identical interests, this view could be more appropriate in the politics of 1950s and 1960s. The "fire alarm" on the other hand, ignores the strategic aspects of information transmission. Any theory of interest group oversight must combine distributive, policy-oriented aspects of the iron triangle with the informational perspective of the fire alarm thesis.

Today, interest groups have to work harder for influence. Their daily activities are centered on gathering and distributing information to public officials. Salisbury (1990) significantly notes that interest groups must first clarify their true interests and then determine the position they wish to embrace. Before they do this, they

must find out not only what technical policy analysis can tell them, but what relevant others, inside the government and outside are thinking and planning. Information, timely and accurate is absolutely vital to the lobbyist" (Epstein and O' Halloran, 1995).

Interest Groups Activities

Interest groups in two ways can affect policies: directly, by influencing the behavior of policymakers, and indirectly, by influencing the behavior of voters.

Campaign Contributions

Campaign contributions are largely examined through theoretic and empirical literature regarding their impact on policy maker decisions. Politicians are willing to serve an interest group's wishes and thereby willing to deviate from the policy position preferred by the voters, because money, as an influence means, is valuable in attracting votes.

Sometimes, the influence on the mere act of contributing is studied, but usually the impact of the level of contributions on voting behavior is investigated. The question that arises is whether money-mainly donated by Political Action Committees (PACs) - directly influences the policy maker behavior of individual legislators and thus it is subjective to an extensive debate. The empirical evidence is mixed and do not lead to a fair result. Firstly, some theorists argue that PAC influence is likely to vary with the scope and visibility of the vote issue. Secondly, PAC influence might also be determined by legislator's characteristics, like their need for funds. The last consideration is that the strategy of an interest group doesn't only affect the legislators, but it affects the interest group itself by its positions. This two-way relationship may lead to both over and underestimation of the interest group influence, depending on the particular strategy of the group (Potters and Sloof, 1995).

Vote functions - The contribution strategy

According to Potters and Sloof (1996) if an interest group takes the positions of candidates as given it will mainly try to get favored candidates elected and address its support and donations to 'friends', especially in those races that are expected to be close. This is the so-called position-induced or support model. If, on the other hand, a group takes the election chances of candidates as given, it will mainly try to influence the policy position of candidates, especially of those candidates which are taking a stance which is not (yet) in line with the group's preferences. This so-called service-induced or exchange model leads to the prediction that an interest group will address its money to candidates from which they are likely to get favors in return, that is, the likely winners of an election, the to be persuaded candidates, and the candidates that are likely to be (or to become) powerful legislators (Potters and Sloof, 1996).

Regarding the same issue, Van Winden (2003) studies have resulted in the following:

a) Groups will only contribute to the favored candidate

b) The more preferred the policy of the favored candidate the higher the contribution

c) No contributions are made if platforms are identical

d) Contributions are higher the 'closer' the election. Regarding the optimal behavior of the candidates it is typically assumed that (informed) voters will punish candidates for adjusting policies in the direction favored by the campaign donors (Van Winden, 2003)

Multiple means and channels

In practice, interest groups can use multiple means and multiple channels. Drawing conclusions from studies focusing on just one means or channel can be treacherous, because the use and impact of these different instruments is not likely to be

independent. For instance, common agency models predict that contributions buy policies. However, if contributions simultaneously transmit information on the lobby's type or only serve to gain access, signaling models suggest that this relationship is much more subtle and may even be absent.

Lobbying

Studies that examine interest group activities other than donating to campaigns are grouped under the header "lobbying" and they report a significant influence on policy. Lobbying is more extensively presented in Part II of the current literature review on interest groups behavior.

Characteristics of interest groups and their environment

Stakes and collective action

An interest group that has a large stake in influencing policy makers is hypothesized to be more politically active and hence stronger to have an impact on policy. Typical variables used to measure the stake of an interest group are: (corporate interest group) degree of government involvement in an industry, degree to which it is able to solve the free-riding problem of collective action, membership rates (Potters and Sloof, 1995).

Political success

Some interest groups receive a higher success in politics than others. There is a wide variety of variables that distinguish and determine the political success of an interest group, which can be grouped as follows:

1. Variables that refer to the political strength of the interest group. The size of the group as well as its geographical dispersion makes its collective action more difficult. The average or relative income position of interest group members is

also a decisive parameter that demonstrates political success (Cahan and Kaempfer, 1992). For corporate interest groups, government support and favorable intervention, when feasible, is critical, while the quality of membership is found to have robust results in the group's political leverage (Plotnick, 1986).

2. Variables that are related to the presence of oppositional or coalitional lobbying groups. If a lobby is likely to encounter a coalitional force in the political arena, it is prone to have higher political success, while the presence of an oppositional lobby is harmful for its operations (Plotnick, 1986).

3. Variables that are related to the interest group's hearings in politics. Politicians essentially have to make a trade-off between the benefits they receive from the special interest groups in return for special favors and the electoral damage that may occur from these special favors. Accordingly, studies indicate that interest groups can more easily affect politicians, which are under low democratic pressure and have considerable judgment (Young, 1991; Teske, 1991).

2.2 Literature Review for Lobbying

Introduction

Among public affair techniques, lobbying is undoubtedly the most mystifying one at least in Europe (Koeppl, 2001). Back in 1980's, the word "lobbying" in European academic literature was used in a negative and skeptical way. Moreover, lobbying was accounted as `typically American', without any right of existence in Europe (Beyme, 1980). Even today, many practitioners are uncomfortable describing themselves as lobbyists, though this may be less true in US foremost, and then in the UK or in Europe. The President of Marlowe & Company in Washington, who is specialized in advising non-profit organizations and local government, states that it causes him no difficulty in Washington to register as a lobbyist, but it does cause him some difficulty around the world, as the word lobbyist sounds as a dirty word. (McGraath, 2002).

What is lobbying?

Lobbying can be defined as the attempt to influence the political system's decisions. The determinant words in the lobbying definition are influence and the political decisions. Influence means to create an impact on the recipient's behavior with a focus on modifying it at your interest. Any process of influence implies the exchange of information or, in short, information and influence can be stated as the two sides of one coin (Schendelen, 1993). Political decisions are based on information from society. To avoid protests from interest groups, the political system seeks to integrate as many interests as possible in its decision-making. The more comprehensive this input is, the more successfully the political system will function. Thus, without information (existing regulations, group interests, technical developments etc), the decision makers are not able to make political decisions (Koeppl, 2001).

Milbrath (1960), the so-called `father of lobbying research', emphasizes the communication process of lobbying. He was the first to analyze lobbying from the viewpoint of communication and significantly argues that “the lobbying process is essentially a communication process” (Milbrath 1960).

The “Responsible lobbying” framework

Danger zones:		Six-step lobbying health-check:		Responsible lobbying is:
Policy inconsistency Are we doing one thing and saying another?	NO	**Alignment:** Are our lobbying positions in line with our strategy and actions, and universal principles and values? **Materiality:** Are we lobbying on the important issues that affect our organization and our stakeholders?	YES	**Consistent with business strategy and universal principles**
Untransparent processes Does it look like we're trying to hide something?	NO	**Stakeholder engagement:** Are we open and responsive to stake-holders in developing and debating our lobbying positions? **Reporting:** Are we transparent about our lobbying positions and practices?	YES	**Transparent and responsive to stakeholders**
Poorly managed lobbying Does the left hand not know what the right hand is doing?	NO	**People:** Do we know who is lobbying on our behalf and where our spheres of influence are? **Processes:** Are management systems and guidelines in place to ensure that what we do in practice is effective and in-line with strategy and policies?	YES	**Effective in translating policies into practice**

(Accountability, 2005)

The Institute of Social and Ethical Accountability defines responsible lobbying as:

a) Being consistent with an organization's stated policies, commitments to stakeholders, and core strategy and actions.

b) Advancing the implementation of universal principles and values in business practice (Accountability, 2005).

Lobbying, public affairs or public relations?

Public affairs appear to include all corporate functions related to the management of an organization's reputation and publicity – including lobbying or government relations, media relations, issue management and community relations. Public affairs is the "big umbrella", where lobbying applies as a technique of practicing public affairs. Without question, one of the most problematic elements involved in the debate about the definition of lobbying has been the proper nature of its relationship to public relations. McGrath (2002) argues that in public relations, the audience is much broader and diverse, whereas in lobbying, the audience is very small and predictable – congressional committee of 20 members- and as a result, lobbying could be further defined as a narrow form of public relations (McGrath, 2002).

Supporting this argument, Neske (1997) notes that neither political sciences nor mass communication studies have become seriously involved in lobbying and as a result, today the only actual research for lobbying depicts from the field of public relations. Sometimes, public relations have been simply renamed as the `new lobbying' meaning that `lobbying is a part of public relations and involves the communication with the public authorities' (Neske 1997).

Lobbying and democracy

Many academics on interest groups support that lobbying stands for the "moral decline of democracy" (Beyne, 1980). Michalowitz (2004) shares this point of view

and states, “it can be easily recognized that the Brussels lobbying community does not account for a democratic or for a fully representative representation of EU citizens”. The main reason for the failure of democracy is that even if associations-interest groups have a democratic inner structure, they will always represent their active members and not all citizens. This can be defined as a lack of representivity and thus a democracy failure (Michalowitz, 2004).

On the contrary, Koeppl (2001) argues that lobbying stands as a sign of ongoing development of a democratic society. Traditionally established interest groups like chambers or unions lobby for their own interests. But, many new single-interest groups and interested businesses are entering the political debate and trying to gain influence over the political decision making process by concentrating on their very specific fields of interest. As a result, lobbying justifies new emerging interests as political actors, because the development from a protest movement to an interest group has to be seen as taking on political responsibility leading to future political majority and socialization (Koeppl, 2001).

Lobbying activities

Michalowitz’s study (2004) reveals seven critical factors in the lobbying activity:

1. Representivity
2. Professionalisation
3. Strategic advice
4. Image – building
5. Lobbying of other actors
6. Delivery of expertise
7. Contact provision (Michalowitz, 2004)

According to Thomas and Hrebenar (2000), the lobbying process involves three activities:

1. Gaining access to policy makers
2. Creating an attitude among policy makers conducive to the group's goals
3. Influencing policy makers in the group's favor

The senior consultant of Global Public Affairs (GPC) in Brussels (2001) states that the organization practices a wide range of services that fall into four final groups: 1) research which is the basis of all the lobbying activity, 2) monitoring, 3) political communications or the "contact program", 4) advocacy (Gibbons cited in McGrath, 2002).

McGrath (2002) agrees with the former group formation and develops a more detailed approach to the lobbying framework and activities. The identified lobbying activities according to McGrath are the following:

1. Atmosphere setting
2. Monitoring
3. Communication with policy makers
4. Advocacy and influencing
5. Application of pressure
6. Coalition building

1. Atmosphere setting

In order for the lobbying process to begin, clients will need to simply raise or enhance their corporate profile with the policy makers. It comes that, much interaction by groups with policy makers is not related to immediate concerns but intended to create an atmosphere – involving trust, credibility, dependence – and therefore gain access to the government policy makers.

2. Monitoring

Lobbying practitioners regard the monitoring process as a key element of their work in Congressional committees, although this function tends to be neglected in the academic literature. A senior lobbyist in the American Medical Association argues that "everything has to be out of reference books. Lobbyists have to get information about the Congress Members anyway possible, as this information is really the currency of their job. They have to look for the competitive edge, which is hidden behind continuous monitoring of their target group, ie. the Congress Members".

The Chairman of the Wexler Group significantly states that "If there weren't lobbyists in the politics arena, they would have to be invented, because the deluge of information is a particular problem in a legislative process, which is absolutely dependent upon information (Wexler, 2001 cited in McGrath, 2002).

3. Communication with policy makers

Lobbyists need research and detailed monitoring of their target, in order to enable their clients to develop messages related to public policy issues and address them appropriately to the policy maker politicians and officials. McGrath (2002) identifies three primary options with regard to lobbying communication to policy makers:

a. On the basis of issues
b. Emphasize on access
c. Know the legislative process

a. On the basis of issues

This approach is generally regarded as the most effective method. A commercial lobbyist in Washington argues that, "when lobbyists are acting on behalf of a special interest or corporate interest, the first threshold they have to cross with a Member of Congress is to create an identity of interest, in order to show that they have an interest in common" (Peyser, 2001 cited in McGrath, 2002). Moreover, lobbyists are not usually interested about what politicians are doing, but about the policy itself. It is this issue-based approach which characterizes the common rationale that lobbying

acts as a bridge between the governed and the governors, across which information can flow in order to ensure that policy decisions are better informed.

b. Emphasize on access

The second approach employed emphasizes on access to decision makers over the knowledge of issues. Lobbying in particular is very relationship driven. The essence of the lobbying business is to create sustainable relationships, as contacts are not necessarily good, but fragile. A Washington consultant notes that "The fascinating aspect for everyone in the business is not the academic background of skills that will impress the clients, but who the lobbyist knows. In order to become a successful professional, a lobbyist must have the lowest possible belied in substance, as it's all image. Clients are buying the Members that the lobbyist has access in the Congress, when they hire him" (George, 2001 cited in McGrath, 2002).

c. Know the legislative process

Knowing the legislative process is directly linked with the institutional framework of the lobbying activity. It comes more as a prerequisite to know the legislative process, than as an activity approach (McGrath, 2002).

4. Advocacy and influencing

The access issue leads back to whether commercial lobbyists should actually undertake the direct lobbying of politicians and officials themselves, or advise their clients to move forward to self-lobbying. It is taken for granted in all the political systems under consideration that direct lobbying is a perfectly appropriate function for the in-house lobbyists. Most of the commercial lobbyists state that they are relatively uninvolved in advocacy.

However, in-direct lobbying is a fact today. Lobbyists craft the strategy and organize the campaign and the clients deliver the final messages directly to politicians and officials, as they are more credible talking about their own matters. Moreover, most

of the times it's better for a client to develop direct personal relationship with the local government and authorities.

It should be noted that while many lobbyists do not themselves directly lobby decision makers, rather advising clients on how to do their own advocacy, these commercial consultants should still be properly regarded as key members of the lobbying industry; indeed, they are so regarded universally by practitioners and academics alike (McGrath, 2002).

5. Application of pressure

Academic research into lobbying into lobbying frequently discusses the use of "insider tactics" and "outsider tactics". In very broad terms, "insider tactics" relate to lobbying activities which take place in private, and which are based on some explicit commonality of interest and a notion that the lobbyist and legislator or official have some mutual sense of how the political system works. The term "outsider tactics" by contrast, in very practical terms often involves persuading an organization's members or supporters to themselves lobby politicians by convincing them to urge that they support or oppose a policy proposal. This approach is mostly known as grassroots lobbying.

It has to be pointed out that with regards to lobbying and the application of pressure, the most successful lobbying campaigns spend more time and energy in cultivating friends than denouncing enemies. Moreover, for the lobbying business the identification of friends is one of the key processes. Most of the studies of lobbying activity show that lobbyists don't work with people who are on the different side of issues, but with those who are already committed in the same direction. Direct lobbying aims to activate the converted, to convince the neutrals and to work on those who are wavering (McGrath, 2002).

6. Coalition building

Most of the lobbyists argue that there is no single group that has the ability to push the legislative process to the appropriate direction without help, which is further translated in the need for coalition building. The director of the Division of Congressional Affairs at the American Medical Association argues, "There are no permanent friends and no permanent enemies, only permanent interests. The people that you are lined up with this morning on one issue, you will be fighting this afternoon on something else. It means that from a lobbying standpoint, if you want to work for a trade association or if you are with a lobbying firm, you can't be emotional about what you are doing. You can't look at somebody as the enemy and then expect to treat them that way and deal with them in that fashion because the enemy this morning may be your closest ally this afternoon" (Hobson, 2001 cited in McGrath, 2002).

Lobbying techniques

Over the last decades of the 20th century, lobbying expanded greatly to accommodate new techniques. These have changed its scale and quality and today the most popular lobbying techniques are coalitions, grassroots lobbying and Political Action Committees (PACs). It has to be noted that those techniques do not operate as an alternative to direct lobbying, but jointly, and in various combinations.

1. Coalitions

Coalitions are a very common form of mobilization and have grown a strategic principle of lobbying, as pressure politics is a politics of force and coalitions are one way of recruiting and getting ready for competition. In everyday politics coalitions are an important signal for the policy maker, as they may become the determinant factor for his re-election and thus of decisive power. Beyond the quantitative aspect, there is a qualitative aspect. A good coalition joins u a variety of groups representing

different types of interest, which further is an indicator for the breadth of the coalition's real and potential clientele.

Coalition politics exhibit the skill of personnel to strongly support and considerate social ramifications of interests. Much depends on the intensity of the group's motives, its central core and the ability to involve and consolidate other members or groups. The rules are institutionalized by the various participating organizations, especially those who build most of their strength on coalitions (Graziano, 2001).

2. Grassroots lobbying

Grassroots lobbying is "any attempt to influence legislation by communicating with the general public or a segment of it". It involves persuading an organisation's members or supporters at large to themselves lobby politicians by contacting them to urge that they support or oppose a policy proposal (known as grass roots lobbying). Thus, interest groups seek to market their policy preferences firstly internally within their own organisation, and then externally when the group's members communicate themselves with politicians. Grass roots campaigns tend to relate to large, national public issues which could impact on many people, while the resolution of more technical and detailed issues may be better suited to direct and private advocacy. Moreover, as the use of technology, internet and electronic means grows rapidly, companies, associations and citizen lobbies, constituted by strong activists, but lacking in means, make excessive use of grassroots lobbying.

However, it should be noted that most grass roots campaigns are not undertaken simply as ends in themselves, but rather as a way of supplementing and reinforcing more traditional 'insider' lobbying strategies. As one academic puts it, "Direct lobbying becomes much more effective when it is supported by an articulate public" (Holtzman, 1966, p. 100) (McGrath, 2004).

3. Political Action Committees (PACs)

PACs are electoral organizations with a broader scope than single candidate committees and smaller than Party Committees. The organizational form of the PAC is extended to corporations and trade associations, institutions with strong interests

and considerable resources. PACs and lobbying are jointly operating in their pursuit of legislative access. The use of money as an institutionalized means takes its place alongside with the other tools of the lobbies – that is expertise, integrity and capacity for mobilizing the base (Graziano, 2001).

Lobbying facts and numbers

- There are an estimated 100,000 professional lobbyists worldwide – 17,000 in Washington, 15,000 in Brussels alone.
- Lobbying presence is growing rapidly in fast-growing large economies (for example Russia, China, India, Brazil and South Africa) and around new rule-making institutions (like the WTO in Geneva).
- Legislators are often outnumbered by professional lobbyists – thirty to one in Washington DC. Business lobbyists outnumber NGO lobbyists by two to one in Brussels but the line between the two is a grey one, inhabited by trades unions, industry associations and other groups.
- Lobbying cultures remain distinct in different capitals, but many suggest that lobbying methods around the world are becoming more like Washington DC's K Street.
- Lobbying is not just about capitals. There is a lively lobbying scene at regional and city level, as well as virtual internet lobbying and ad hoc activities around mobile events like G8 summits.
- Lobbying is not just carried out by professional lobbyists. A wide variety of organizations and individuals within them, are involved in lobbying activities (Accountability, 2005).

2.3 Literature Review for game-theoretic models of interest groups strategies and activity

More recent studies are more explicit about the kind of activities interest groups use when modeling the impact of interest groups on public policy. Just like the empirical literature, most theoretical papers modeling interest group actions using game theoretic models and focusing on "truthful Nash equilibriums", they are more explicit about the means of influence involved on the formulating the impact on the policy maker. Regarding campaign contributions means of influence, they are either intended to obtain specific favors from politicians (service- induced model), or are used to get the favored candidate elected (position- induced model). Modeling lobbying activities has also received considerable attention in the theoretical literature. They have been modeled as explicit bribes, as implicit payments through "wining-and-dining", and as a means of strategic information transmission. Of course, when lobbying is modeled as money transfers to the politician, there is only a small difference between lobbying and campaign contributions. Finally, some studies model interest group influence by means of the voting power of their individual members.

A shortcoming of this literature is that many studies, predominantly the earlier ones, are not explicit about what kind of activities interest groups undertakes to influence public policy. As a result, they do not explain why interest groups are able to affect policy. In these models it is just assumed that interest groups exert "pressure" on government through spending resources, i.e. they use a black box production process of political pressure. Moreover, government is modeled in reduced form because it is assumed to react mechanistically, i.e. in a predescribed, exogenously given way, to interest group pressure. Because these models are not explicit about which activities are involved, pressure may very well represent any activity of the interest group, or the aggregate influence of all instruments used by the interest group together. Thus, the question why an interest group uses one rather than

another – and, thus, why different groups employ different means – cannot be addressed. Similarly, issues such as whether different means of influence are complements or substitutes in the production of influence, remain underexposed (Sloof, 1997). Only a very few existing game-theoretic models are concerned with the endogenous choice of a specific type of instrument, or with the combined influence of package of instruments, which are presented below.

Modeling the choice of means of influence

Moore and Suranovic (1992) form a game theoretic model concerning an industry's choice between lobbying the legislative branch and/ or the executive branch in obtaining government protection. The choice of a specific option is simply determined by its exogenously given relative success. The model does not indicate what the determinants of this relative success are, because lobbying is modeled as a black box process. The main point of the paper is that policies lowering the probability of success of (one or both of) the two means of influence may reduce national welfare. The reason is that the industry may switch to an alternative option of protection seeking which uses more resources, or starts using the alternative option after an unsuccessful first attempt using its most preferred option.

A similar criticism to the above mentioned model applies to Hoyt and Toma (1989). They adapt a game model allowing interest group lobbying both at the local and the state level. Their specific assumptions concerning the influence functions, namely that lobbying at the state level is (far) more effective, immediately yield the conclusion that interest groups mainly direct their lobbying efforts at the state level.

Austen-Smith (1993a) is more specific about the type of instruments interest groups use. Moreover, their influence is explained rather than assumed. He models lobbying as the strategic transmission of information. In his model only an interest group may acquire information about the final consequences of certain policies. The interest group may lobby the (closed rule) legislature both at the agenda setting stage

(committee members) and at the vote stage (House members). In equilibrium the decision at which stage(s) to lobby depends on the relative preferences of the House, the committee and the lobbyist. It appears that there can coexist influential lobbying at both stages. But, lobbying the committee is likely to be influential, whereas lobbying the House is often only informative (that is, not affecting the voting behavior of its members). Note that this result is in line with the empirical results obtained by Wright (1990) regarding the effectiveness of campaign contributions.

Using game theoretic models to explain interest group influence to the policy maker

Another group of literature refers to the formation of cooperative games and compromise functions. Characteristic of the cooperative game models is the focus on coalitions rather than individual agents and outcomes rather than strategic moves. Two models of cooperative games regarding interest group influence to the policy maker are: the power to tax model (Aumann and Kurz, 1977) and the interest function approach (Van Winden, 1983).

The power to tax model, presented by Aumann and Kurz (1977), concerns a redistribution game where the so-called Harsanyi- Shapley-Nash value is used as solution concept. The income distribution is determined by majority voting. The outcome of this game is determined by using the Nash Bargaining Solution (which assumes that players can make binding agreements, committing themselves to carry out threats if no agreement is reached). Proceeding in this way for all possible coalitions, an individual's ‘power’ (Shapley value) can be derived from the individual's (expected) contribution to all possible coalitions. Since commitments are possible threats are never carried out, because the players, preventing inefficient outcomes, anticipate them. Furthermore, no coalitions (interest groups) actually form.

Information transmission models

An important kind of interest group activity neglected in the models discussed so far is the transmission of information. The basic signaling model of lobbying of Potters and Van Winden (1992) accordingly illustrates that lobbies should somehow be able to distinguish themselves in order to influence policies through information transfer. Fixed lobbying costs provide one such opportunity. However, also the policymaker can make lobbying costly, by demanding a fee or contributions for access (Austen-Smith 1995). The reason may be a time constraint, the intrinsic valuation of contributions, or to screen the lobbies. Also in this way the scope for information transfer increases, by forcing lobbies to reveal their preferences. Other extensions, with a similar outcome, include multiple senders, multiple receivers, multidimensional policies, receiver uncertainty about whether the sender is informed, auditing and verification by the policymaker or an intermediary agent, and persuasion games (Lagerlöf 1997 cited in Van Winden, 2003).

In a persuasion game the sender can transmit or withhold evidence, but cannot 'lie'. This assumption is sometimes justified by referring to reputational concerns in a repeated game. This may also jusitify the cost of lying in the model of Austen-Smith and Wright (1992). In this model two interest groups have to pay a cost to get informed (observed by the policymaker) but can subsequently send a costless message (which would be uninfluential 'cheap talk' were it not for the anticipated cost of lying). This obviously increases the scope for information transfer. Actually, a persuasion game can be seen as one extreme of a more general static model with exogenous cost of lying (which are infinite, then), and the basic signaling game (where lying is costless) as the other extreme. These costs can be endogenized in a repeated signaling game model, where an interest group may want to report truthfully to build up or maintain its reputation. Moreover, apart from costly messages ('words'), sanctions through the enforcement of threats ('deeds') become available then as a means of influence. (Van Winden, 2002).

Chapter 3. Methodology

3.1 Game Theory: Basics and Principles

Chapter 3 begins with some basics of Game Theory. As it has been mentioned in the introduction of the study, Game theory seems to be the perfect theoretical method for the analysis of the strategic interaction between interest groups and governmental instruments. In this chapter, it will be given a brief presentation of principles and basics of Game Theory that are necessary for the understanding of the game-theoretic model which will be developed for the objectives of the study.

3.1.1 Applications of Game Theory

It could be claimed that "Game Theory" is the science of conflict and cooperation. Game theory explores the cases where N persons interact, so that it matters to each person what is the selected move of the other persons participating in the game. This revolutionary theory uses various mathematical tools for modeling, illustrating and analyzing the games. Some of these mathematical tools are briefly represented in the present chapter.

Game theory can be applied in every strategic issue. The players can be corporations, traders, voters, military governors, political parties, interest groups, even couples. This diversity of choices is the reason that many people worldwide find game theory very challenging.

John von Neumann in 1944 developed the fundamental idea for game theory, published in book Theory of Games and Economic Behavior (Nelson, 2003; Regis, 1992). However, about 3 decades later, a work team of young mathematicians at Princeton University extended the existing research of Von Neumann and brought

game theory to the principal center of interest. The mathematicians were John Nash, Harold Kuhn and Lloyd Shapley. Although mathematicians set the foundation of game theory, today it is mostly developed by economists and other social scientists (Stengel, 2008).

Game theory is also used in biology, computer science, networking, engineering, international relations, law, international trade, philosophy, and finally in political science in which the examined issue of interest groups and lobbing is osculated. Furthermore, Aumann states that game theory is the science that unifies the rational side of social science -where "social" is interpreted broadly- in order to include human as well as non-human players (Aumann, 1987).

3.1.2 Basics of game theory

Interaction is the most important ingredient in Game theory. The benefits of the players are depended not only by their own strategies they prefer to apply but also by those of the other players participating in the game as well. Strategic Games consists of:

- ***a set of players N = {1,2,3,……,n}***
- ***a poor strategy set A_i for each player i***
- ***a utility function U_i for each player: $A \rightarrow R$, where $A= X_{i \in N} A_i$***

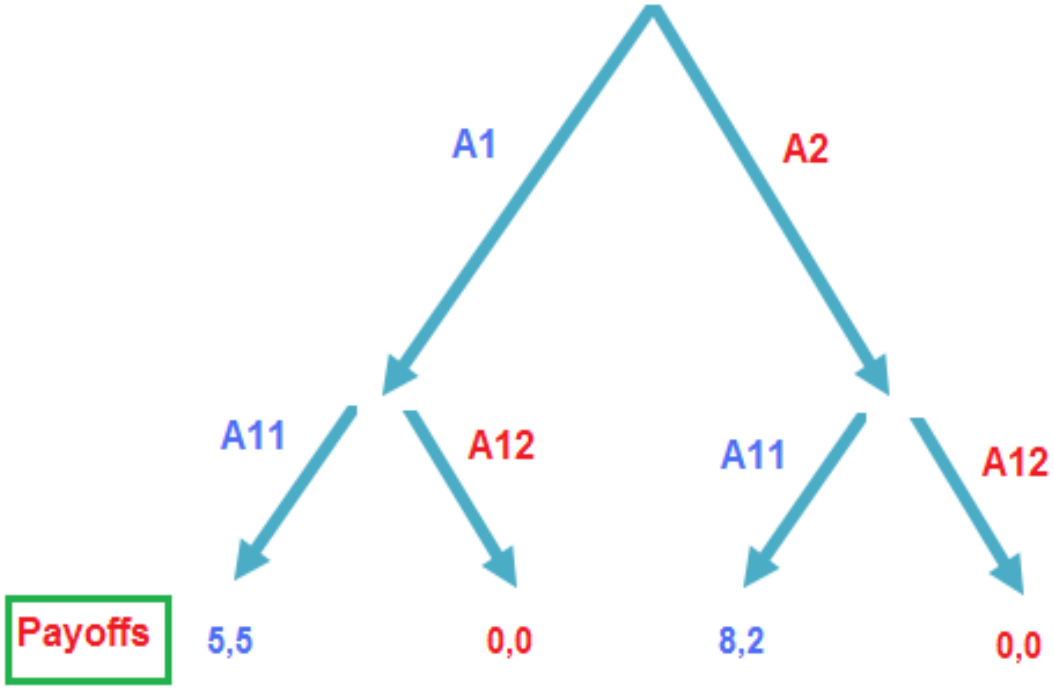
Games are called strategic because they attempt to determine the particular behavior or set of behaviors that a player uses and they are defined as strategies. Usually, are categorized in pure and mixed strategies. A pure strategy defines a specific move or action that a player will follow in every possible attainable situation in a game. Such moves may not be random, or drawn from a distribution, as in the case of mixed strategies. A very popular game of pure strategies is the "hawk and dove game" or "chicken game" (see Appendix A). On the other hand, sometimes, strategies consisting of possible moves and a probability scale, which corresponds to

how frequently, each move is to be played. A player uses a mixed strategy when he is uninterested in several pure strategies, and when keeping the opponent guessing his possible choice (Shor, 2005).

The normal games are usually modeled in a matrix that shows the players, their possible strategies, and the payoffs of the game. Generally games can be represented by any function that associates a payoff for each player with every possible combination of actions. In the following matrix there are two players, player 1 and player 2. The possible strategies of player 1 are represented in the column and strategies of player 2 in the row. Both player 1 and player 2 have two possible strategies, which are specified by the number of rows and the number of columns. Specifically, player 1 has to choose between strategy C1 and C2 and player 2 between strategy R1 and R2. The respective payoffs are provided in the cells. The first number is the payoff received by the row player, which is player 2, and the second number is the payoff for the column player, which is player 1. If player 1 follows strategy C1 and player 2 strategy R2, then player 1 gets a payoff of 2, and player 2 gets a payoff of 0.

		Player 1	
		C1	C2
Player 2	R1	-2, -2	2,0
	R2	0,2	1,1

When a game is presented in a matrix, it is usually supposed that each player acts simultaneously or without knowing the strategy that will prefer the opponent. In case that player has some information about the strategy of other players, the game is usually presented in extensive form known as well as decision-tree. The extensive model is preferable for representing games with some important order. Each node of the decision-tree represents a point of choice for a player. A number listed by the nodes specifies the player and the lines out of the nodes represent a possible action for that player. The payoffs are specified at the bottom of the tree. In the following figure, there are two players. First player has to choose between strategy A1 and A2. Then, the second player has to choose between A11 and A12. In case that first player choose strategy A2 and second player strategy A11, the resulted payoffs are 8 and 2 correspondingly. Furthermore, the extensive model is very useful method for depicting simultaneous-move games and games with imperfect information.



3.1.3 Nash equilibrium

Nash equilibrium is a solution concept* of a game in which participate two or more players. In Nash equilibrium, each player is supposed to know the equilibrium strategies of the other players, and no player has anything to gain by changing only his own strategy. If each player has chosen a strategy and no player can benefit by changing it while the other players keep theirs unchanged, then the current set of strategy choices and the corresponding payoffs constitute Nash equilibrium (Kuhn & Nasar, 2002; Dutta, 1999). However, Nash equilibrium does not necessarily mean the best cumulative payoff for all the players involved. In many cases is feasible for all the involved players to improve their payoffs if they somehow agree on strategies different from these that Nash equilibrium defines.

3.1.4 Basic Types of Games

Cooperative and non-cooperative Games

A game is called *cooperative* when the players are able to follow obligatory commitments. In non-cooperative games there is no possibility for cooperation among players. It could be argued that *communication* among players is allowed in cooperative games, but not in non-cooperative ones. However, Harsanyi (1974) has rejected this classification. Non-cooperative games are able to model situations with excellent details, resulting accurate payoffs. On the other hand, cooperative games are based on more unconfined models.

Perfect information and imperfect information

A game is one of perfect information if all players know the moves previously made by all other players. Hence, only sequential games can be games of perfect information, because it is impossible in simultaneous games for every player to know

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In game theory, a **solution concept is a formal rule for predicting how the game will be played. These predictions are called "solutions", and describe which strategies players, therefore predicting the result of the game, will adopt. The most commonly used solution concepts are equilibrium concepts, most famously Nash equilibrium.*

or guess the actions of the others. Most cases examined in game theory are imperfect-information games, although there are some interesting games of perfect-information games, as the ultimatum game (see Appendix B). An important note for perfect information is that the term is often confused with complete information, which is a similar concept, but not exactly, the same. Complete information requires that every player knows the strategies and payoffs of the other players but not necessarily the actions (Bajari, Hong & Ryan, 2009). Complete information is one of the theoretical pre-conditions of an efficient perfectly competitive market.

Zero-sum and Non-Zero Sum Games

In a zero-sum game there is no space for cooperation among players. A zero sum game is a special case of a constant sum game in which all outcomes involve a sum of all players' payoffs of 0. Given the conflicting interests of the players, the equilibrium of such games is often in mixed strategies and whatever one player wins, the other loses. A typical zero-sum game is the familiar game of rock, paper and scissors (see Appendix C). Contrariwise, the theory of non-zero-sum games differs considerably from that of zero-sum games because an optimal solution can always be found. Furthermore, non-zero-sum games differ from zero-sum games in that there is no universally accepted solution. There is neither single optimal strategy that is preferable to all others, nor a predictable outcome. Non-zero-sum games are also non-strictly competitive, as opposed to the completely competitive zero-sum games, because such games generally have both competitive and cooperative elements. Players participating in a non-zero sum game sometimes have some complementary interests and some interests that are completely opposed (Varoufakis, 2003). However, the theory of non-zero-sum games hardly represents the conflicts faced in the real life. The Battle of the Sexes is a simple example of a typical non-zero-sum game (see Appendix D).

Symmetric and Non-Symmetric Games

A symmetric game is a game where the payoffs of a strategy depend only on the other strategies and not on who is the person who choose the strategy (Cheng, Reeves, Vorobeychik & Wellman, 2004). One typical characteristic of symmetric

games is that the identities of the players can be changed without changing the payoff to the strategies. Many of the commonly studied games are symmetric and the most popular of them is the prisoner's dilemma (see Appendix E), and the stag-hunt game (see Appendix F). Contrariwise, non-symmetric games are games where there are not identical strategy sets for both players, and the most popular non-symmetric games are the ultimatum game (see Appendix B) and the dictator game (see Appendix G). However, it is possible for a non-symmetric game to have identical strategies for both players.

Simultaneous and sequential (repeated) games

Simultaneous games are games where both players move concurrently; otherwise the later players are uninformed of the earlier players' actions. On the other hand, sequential games are games where later players have some knowledge about earlier actions. The main difference between simultaneous and sequential games that mentioned above is that simultaneous games are used to be modeled in normal form, and sequential ones in extensive form. It could be claimed that sequential games are a set of several single games played in sequence, or in parallel (Benthem, Ghosh & Liu, 2008).

3.1.5 Bayesian probabilistic games

Bayesian theory is a statistical probability theory of making statements about uncertain events. Initially events are assigned a prior belief, which reflects existing knowledge about the event. The availability of new information *D* updates the subjective beliefs the Bayes' rule. The Bayesian rule is the following:

$$posterior = p(\theta|\mathcal{D}) = \frac{p(\mathcal{D}|\theta)p(\theta)}{p(\mathcal{D})} = \frac{likelihood \times prior}{normalizer}$$

The likelihood term $p(D|\vartheta)$ measures the probability of seeing particular realizations of the event *whereas* the normalizer $p(D)$ is used to ensure that the values of $p(D|\vartheta)$sum up to one and thus define a proper probability distribution. After the update, the values of the posterior $p(\vartheta|D)$ are used as the new priors $p(\vartheta)$ (Nurmi, 2005).

In many games the players have access in different information about some important parameters of the game. To model such situations, Harsanyi introduced the concept of *Bayesian games* has been widely adopted (Aberer & Despotovic, 2004). Informally, keynote to Bayesian games are *types* of the players by which the players' private information is modeled. Each player formats his own type but there is no information for the types of the other players of the game (Harsanyi, 1967–1968). Another important assumption is that the types are drawn from a common prior probability distribution, known to all the players, so that every player can obtain the probability distributions of the combinations of the other players' types given any of his own types (Aberer & Despotovic, 2004). In an equlibrium each player must form a belief about the other players' strategies given his knowledge of the types' distributions and then play aiming to maximize his benefit or minimize his loss. A typical Bayesian game consists of:

- **a set of players N = {1,2,3….,n}**
- **a set of possible actions A_i for each player I**
- **a set of possible types T_i for each player I**
- **a probability function $p_{i:} T_i \rightarrow \Delta (T_{-i})$, where $T_{-i} = X_{i€N-i} T_j$**
- **a utility function $U_i : A * T \rightarrow R$, where $A = X_{i€N} A_i$ and $T = X_{i€N} T_i$**

3.2 The critical role of reputation in bargaining games

Accordingly to “homo-economicus” assumption of classical economic theory humans act out of pure self-interest in economic transactions (Chaudurhi, Khan, Lakshmiratan, Py and Shah, 2003). However, a lot of economic scientists claim that actual behavior often deviates from the self-interested predictions by exhibiting notions of trust and reciprocity (Berg, 1995; Camerer and Weigelt, 1988; Chaudhuri, 2002; Cox, 2002; Dufwenberg and Gneezy, 2000; Gneezy, 2000; McCabe, 1998).

Robert Wilson states that many human behaviors and acts can be explained by the critical factor of *reputation* (Wilson, 1985). It is possible and reasonable to consider that there is an unobserved state variable called reputation that affects radically to the decision-making of people. The parameter of reputation has the same effect as well as in the strategic games. It is obvious that many bargaining games do not occur in isolation, and players often negotiate in several bargaining games sequentially, taking into consideration the prior knowledge and the characteristics of the other players.

There is a lot of discussion concerning the reputation formation and its effect to the adoption of a specific strategy. Most of the studies motivated originally by three remarkable papers: Kreps and Wilson (1982), Kreps, Milgrom, Roberts and Wilson (1982), and Milgrom and Roberts (1982). Work in this source until 1992 is confidently surveyed by Fudenberg (1991). Many papers since then have addressed the difficulties noted by Schmidt (1993) in extending the famous “Stackelberg result” for one long-run player by Fudenberg and Levine (1989) to settings in which long-run reputational players treat less patient players. Furthermore, this literature examines the issue of how a player recognizes successfully the behavioral type of the opponent. The approaches concerning reputation vary a lot. Watson (1996) considers two-sided reputation formation without equilibrium and without discounting. On the other hand, Cramton (1992) exploits the framework of Admati

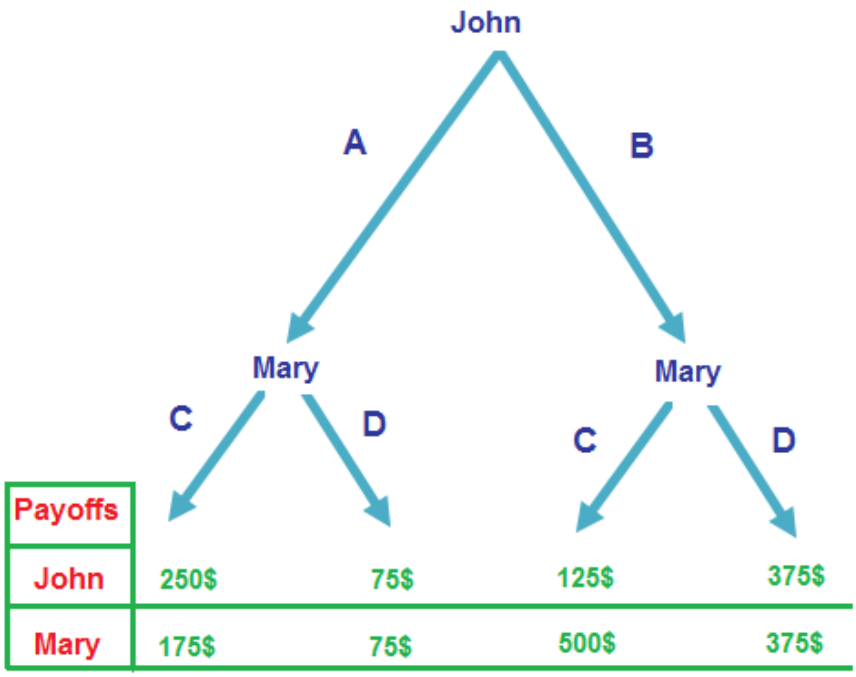
and Perry (1987) to study two-sided incomplete information in a fully optimizing model of bargaining (Abreu & Pearce, 2002).

The game theoretic framework for examining reputation is that of sequential games, in which uncertainty about the payoff structures regulates the relationship among players. There are two dominant terms for the comprehension of the notion of reputation. These two terms are repeated/sequential games and uncertainty. The repetition of games is necessary in order a player to build up reputation and only if it can influence payoffs in next stages. If all games consist of one stage then reputation is not necessary because it does not make sense for a player to know in the future what the other players did in the past. Regarding the term of uncertainty is not so obvious as the necessity of repetition. In case that a player has not the possibility to change the type of his own behavior, he cannot have or build a reputation for that specific type, because he is of that type with certainty (Aberer & Despotovic, 2004).

Another determinative factor for reputation games is *incomplete information*. Incomplete information is necessary for reputation effects, in order to impact opponents' beliefs. Under incomplete information situation, the long-run player's payoff from choosing specific actions may not be known with certainty. Moreover, all actions available to the long-run player may not be known and finally the player's knowledge of the game may be uncertain (Conlin, 2000). The different possible payoffs, actions and knowledge of the long-run player are modeled as different types of long-run players. The incomplete information gives the long-run player the ability to take certain actions to convince the other involving players that he is a specific type.

In standard reputation models, no players actually build reputation in equilibrium. The informed player starts pooling with another type from the start of the game and so is built reputation. Even though reputation can increase the equilibrium payoff, reputation can always be built. However, in many applications, these features are not completely realistic (Mailath and Samuelson, 2001).

In order to realize the effect of reputation in a long-run game, it will be represented a brief example. In the following case individual rationality suggests one outcome but players may achieve a better monetary outcome if they are motivated by trust and reciprocity. In the game bellow, John is the player that chooses a strategy first and has to decide between A and B strategy. In the second stage of the game, Mary observes what John chose and responds by choosing either C or D strategy. The payoffs are denoted in dollars and are paid to the players at the end of the game. Using backward induction, the perfect equilibrium in this game is strategy A for John and strategy C for Mary. The payoffs for John and Mary is 250$ and 175$, accordingly.



However, there is a symmetric joint payoff-maximizing outcome. This path is first strategy B chosen by John and then strategy D chosen by Mary. This specific sequential game yields 375$ for each player. The problem with this situation is that in order to attain this, John would have to make an explicitly trusting move of choosing strategy B at the beginning. The choice of B requires trust because Mary, on the other hand can take advantage and respond with strategy C. This path yields

only 125$ to John and 500$ to Mary. In that case John is better off at the perfect equilibrium situation where he gets 250$. However, if Mary reciprocates John's trust by choosing strategy D after B, then both players are better off, with each getting 375$. Mary would have to think along the following states: I should choose D in response to John's choice who chose strategy B, and John is obviously trusting me to do so since he could easily have chosen Left and given me no more than 175$.

In this chapter it was represented the effective and critical role of reputation in game theory and specifically in bargaining games. The reason of the existence of this chapter in the present study is that the type of the players -and specifically the type of the interest groups and lobbies- is fundamental for the formation of the bargaining game that will be examined in the next chapters. The players of the game are categorized accordingly to their power. So, we consider two different basic types of interest groups: low-power and powerful type. This categorization is a result of the information that the policymaker, receives or alternatively a result of the policymakers' beliefs taking into consideration the prior moves of the interest group.

3.3 Setup of the Game-Theoretic Model

This is obviously a 2-person game-theoretic model and the players of the game are the governmental agent, who plays the role of the decision-maker and on the other hand the interest group. Literature review chapter presents many different means that interest groups use in order to influence the policymaker and succeed their goals. In this model, these means will be separated in the following two categories: Lobbying activities and Threats.

Lobbying consists of soft influence tools like sending messages to the governmental agent, or discussion in order to convince the agent that his prepositions are beneficial for the society, and many other means that are not directly hazardous for the governmental agent. On the other hand, the second wide category of interest groups' means is the threat actions. This form of means involves actions that create

strong pressure on the agent. Furthermore, these threats are harmful and attend direct cost for the governmental agent, in case that the interest group that exerts the threats is powerful.

In this point, it has to be mentioned that “Lobbying” and “Threats” in this study, are not just a mean of influence, but mainly the alternative strategies that the interest group has to run appropriately in order to convince the representative of the government to accept its proposals.

In strategic level, it is more sensible for an interest group –independently of its power and reputation- to start the bargaining with the policymaker with the strategy of lobbying. In case that this strategy is not successful then it becomes necessary for the interest group to intense the pressure, using the strategy of Threats. However, this sequence of strategies is not always the most suitable. Observations, suggest that especially the new interest groups, or groups without strong reputation, first have to use hard measures before they arrive in an established position. The reason is that threats typically are necessary in order to get reputation. On the other hand, lobbying is a complementary action, which is mainly used to maintain the reputation that an interest group has already got. Concerning the powerful interest groups with strong reputation, typically seem to rely on informal contacts, verbal persuasion and general lobbying activities, which demand an interpersonal relation with the policymaker (Sloof, 1997).

3.3.1 Description and basic assumptions of the model

As mentioned above, the basic concept of the lobbying game is that two persons, the representative of the interest group and the governmental agent/policymaker, have opposite interests. Specifically, the interest group aims to the influence of the governmental decision-maker using threats or lobbying measures and the objective of the decision-maker is to evaluate the situation and stand foursquare to the influence of the interest group for the benefit of the public interest. In our game-

theoretic model the player that acts as the governmental decision-maker, is symbolized with “G” and the player that appears as the representative of an interest group is symbolized with “I”.

In first level, the interest group has to choose between two alternative strategies: Threats and lobbying activities, which mentioned briefly above. In this model, the strategy of “Threats” is symbolized with “T” and on the other hand the strategy of “Lobbying activities” is symbolized with “M”. In second level, when player I (Interest Group) decides to exert pressure either with Threats (T), or with lobbying activities (M), then player G (Governmental Decision-maker/agent) has also to choose between two strategies. The alternative strategies for player G is “Compromising” to the pressure of the interest group which is symbolized with “C” and “not Compromising” against the actions of player I, a strategy that is symbolized with “N”.

In case that player G cannot stand out against the pressure of player I, accepting to accomplish the wishes of player I, the interest group does not enforce its attempts for influencing G. Contrariwise, in case that the governmental decision-maker does not compromise, the interest group over again has to decide either to “Resume”, an action that is symbolized with “R” or to “Suspend” which is symbolized with “S”. It is more sensible that a powerful interest group prefers to choose strategy “R” and on the other hand an interest group with low power to choose strategy “S”. The powerful interest group is symbolized with “I_S” and the interest group with low power with “I_L”. Player I, -without regard to the two types of interest groups- always prefer the governmental agent to compromise without exerting threats or lobbying activities which attend cost for them and a possibility of failure of the bargaining with the decision-maker.

Concerning the preferences of player G, he compromises only in case that has evidence that the interest group that rushes him is powerful (I_S), because there are many possibilities for resumption from the side of player I, exerting threats. Contrariwise, if player G has to cope with an interest group of low power (I_L), then prefers to not compromise.

One critical assumption of the model is that player G has no initial information regarding the type and the power of the interest group. Furthermore, taking into consideration this assumption, the interest group has a motive to trick the decision-maker, letting him to believe that it is a strong interest group, even though it is not. This bluff is possible, using the mean of lobbying activities and sending a lobbying message to player G. It has to be mentioned that lobbying messages can be sent from both types of interests groups and they have a cost X_L that is fixed and is not depended by the content or the type of the group that sends it.

The model belongs to the sequential (repeated) games and consists of 2 separate single games. Given the assumption that player G has no information about the power of the interest group, the reason for introducing the game-theoretic model of repeated games is that, in a second round of negotiations the interest group can gain reputation that is possible to affect the decision of player G. In case of using a single game model, the negotiations would be interrupted right after the first strategic decision of player G. Moreover, the two-stage repeated game is important parameter in the present study, because it fosters the examination of critical conjectural, regarding the strategies that an interest group should choose for building up or maintaining reputation and power. It has to be noted that the total payoffs of the two-stage game are the sum of the payoffs that results from the two periods.

Further down are presented collectively the basic assumptions of the game-theoretic model that is used for the exploration of the orientated objectives:

i. *It is a 2-person bargaining game model. The players are the governmental decision-maker (G) and the interest group (I)*

ii. *Interest groups are categorized in two types accordingly to their power {(I_S), (I_L)}*

iii. *The game is sequential type, consists of 2 single games and it is extended in two different periods*

iv. *The total payoffs of the game result from the sum of the payoffs of the two single games*

v. *The "Threat strategy" of interest group is hazardous for player G and this inconvenient situation is translated to direct cost for G.*

vi. *The "Lobbying strategy" of interest group does not involve any direct cost for player G. On the other hand, the lobbying activities involve a fixed cost* X_L *for player I*

vii. *The opportunity for interest groups to exert lobbying activities is independent of players' G reaction. Consequently, player I can use lobbying means before player G takes his first decision.*

viii. *An interest group can exert threats only in case that the decision-maker chooses strategy N (not compromising).*

ix. *Player G has no information regarding the type and the power of the interest group.*

x. *Player G has information only for the prior statistical probability (p) that an interest group is powerful or not.*

xi. *An interest group with low power can gain reputation during the bargaining game.*

xii. *Both players know the objectives of player G. On the other hand, the objectives of the interest group are not transparent to the governmental agent.*

In this point, it will be presented the basic parameters that affect the strategic decisions, the payoffs and the benefit for each player. These parameters are critical for the setup of the model and the examination of the games. First parameter is the benefit of the players, which differs between them. The evaluation of the strategic options is obviously different for player G, player I_S and player I_L. The evaluation of the options for the governmental agent and the two types of interest groups is the following:

Player G: $B_G(N, S) > B_G(C, S) > B_G(N, R)$ (1)

Player I_S: $B_{IL}(C, S) > B_{Is}(N, S) > B_{Is}(N, R)$ (2)

Player I_L: $B_{IS}(C, S) > B_{Is}(N, R) > B_{Is}(N, S)$ (3),

where: $\mathbf{B_i}$ the benefit for each player i, **N** is the strategic choice of player G for not compromising, **C** is the strategy of compromising, **S** is the strategy of player I for suspending the pressure and **R** is the strategy for resuming with threats.

Furthermore, two important parameters of the model are the probability (p) that an interest group belongs to low-power groups (I_L) and the variable z. The parameter p, in combination with the value of variable z determines the strategy that player G prefers to choose. Specifically, it could be claimed the following:

If p > z, player G chooses strategy N (4)

If p = z, player G chooses either strategy N or strategy C (5)

If p < z, player G chooses strategy C (6)

Where,

$z = B_G(N, S) - B_G(C, S) / B_G(N, S) - B_G(N, R)$ (7)

The larger z, attends more probabilities for player G to not compromise. Taking into consideration this presumption, variable z could be also claimed as measure of conflict between player G and I. Furthermore, a raise in the variable z increases the potential gain for player G for not compromising.

Finally, another important parameter is variable C', that affects the cost of exerting threats for the low-power interest groups. In addition, the value of variable C', given the costs C that result from lobbying activities, limits the potential of low-power interest groups to exert threats in next level and for both types of interest group to send a lobbying message to player G. Concerning the rest effects of C' on the powerful interest groups, it affects the potential gain of the interest group from convincing player G to compromise.

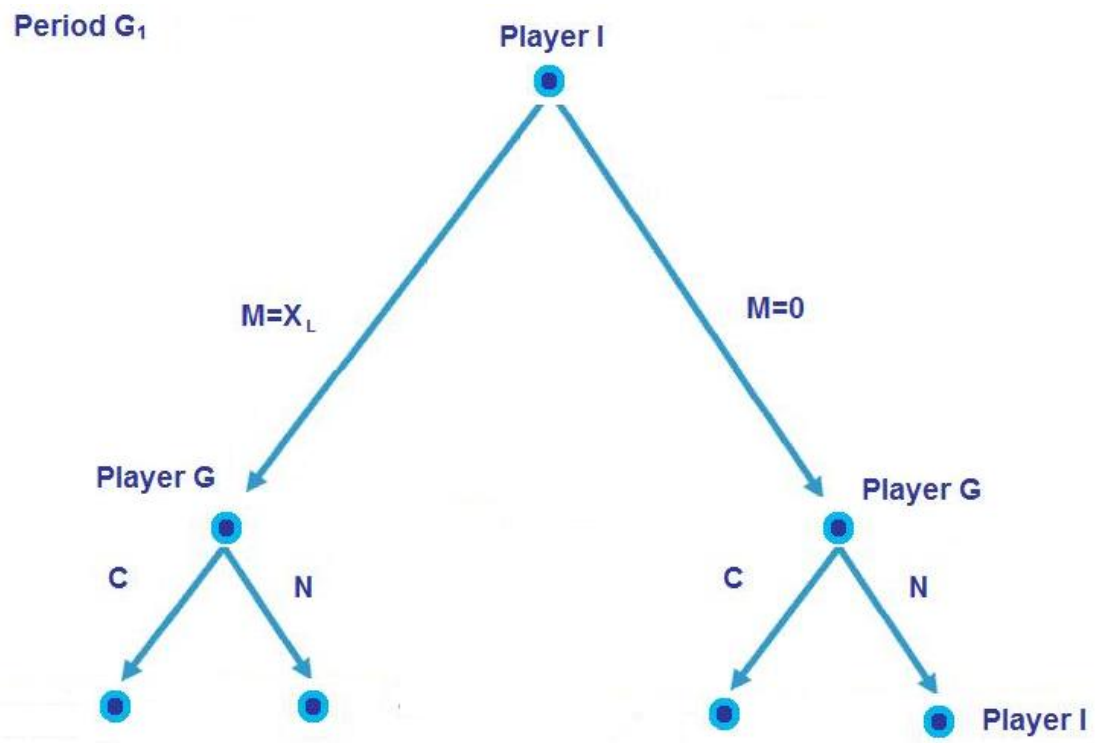
3.3.2 The period Games of the model

As mentioned above, in this model is introduced a two-period bargaining game which consists of two distributive games. These games are separated in two periods, period 1 and period 2. Periods are numbered in the normal order. Consequently, the game starts normally with period 1 and ends after period 2. However, it will be examined the reverse scenario of games, such that a game will start with period 2 and finish by the end of period 1 (G_{21}). Furthermore, it will be examined two mixed versions of the bargaining games, such that a game will start with period game 1 and continue over again with period game 1 (G_{11}), and the respective version of period 2 (G_{22}). The reason for the study of 4 alternative games is the exploration of the influence for all alternative strategic scenarios to the interest group performance.

Period Game 1 (G_1)

The first period game is symbolized as $\mathbf{G_1}$ and it can be summarized in the following points. First, player I decides if he should exert lobbying measures in order to

influence player G. One of these lobbying measures could be –as mentioned above- a lobbying message. In case that an interest group sends a lobbying message (M) to the governmental decision-maker, and then this action entails a fixed cost X_L. The cost is independent of the content of the signal and is the same for the two types of interest groups. The same assumption for the lobbying message has been also used in prior studies, like in Sloof and Van Winden (2000), Ainsworth (1993) and Rasmusen (1993). If player I does not prefer to send a lobbying message the cost of this action is 0. Then, player G examines the message (M) that has been sent by player I and chooses between two alternative strategies: Compromise (C), Not Compromise (N). In case player G chooses to follow strategy C then normally there is no reaction from the side of player I. The figure below represents the extensive form of period G_1.



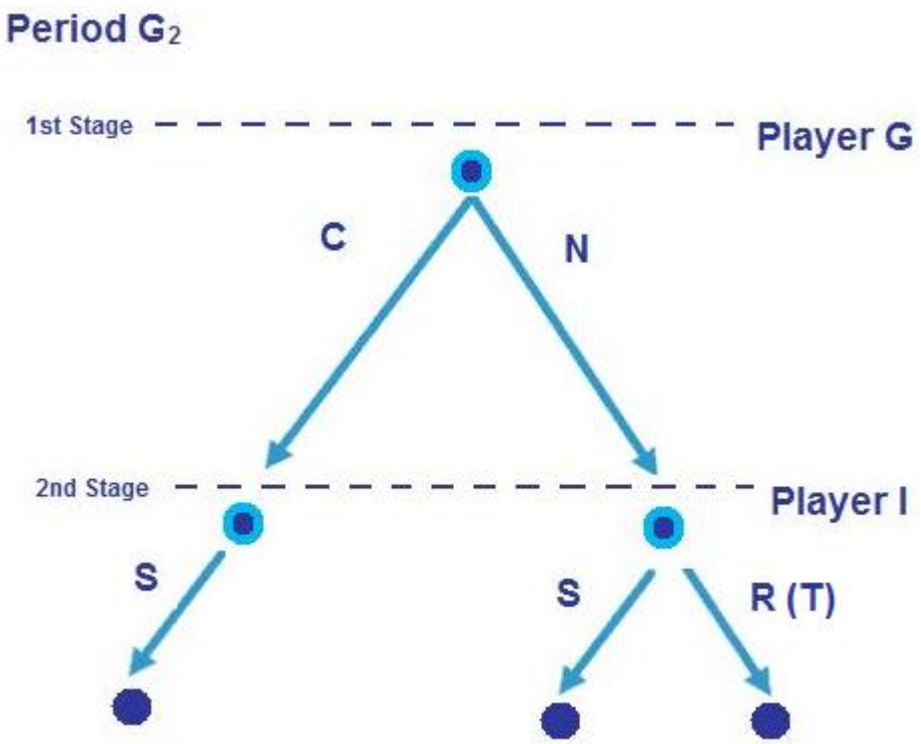
In second level, if the preferred strategy of player G is N, consecutively the interest group decides between strategy R (resume) and strategy S (suspend). In case that a powerful interest group (I_S) decides to resume with enforced threats, the cost for player I_S is inconsiderable. So, a powerful interest group always prefers to follow

strategy R. On the other hand, in case that a low-power interest group (I_L) decides to follow strategy R, this action involves considerable cost for the player and it is preferable for player I_L to choose strategy S.

Period Game 2 (G_2)

The second (in normal order) period game is characterized as $\mathbf{G_2}$. In this period game, the only mean of pressure that can be exerted by the interest group for influencing the governmental decision-maker is the threats.

The setup of period game $\mathbf{G_2}$ starts with the reaction of player G to the prior lobbying message that has been sent in period game $\mathbf{G_1}$ by the interest group. The two possible options for player G are either to compromise to the wishes of player I, or to not compromise. The next move in the game is the strategic preference of player I. In case that in the prior stage player G choose strategy C, then the only option for the interest group -having achieved its objectives- is to suspend (S). If the preferred strategy of player G is N (not compromise), then player I has to choose over again between strategy R (resume) / T (Threats) and S (suspend).



The payoffs both for game $\mathbf{G_1}$ and for game $\mathbf{G_2}$ are summarized in the tables below. For the two different period games the payoffs are the same. However, there is difference to the payoffs of the two types of interest groups. In the first of the two following tables are represented the payoffs for the two games between the governmental agent and the low-power interest group. In the second table are summarized the payoffs for both games between player G and the strong interest group.

Player I_L

Player G	R	S
C	Unfeasible Equilibrium	0,2
N	z-1, C'	z, 1

Player I_S

Player G	R	S
C	Unfeasible Equilibrium	0,2
N	z-1, C'	z, 0

Taking as granted that the full game is developed in two different periods, which express two different period games (**G_1** and **G_2**), it can be assumed that this study examines four different game-theoretic models. These four games will be analyzed further in the following chapters of the study.

3.4 Solution of the bargaining Games

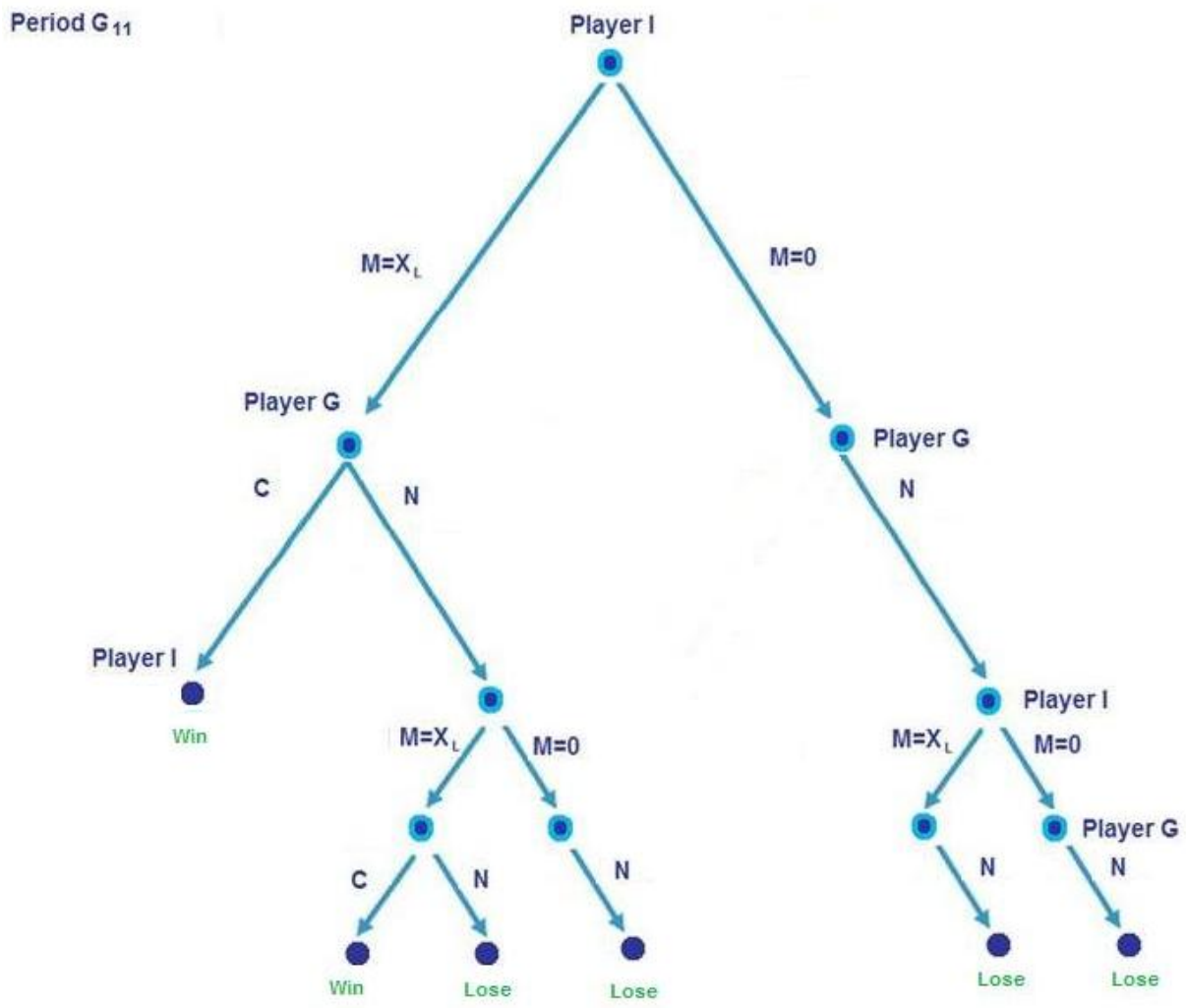
As mentioned above, in this study will be examined four different combinations of bargaining games between the interest group and the governmental decision-maker. The four alternative bargaining games are the following: **G_{11}**, **G_{12} G_{21} G_{22}**. There are many critical reasons for the examination of all the potential combination of the two period games.

The most important reason is that the four different models can be covered as different situations with different results. For example, game-theoretic model G_{11} explains why the strategy of sequential lobbying is appropriate for an interest group for building reputation. On the other hand, model G_{12} is applied in case that the interest group has the opportunity to exert lobbying actions to the governmental agent, before he takes the decision. This model seems appropriate for an interest group to obtain reputation and power, as model G_{11} does. Moreover, model G_{21} examines the way that an interest group, which has not yet strong reputation to political scene, attempts to create access to the decision-maker for expressing its demands. Also this model seems to be a perfect strategy for powerful interest groups for maintaining their power and reputation. Finally, model G_{22} is used mainly from the low-power interest groups, and this strategic choice increases effectively the reputation of the group.

Symbols	Meaning
G	Governmental decision-maker player
I	Interest group player
I_S	Interest group with power and strong reputation
I_L	Interest group with low power and low reputation
T	Strategic action of threat, used by interest groups
R	Resumption of the actions of the interest groups
S	Suspension of the actions of the interest groups
C	Action of compromise of the governmental decision-maker
N	Action of not compromise of the governmental decision-maker
M	Action of sending a lobbying message
X_L	Fixed cost of the lobbying message for both players
p	Probability that an interest group is powerful or not
B_G	Benefit of governmental decision-maker
B_{IL}	Benefit of low-power interest group
B_{IS}	Benefit of powerful interest group
z	Indicator of conflict between player G and player I
C'	The cost of exerting threats for the low-power interest groups

3.4.1 Game-theoretic model G_{11}

In this game-theoretic model in both the first and the second period game is applied from the interest group the strategic choice of lobbying actions. Practically, the interest groups lobby easily with the decision-makers. Meanwhile, these lobbying activities attend additional cost for the groups. In this model, the objectives are first to explain why the strategy of repeated lobbying is acceptable and effective and second, what are the specific results of this strategy upon the power of the interest group and how this change can empower the influence of the interest group on the governmental decision-maker. In the next figure it is represented the repeated lobbying game G_{11}.



The scenario of Game $G_{11,}$ is the following: First the interest group (player I) chooses between sending and not sending a lobbying message to the governmental decision-maker. The interest group has the opportunity to send another lobbying message to player G, in case that player not compromise with the first lobbying action.. If the decision-maker comprises with the first message that receive, then the interest group has no obvious benefit to resume. The main reason of not resuming is not only the achievement of the goal, but also that sending a lobbying message -that is symbolized with M in the model- attends a fixed cost for this action (X_L).

Game G_{11} has many perfect Bayesian equilibria. Taking into consideration the strategy of the interest group in the first period of the game, there are two obvious types of equilibria. The first type is the equilibria that player I decides to exert

lobbying actions in the first period, and the other is the no-lobbying equilbria where player I does not use any lobbying activity at all. In the case of no-lobbying equilibria, player G does not modify his position against the interest group. The no-lobbying equilibria do not indicate whether the strategy of sequential lobbying is a sufficient method for the empowerment of the interest group.

In all equilibria of game $G_{11,}$ the low-power interest groups blow exerting and not exerting lobbying actions in the first period of the game. On the other hand, the strong interest groups have a pure strategy that is always lobbying activities in the first period. The no-lobbying action exposes the power of the interest group and has as a result the negative response from the governmental agent. In that case, even though the interest group decides to enforce the pressure with lobbying activities in the second period of the game, such an action is nugatory because there is no chance for player G to change his initial decision.

In case that an interest group –independently on its power- follows the strategy of early lobbying, then it is the turn of player G to blow between two different strategic choices. The first choice is to compromise and satisfy the demands of the interest group (C) and the second choice is to not compromise (N). If player G chooses strategy N, then the formatted path of the game generates 3 different types of equilibria, which are the following:

a. Partial separation through both resumption and late lobbying
b. Full separation through both resumption and late lobbying
c. Partial separation through the resumption of threats

Cases a and c contain one equilibrium and case b contains two equilibria. In the two equilibria of the second case, only a powerful interest group resumes. On the other hand, in cases a and c, low-power interest groups resume as well. Also, in the case of full separation (case b), the situation that player G chooses strategy N, is more interesting because it is revealed more information and the interest group has to obtain stronger reputation in order to obligate the decision-maker to accept the

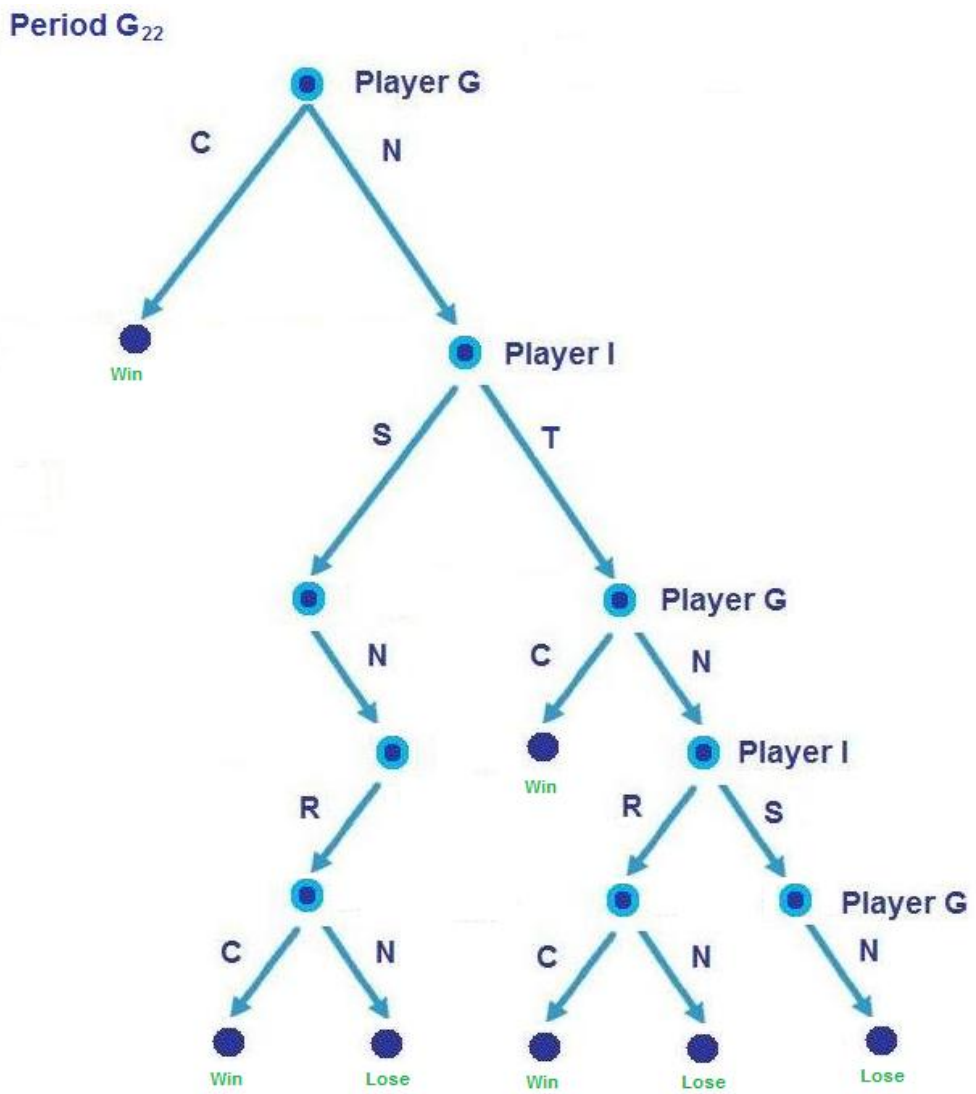
demands of the group. In case that player G receives a lobbying message in the first period of the game, has the belief that the group is powerful and there are more probabilities to compromise. By inference, in case of full separation through both resumption and late lobbying, an early lobbying message improves more effectively the reputation the interest group relatively to the other equilibria.

Regarding the equilibria a and c, the strategy of sequential lobbying may be also a fair decision for the interest group for the increase of its reputation. Taking into consideration that in the equilibria of case b the strategic choice of early lobbying has a larger impact on the reputation of the group, it is possible in one equilibrium, lobbying actions to achieve the compromise of player G. This conjecture attends that sequential lobbying can provide high reputation to a low-power interest group, independently on the level of conflict between the two players (z) and the cost of lobbying action (X_L).

3.4.2 Game-theoretic model G_{22}

In model $G_{22,}$ it is examined the issue of how strategy of threats can be used by an interest group in order to build up reputation in a two-period game. In this model, the interest group (player I) decides if in first period of the game should exert threats or not to the governmental decision-maker (player G). By assumption, this game is not directly feasible in this model because it is necessary that an interest group for exerting threats should have first got a negative answer from player G. So, threat is not an acceptable strategic choice in this model. Actually, the model of repeated threat is valid only in case that the game has started with a lobbying action and player G has not compromise. So, the game G_{22} is transformed in G_{12} model. Meanwhile, for the complete examination of the game-theoretic model it will be ignored the limitation of prior not compromise action for the use of threat strategy and the it will be introduced the assumption that the interest group has already got a negative answer for compromise from player G. The same acknowledgement will be adopted also in the model $G_{21.}$

Taking into consideration the above-mentioned notations the scenario of the model is the following. After the negation of the governmental decision-maker, the interest group has to decide if it is able to exert threats against player G. In this point it has to be noted that by assumption the strategic choice of threat attends a cost C' for a low-power interest group and on the other hand the same action attends an inconsiderable cost for a powerful interest group. The parameter of the cost is critical in the model, especially for the low-power groups. Consequently, it is more sensible for a low-power group not to exert any threats in the first period of the game, and for a strong group to exert threats both in first and in second period of the game.



In game $G_{22,}$ there are three different basic equilibria that are depended on the value of probability (p). In case that the initial reputation of player I is low ($p < z^2$), player G does not compromise (N) in the first period of the game. Taking this scene as granted, the interest group has no other choice than exert threats (T) in the first period, independently on the high cost that consolidates this action. The reason of this strategic choice is that especially in the case of a low-power interest group without any reputation, it is necessary in first level to attempt to build up reputation, in order to have more possibilities in the second period of the game to influence player G.

A low-power interest group resumes threats with a lower probability than a powerful interest group, and an action like this, increases the reputation of the group. This sequence of the strategic choice of low-power interest group invalidates the initial claim that the high cost C' of the threat action will stave off the group from this choice, because as it is explained above, there is no alternative choice for this type of groups to have the possibility of achieving their objectives.

In case that the possibilities that an interest is powerful are high ($p > z^2$), and player G has this belief, then he decides to choose strategy C and compromise in the first period of the game. The reason is the high level of probabilities that the interest group will bring into effect its threats. The situation is more complicated and not so clear in case that the level of reputation of the interest group is intermediate (($z^2 < p < z$). In such a situation, the higher the value of p, the more possibilities to compromise.

It is very clear that the game of repeated threats (G_{22}) is a model which forecasts that strategic choice of threats takes place only in case that the power and consequently the prior reputation of the interest group are low. For this type of interest groups this strategy always generates benefit for the group, which is the raise of the reputation. This raise helps the group to establish a stronger position and negotiate with better terms in a subsequent bargain game. On the other hand, this model seems to be not so beneficial for a strong interest group because the

decision-maker, under the fright of the accomplishment of the threat is eager to compromise.

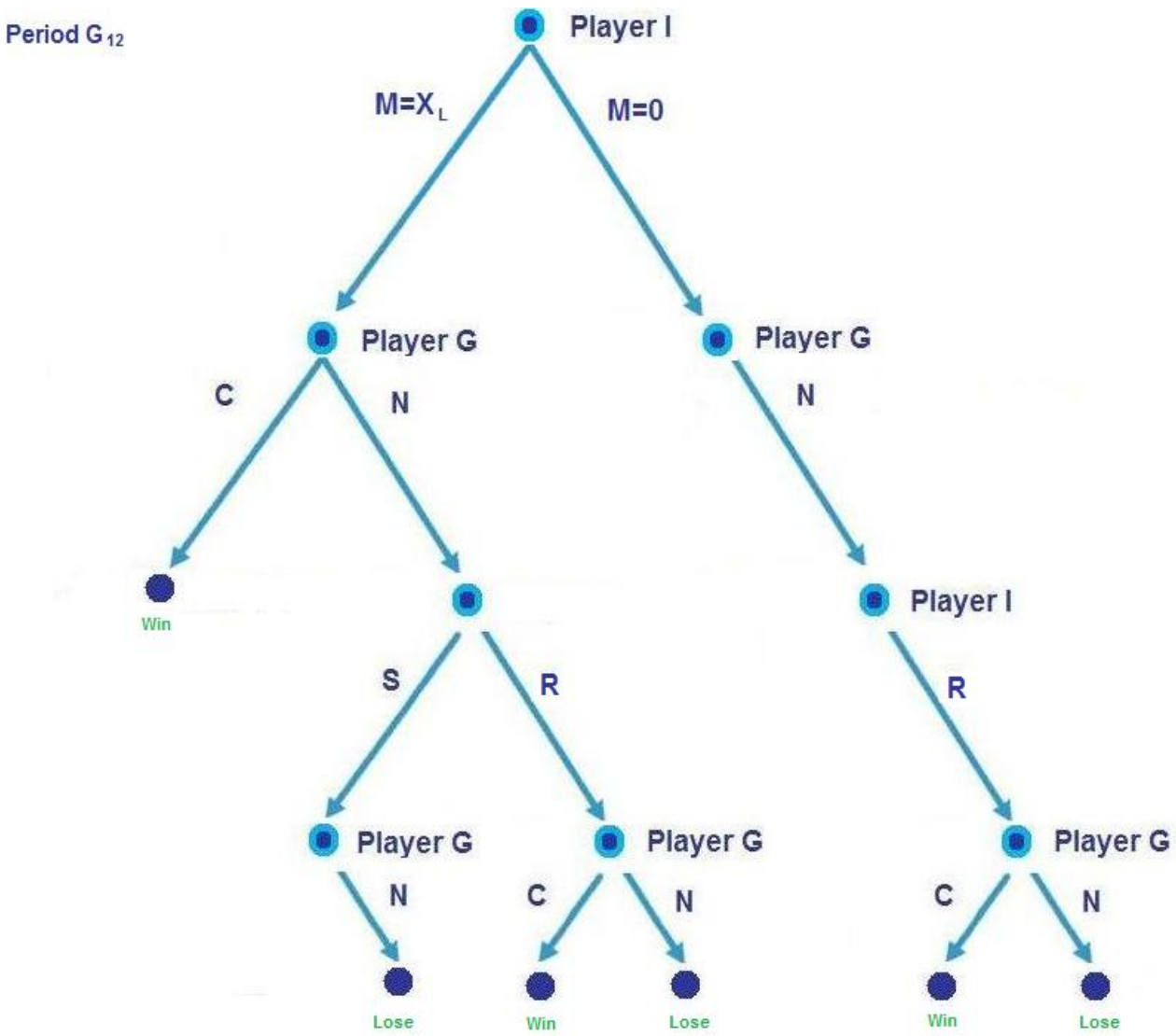
3.4.3 Game-theoretic model G_{12}

On the above model it was examined the situation in which an interest group follows the strategy of threats both in the first and in the second period of the game. In this model (G_{12}) it will be added in the first period of the game the possibility of lobbying strategy. This addition formats a new version of the model in which the fist move of the game is the exertion of lobbying actions from the side of the interest group. After the early lobbying period, there are two stages for the decision-maker to decide whether to compromise or not. The interest group after the first decision of player G has one more chance to react, resuming with threats or suspending. It has to be mentioned that in this model the strategic action of threats can take place only in the second period of the game.

The two separate actions of threats and lobbying have different results in the model $G_{12.}$ The most important issue that this model attempts to give an answer is whether an interest group with low power and reputation, prefers to exert either threats or lobbying actions in order to obtain effectively more reputation, with ultimate goal the compromise of the governmental decision-maker.

In game-theoretic model G_{12} there is no separating equilibrium. In the last period, after the exertion of threats by interest group, the decision-maker has to base his final decision on incomplete information about the power of player I. The decision-maker never wants to give the powerful interest group the opportunity to separate itself out. Taking into consideration the assumptions $X_L<1$ and $C'<1$, complete separation through lobbying only, or just resuming instantly with threats is cannot be considered an equilibrium. In contrast with a powerful interest group, a low-power group is never prepared to both exert lobbying action and resume with threats, in order to convince player G to change his strategic preference. However,

separation of lobbying and threat resuming cannot occur in equilibrium. In case of full separation the low-power interest group would desist from both lobbying and resuming with threats and the type of the group would be revealed to player G after the first period of the early lobbying. In case the decision-maker becomes a recipient of a lobbying message, then it would be obvious that the interest group is powerful and the expected move from player G is to compromise (C). Below is represented the extended form of the model G_{12}.



In case that the reputation of the interest group in the first period is low (p < z), the interest groups partially separate either through both lobbying and resuming or just resuming with threats. In the latter case that only the resuming action takes place, both the powerful and the low-power interest group do not send a lobbying

message. The decision of not exerting lobbying action does not attend a change to the reputation of the interest group and the governmental decision-maker chooses strategy N (not compromise).

In second level, the only possible action for the interest group for asserting better results is the resumption with threats. The powerful interest group always prefers to resume. On the other hand, the possibilities for a low-power interest group for resumption range between 0% and 100%. The value of variable C' is the critical factor for the strategic decision of a low-power interest group. Meanwhile it is obvious that in case that an interest group suspends, this action is a clear sign of being not powerful and consequently player G not chooses strategy N. In case that the interest group decides to follows strategy R, then player G reconsiders his beliefs about the type of the group and oscillates between compromise and not compromise.

Always, in the first period the low-power interest group blows between sending and not sending a lobbying message. The second choice certainly leads to a negative response. On the other hand a prior lobbying action obligates the decision-maker to think more carefully his strategic choice and randomize between strategy C and N. In case that after the lobbying action the governmental agent does not compromise, then the powerful interest group anywise resumes, and the low-power group mixes between its two options. However, for both types of interest group, the only chance for updating its reputation and finally convince player G to compromise is to resume with threats. In this point it has to be mentioned that the dominant strategy in the final level for player I_L is to suspend and for player I_S to resume with threats.

The interesting point in model $G_{12,}$ is that the reputation of an interest group can be increased over time significantly. In case that the (low-power) interest group does not send a lobbying message to player G, its reputation falls. However the strategic option of resumption with threats in the second period of the game increases the reputation of the interest group radically. Indirectly, it could be assumed that a

powerful group, in order to maintain its initial reputation efficiently has to exert both lobbying actions and threats.

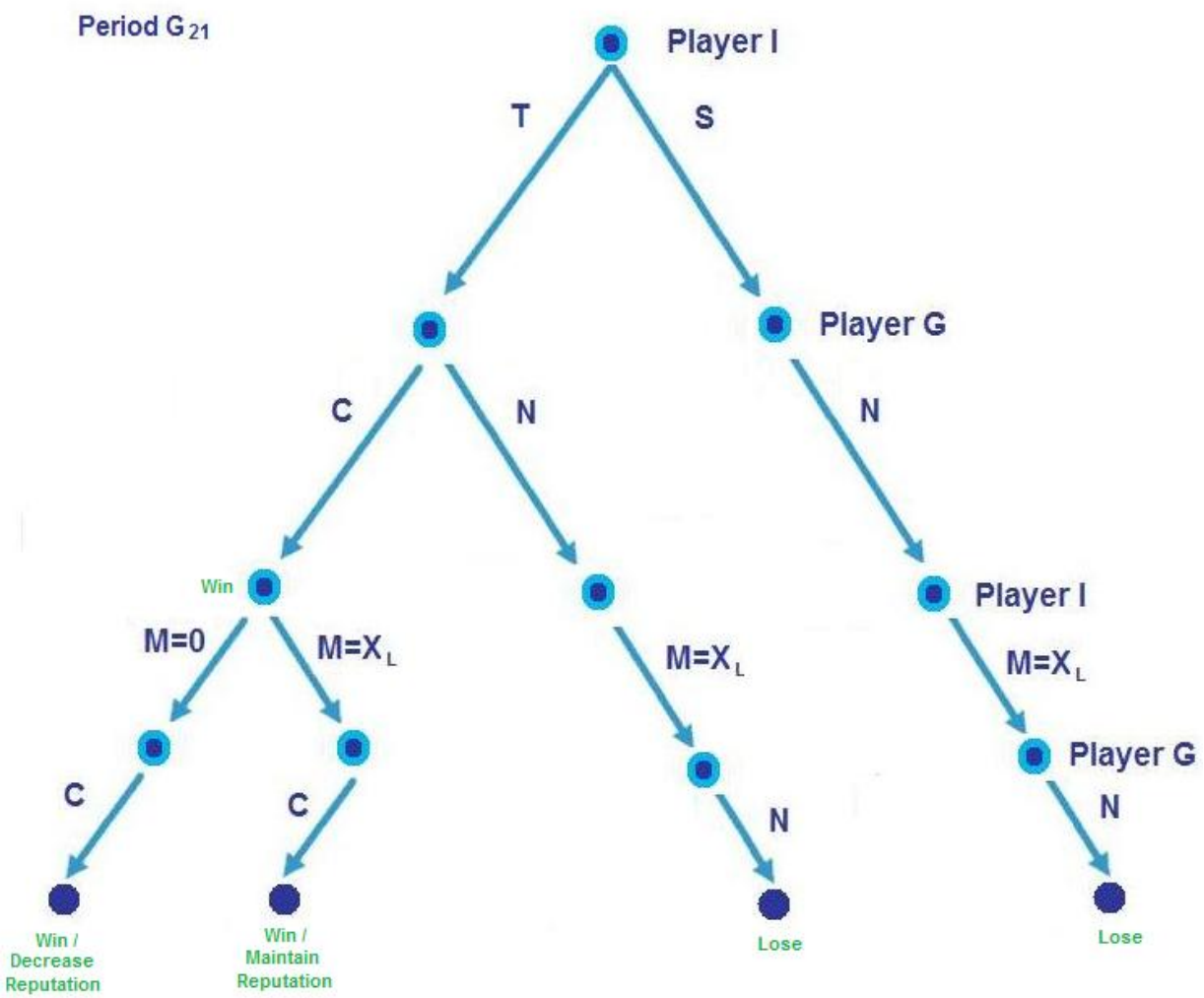
From the above analysis of $G_{12,}$ stems -as in model G_{22}- that the strategic option of threats is preferable only in case the reputation of the interest group is adequately low. In addition, threats does not occur when $p > z$ because player G never gives to the (low-power) interest group the chance to exert threats in case $p > z$. On the other hand, when $p < z$ threats take place with positive probability in equilibrium. Moreover the expected occurrence of threats raise when $p < a^2$ and falls when $a^2 < p < a$. Lobbying strategic option chosen by a low-power interest group is an equilibrium situation for any value of the interest group reputation, contrary to threats.

3.4.4 Game-theoretic model G_{21}

The results from the analysis of $G_{12,}$ showed that threats is more effective strategic choice than lobbying action for obtaining reputation. In model $G_{12,}$ lobbying action was possible to be exerted in the first period of the game. In this section, it will be examined the game-theoretic model $G_{21,}$ in which lobbying takes place in the last period of the game and threats can be exerted in the first period of the game. Actually, model G_{21} is reverse alternant of model $G_{12.}$

The critical issues that have to be explored in this model is whether the reverse turn of the two strategic options have different impact on the reputation and the performance of the interest group and also presume whether the prior lobbying action is necessary for maintaining the reputation in high levels. In other words, the following analysis attempts to examine if the findings of the above analyzed models, which conclude that threat actions are the appropriate choice for building up reputation and lobbying actions are the right strategic choice for maintaining the obtained reputation, stand for model $G_{21,}$ too.

By assumption, the exertion of lobbying actions has not direct cost to player G, contrary to exertion of threat actions that has. So, the collection of information for the power of the interest group is costless through lobbying than through threats for the decision-maker. This comment leads to the presumption that player G is not going to allow the interest group to resume with threats. Namely, the governmental decision-maker is always ready to choose strategy C in the first period, and depend on the information that he will collect through the lobbying progression in order to take his final strategic decision in the second period. This strategic path of latter effect for player G prevails over the path of prior effect, especially in case that $p < z^2$, where player G prefers strategy N in equilibrium. The possible strategic paths of game $G_{21,}$ is represented below.



In game-theoretic model G_{21}, contrary to model G_{22} and $G_{12,}$ there is a separating equilibrium. This equilibrium takes place in case that player G takes his final decision in the second period of the game under complete information. In this case the mixed path of both threats and lobbying is significantly costly for a low-power interest group. Specifically, the total cost that the low-power interest group has to undertake is the fixed cost X_L for the lobbying action plus 1-C' for the threat action. This sum exceeds the maximum potential benefit for the low-power interest group. On the other hand, the powerful interest group is always ready to exert both threats and lobbying in order to convince player G to compromise, since the total benefit for I_S more than the total cost ($2-C' < X_L$). In the separating equilibrium, threats and lobbying operate as supplementary strategies to the attempts of the interest group to obtain reputation.

When the fixed lobbying cost X_L is considered to be relatively high, X_L covers the additional benefit for the powerful interest group from complete separation. Consequently, the powerful interest group decides to partially separate itself out only exerting the threat resumption strategy. Sequentially, the decision-maker has to give the chance to the powerful interest group to separate its type and when it happen player G is ready to choose strategy N only case that the initial reputation of the group is not too strong.

Furthermore, in case that the interest group has high initial reputation ($p > z$), player G is obligated to compromise from the first period of the game and lobbying in the second period is optional. Meanwhile, lobbying may be useful in case that the decision-maker has the belief that it will happen, and the no-lobbying action in this case is considered as weakness for the group. So, if the fixed cost X_L, does not depress significantly the gains of the group, it is preferable to happen.

It is obvious that when the initial reputation of the interest group is low ($p < z^2$), the decision-maker not compromise. In the second period, after the resumption with threats, the reputation of the group of being strong increases. The lobbying process does not provide further information to player G since the two types blow between

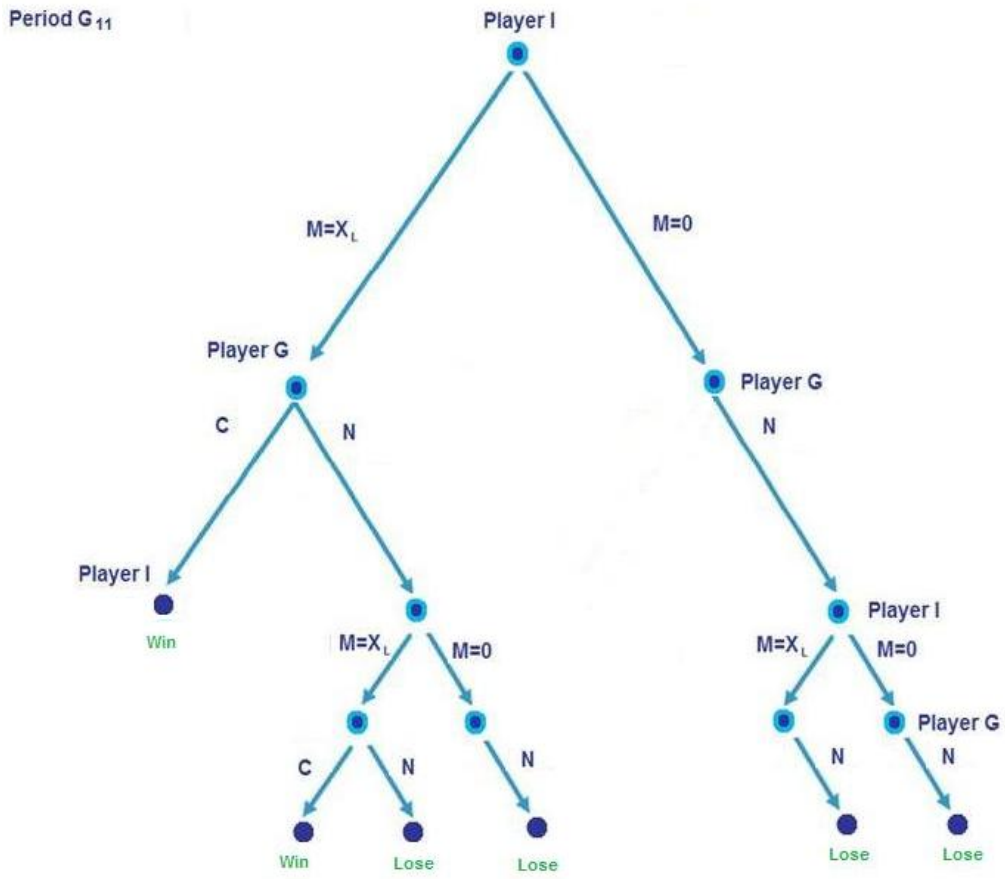
sending and not sending a lobbying message. If the interest group has not exerted threats in the first period, then its reputation decreases dramatically and cannot be reclaimed through lobbying in the second period. It is obvious that lobbying actions, after not exerting threats in the first period are avail, and almost never take place.

When the reputation of an interest group is intermediate level ($z^2 < p < z$), the interest group has one more chance to increase its reputation, just like as in model G_{12}. In the second period the action of sending a lobbying message with cost $X_{L,}$ increases the reputation, creating better conditions for the compromise of the decision-maker. On the other hand, if the interest group takes no action in the second period leads to total loss of reputation.

The findings of the above analysis show that in a game-theoretic model like G_{21}, the threat action is always necessary for an interest group in order to increase its reputation, independently on its initial power. On the other hand, in this model of late lobbying, the lobbying action is useful only for maintain the reputation which has been yield in the first period through threats.

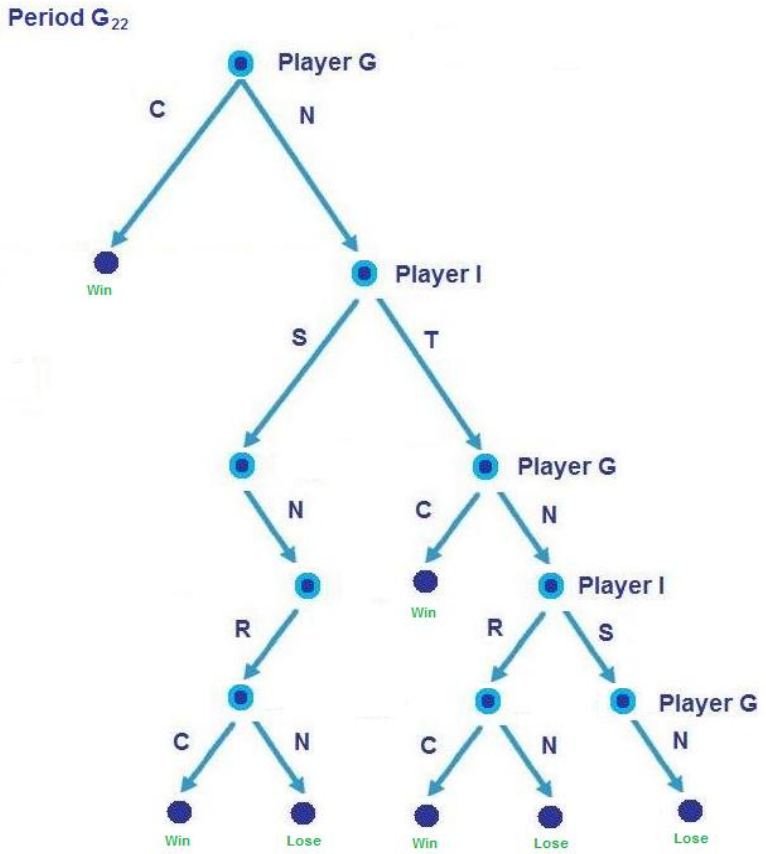
4. Algorithmic Solution

Game-theoretic model G_{11}




```
Let M: Lobbying Message
    Pi: Lobby
    G: Governmental decision maker
Begin
        If Pi.M = Xi then
                If (G.Compromise() = true) then win(Pi);
                Else  {
                        If (Pi.Resend(M)) = Mi then
                                If (G.Compromise() = true) then win(Pi);
                                Else lose(Pi);
                        Else lose(Pi);
        Else lose(Pi); //Pi.M = null
End
```

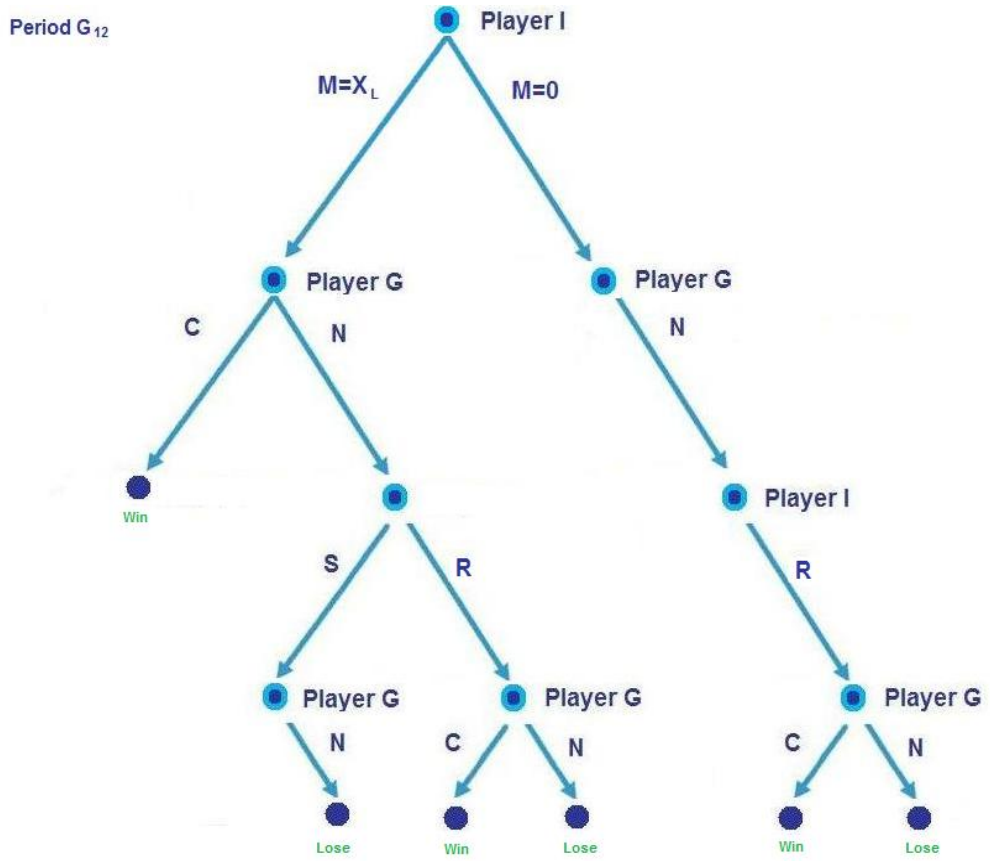
Game-theoretic model G_{22}



Let M: Lobbying Message
Pi: Lobby
G: Governmental decision maker

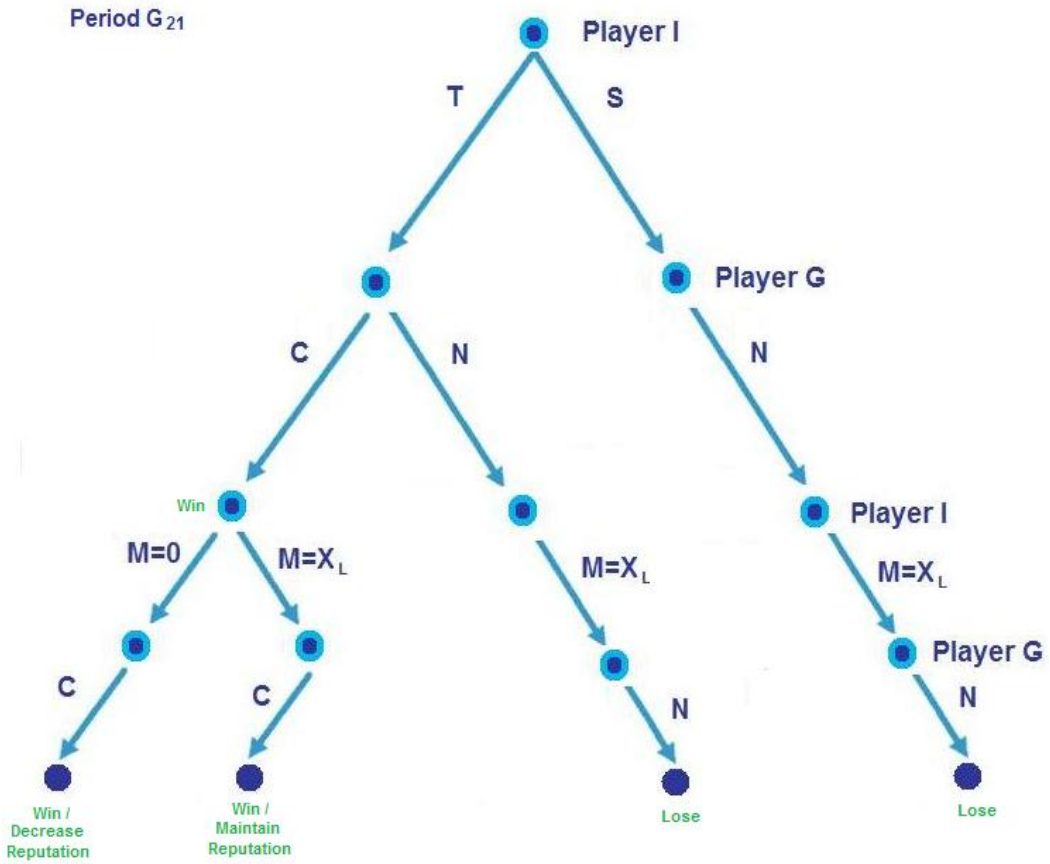
```
Begin
        If (G.Compromise() = true) then win(Pi);
                Else  {
                        If (Pi.Suspend() = true)  then
                                If (G.Compromise() = false) then
                                        If (Pi.Resume() = true) then
                                                If (G.Compromise() = true) then win(Pi);
                                                Else lose(Pi);
                                Else //Pi.Suspend() = false
                                        If (G.Compromise() = true) then win(Pi);
                                        Else
                                                If (Pi.Resume() = true) then
                                                        If (G.Compromise() = true) then
win(Pi);
                                                        Else lose(Pi);
                                                Else lose(Pi);
                        }
end
```

Game-theoretic model G_{12}




```
Let M: Lobbying Message
    Pi: Lobby
    G: Governmental decision maker
Begin
        If Pi.M = Xi then
                If (G.Compromise() = true) then win(Pi);
                Else  {
                        If (Pi.Suspend() = true) = then lose(Pi);
                        Else
                                If (G.Compromise() = true) then win(Pi);
                                Else lose(Pi);
                        }
        Else {
                If (Pi.Suspend() = false) then
                        If (G.Compromise() = true) then win(Pi);
                        Else lose(Pi);
                }
End
```

Game-theoretic model G_{21}



Let M: Lobbying Message
Pi: Lobby
G: Governmental decision maker

```
Begin
If (Pi.Suspend() = false) then
        If (G.Compromise() = true) then win(Pi);
        Else lose(Pi);
Else lose(Pi);
End
```

5. Results

Summarizing the findings of the analyzed game-theoretic models, it would very useful to focus on 4 very important results. The most significant results are the following:

1. The interest group, in case that has an established position, or has gained a higher level of reputation from the first period of the process (e.g model G_{21}), has to exert lobbying action in the second period in order to maintain the initial reputation. The no-lobbying action, in many cases could be claimed from the decision-maker as a weakness of the interest group and this strategic choice leads to the loss of reputation in the second period. This is a feasible scenario especially in case that the decision-maker has the belief that the interest group is powerful and the no-lobbying action can cause serious decline to the reputation of the group. So, it is very important lobbying action always take place, even though in cases that the decision-maker has compromise in the first round of the negotiation, just like in model G_{21}. Meanwhile, it has to be noted that the lobbying action just maintains the established level of reputation and does not cause any raise. As it is represented in the second result, the only effective strategy for the increase of the reputation is threats.

2. The strategy of threats occurs mainly in equilibrium in case that the interest group is of low power and has relatively low reputation. Actually, the only way for a low-power interest group to get the necessary level of reputation in order to convince the decision-maker in the second period is to exert threats. On the other hand, lobbying activities take place mainly in equilibrium that the interest group is powerful and has already an established reputation. So, the most appropriate strategy for building up a reputation is threats and this strategic choice always leads to the improvement of the reputation of the interest group - independently of the

initial level of reputation of the group-, contrary to lobbying actions that are useful only for maintain the level of reputation.

The above mentioned result is an outcome of the assumption that threats can take place only after the refusal of the decision-maker to compromise and the additional assumption that threats impose direct cost to decision-maker, contrary to lobbying actions that do not. The cost-factor plays a critical role for the decision of the policymaker whether he will provide or not the opportunity to the interest group to exert threats. When the cost of compromise is low relative to the cost of accepting threats for the decision-maker, the interest group needs a lower level of reputation for convincing him to compromise.

3. Repeated lobbying, only under specific conditions can be used for building up reputation. Even though, when the initial reputation of the group is pretty low, there is always the possibility that it has to exert threats in order to raise the level of reputation. That means that when the decision-maker gives to the interest group the opportunity to exert threats, always it has to utilize the opportunity for building up reputation. Only in case that the interest group –especially the low-power group- does not utilize the opportunity to exert threats, the strategy of repeated lobbying is an acceptable alternative solution, which is not necessarily effective. So, it is presumed that it is necessary the interest group to utilize the opportunities for threats, whenever they are given, in order to build up reputation. Contrariwise, for the same objective, it is not necessary for the interest group to utilize the lobbying opportunities.

4. A general conjecture that outcomes from the three above mentioned results, is that hard measures as threats are generally more efficient means for building up reputation than soft measures as lobbying actions, that are useful only for maintain the reputation to the same levels. So, the group, which has

not an established status in the beginning of the negotiations with the decision-maker, must first behave threateningly in order to obligate the decision-maker to take its commination for sure.

6. Concluding Discussion

In this study it was represented a game-theoretic approach of the activity and the strategies of the interest groups in their attempt to influence the governmental decision-makers. The alternative strategic tools that the interest groups can use for the achievement of their goal is the hard measure of threats, and the softer measure of lobbying actions, like lobbying messages etc. In the model, the main difference between threats and lobbying is that the first the strategy imposes direct cost on the decision-maker, contrary to lobbying that does not. Furthermore, the possibilities for lobbying are independent of the actions of the decision-maker, contrary to the opportunities of exerting threat actions, which are not.

They were formed four different game-theoretic models, which are a result of the potential combination of two period games. So, from the mix of the single period games G_1 and G_2, they were formed the repeated games G_{11}, G_{12}, G_{21} and G_{22}. The main conclusion from the examination of the four mentioned models is that hard measures like exerting threats are more efficient for increasing reputation than soft measures like exerting lobbying actions, that are useful only for maintain the reputation to the initial level.

Also, it was conjectured that only under specific conditions the strategy of lobbying is appropriate for the increase of reputation. However, lobbying never can completely replace the threat strategy. In addition, when there is an established position for the interest group, just the exertion of lobbying action may be sufficient for convincing the decision-maker. Meanwhile, even though the decision-maker compromise in the lobbying action of the interest group in the first round of the negotiations, it is beneficial for the group to resume with lobbying actions in order to maintain the high level of reputation that has got.

The game-theoretic model, which is described in this study, is very close to the real bargaining situation between the interest groups and the policymaker. There are

hundreds cases where the interest group has used the strategies of lobbying and threats, and combinations of them in order to abort or distort statutes that bring forward their interests. Also, this model does not concerns only the organized interest groups, but also it regards every organization and body that wants to defend their interests. Consequently, the player I of our model could be also an enterprise, a labor union/ syndicate, even a country-member of an economic zone.

A proposed extension of the present study could be the exploration the models, introducing the critical assumption that the decision-maker is not a player that lose every time he compromise. It could be introduced the assumption that the decision-maker in some occasions can collaborate with the interest group gaining from these bargaining process. The terminus in this case is to determine against what benefit and conditions the decision-maker is possible to abandon his initial position and co-operate with the interest group. In point it has to be mentioned that lobbying actions can contain except from messages, the financial support, campaign contributions or other lobbying actions, which are translated to clear returns for the decision-maker.

7. Case Study: The lobbying strategy of Microsoft Corporation

There are many examples from the real life that confirm empirically the findings of the study. One well-known example is that of software giant Microsoft. In 1996, Microsoft has created an "army" of lobbyist for influencing the American policymakers to approve the Software Export Equity Act (SEEA). The act of SEEA was a tax regulation that allowed software companies to exempt 15% of foreign sales from corporate income taxes.

This decision, which was taken, finally in 1997, gave a tax break to the American exporters of software totally for $ 1.7 billion over the next ten years, but he number one beneficiary of this act was Microsoft and in the same year the profits of the company increased by 51% exceeding $ 2 billion. The loser of this regulation was the American people who were called to cover with tax contribution the loss of the governmental income.

It is obvious that Microsoft when attempting to influence the decision-maker had an established position and a strong reputation. Moreover, Microsoft had immediate access to the decision-makers and this access allowed Microsoft to exert lobbying actions. This access is confirmed from the clue that from the 72 people who registered to lobby for Microsoft in 1996 and 1997, at least 57 of them had government experience and were either retired members of the Congress or Capitol Hill staffers. So, Microsoft preferred to follow the lobbying strategy for promoting their interests and achieved that in the first round of the negotiations.

Although the decision-makers committed to approve SEEA, Microsoft enforced its lobbying team in 1997, spending $ 600.000 more and continued to lobby the decision-makers in order to maintain the position and the reputation that has gained from the prior lobbying process. This case of Microsoft is a very good example of the way that the interest groups work, confirming at the same time the findings of the study.

8. Appendixes

Appendix A: Hawk – Dove Game (Chicken Game)

The **Hawk-Dove** game, also known as the **Chicken** game, is a 2-person game-theoretic model. In this model of games each player prefers not to yield to the other. The outcome where neither player yields is the worst possible one for both players. One typical example of chicken game is the situation in which two drivers drive towards each other on a collision course. One must change direction, or both may die in the crash, but if one driver change his direction and the other does not, the one who changed will be called a "chicken," because his behaved as a coward.

On the other hand, the name "Hawk-Dove" refers to a situation in which there is a competition for a shared resource and the contestants can choose either conciliation or conflict, but from a game-theoretic point of view, both "Chicken" and "Hawk-Dove" are identical terms. The different names stem from parallel development of the basic principles in different research areas (Osborne and Rubenstein, 1994). Chicken term is more frequently used in political and economic science and Dove-Hawk term is used more appropriately in biology and evolutionary game theory. In Chicken Game it is assumed that the best thing for each driver is to stay straight while the other change direction, since the other is the "chicken". On the other hand, a crash is assumed to be the worst result for both players. This yields a situation where each player, in attempting to secure his best outcome, risks the worst. In the below table are represented 2 matrixes –one strategic type and one numerical- for the best understanding of the game.

The Hawk-Dove version consists of two players contesting an inseparable resource who can choose between two strategies, one more escalated than the other (Smith and Parker, 1976). They can play as dove using threats, or Hawk using physical attacks. If both players choose the Hawk strategy, then they fight until one is injured and the other wins. If only one player chooses Hawk, then this player defeats the

Dove player. If players play dove, there is a tie, and each player receives a payoff lower than the profit of a hawk defeating a dove. A formal version of the game of Chicken has been the subject of serious research in game theory (Rapoport and Chammah, 1966). Two versions of the payoff matrix for this game are presented in the tables below. In Figure XX the outcomes are represented in words, where each player would prefer to win over tying, prefer to tie over losing, and prefer to lose over crashing. Figure XX presents numerical payoffs, which conform to this situation. Here the benefit of winning is 1, the cost of losing is -1, and the cost of crashing is -10.

		Player 1	
		Ghange Dir.	Stay
Player 2	Ghange Dir.	Tie, Tie	Lose, Win
	Stay	Win, Lose	Crash, Crash

		Player 1	
		Ghange Dir.	Stay
Player 2	Ghange Dir.	0,0	-1,1
	Stay	1,-1	-10, -10

Both Chicken and Hawk-Dove are *anti-coordination games*, in which it is mutually beneficial for the players to play different strategies. In this way it can be thought of as the opposite of coordination game, where playing the same strategy Pareto dominates playing different strategies. Because the loss of swerving is so trivial compared to the crash that occurs if nobody change direction, the reasonable strategy would seem to be to swerve before a crash is likely.

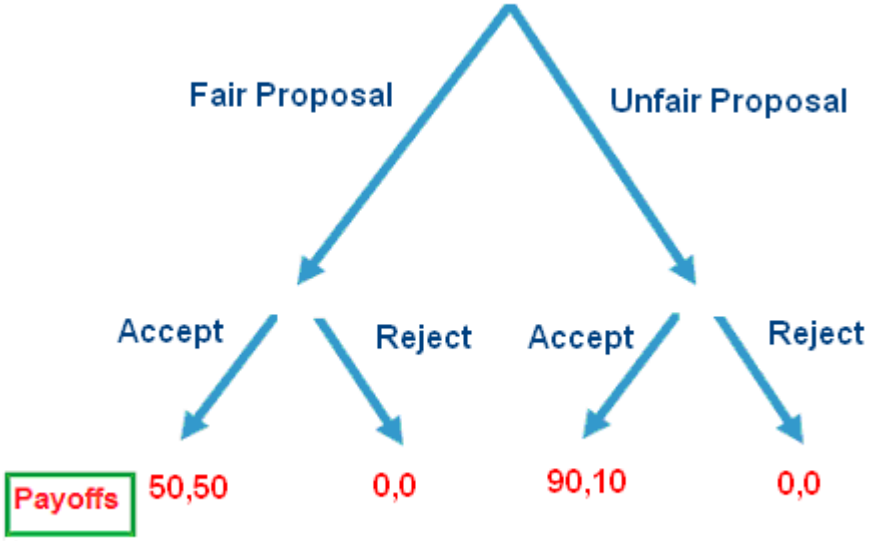
Appendix B: Ultimatum game

The ultimatum game is a game often played in economic experiments in which two players interact to decide how to divide a sum of money that is given to them. In this game, the first player proposes how to divide the sum between the two players, and the second player can either accept or reject this proposal. In case that the second player rejects, the payoff is 0 for both players. If the second player accepts, the money is split according to the proposal. It has to be noticed that ultimatum game is played only in one stage. Consequently, reputation and reciprocation is not important.

There are two players in the experiment, players A and B, who do not know each other. They have received an amount of x $ and the smallest possible share of the amount is 1 cent. The first player, player A, chooses some amount p in the interval $[0,x]$. Player B chooses some function f: $[0, x] \rightarrow$ {"accept", "reject"}. We will represent the strategy profile as (p, f), where p is the proposal and f is the function. If $f(p)$ = "accept", player A receives p and the player B x-p, otherwise the outcome for both players is 0.

If $f(p)$ = "accept", then (p, f) is a Nash equilibrium of the ultimatum game and there is no $y > p$ such that $f(y)$ = "accept". Player A would not want increase his demand since B will reject any higher demand. On the other hand, player B would not want to reject the demand, since he would then get nothing. There is another Nash

equilibrium where $p = x$ and $f(y)$ = "reject" for all $y>0$. In this case, both players get nothing, but neither could get more by changing their strategy.



However, only one of these Nash equilibria satisfies a more restrictive equilibrium concept, subgame perfection. Presume that the player A demands a relatively large amount of money that gives player B a very small amount. By rejecting the demand, player B is choosing 0 rather than something. So, it would be better for B to choose to accept any demand. If player A knows this, he will give to player B the smallest non-zero amount possible.

In many cultures, people offer a 50:50 split, and offers of less than 20% are often rejected (Henrich, Boyd, Bowles, Camerer and Fehr, 2004; Oosterbeek, Sloof and Kuilen, 2004). The results are taken to be evidence against the Homo economicus model of individual decisions. Since an individual who rejects a positive offer is choosing to get 0 rather than something, that individual must not be acting solely to maximize his economic gain. Several attempts to explain this behavior are available. Bolton (1991) suggests that individuals are maximizing their expected utility, but money does not translate directly into expected utility.

Appendix C: Rock, paper, scissors Game

Rock, Paper, Scissors is a very popular and familiar game for most people. The minority of them ignore that this childish game is on of the most frequently used models of game theory. In this game, two players, at the same time, choose among three strategies: rock, paper, or scissors. The assumptions of the game are that rock beats scissors, scissors beat paper, and paper beats rock. Rock, paper, scissors is a typical example of a zero-sum game without perfect information. Whenever one player wins, the other loses. We can express this game using a payoff matrix that explains what one player gains with each strategy the players use. In the payoff matrix below, the rows represent the alternative strategies of player 1 while the columns represent the alternative strategies of player 2. Output 1 represents a win for player 1, 0 a tie between two players, and -1 a loss for player 1 or win for player 2.

Player 1

Player 2	Rock	Paper	Scissors
Rock	0	-1	1
Paper	1	0	-1
Scissors	-1	1	0

Appendix D: Battle of the sexes Game

The Battle of the Sexes is a two-person coordination game used in game theory. The concept of this game is a couple that decided to go out together, but cannot remember if they decided to go to the opera or to the football match.

The husband would most of all like to go to the football match. On the other hand, his wife would like to go to the opera. It is assumed that both would prefer to go to the same place rather than different ones. In the payoff matrix below it is represented the Battle of the Sexes game, where the wife chooses a row and the husband chooses a column.

		Husband	
		Opera	Football
Wife	Opera	3,2	0,0
	Football	0,0	2,3

This game has two pure strategies Nash equilibria, one where both go to the opera and another where both go to the football game. Thus, both equilibria are Pareto optimal. There is also a Nash equilibrium in mixed strategies, where the players go to their preferred event. For the payoffs listed above, each player attends their preferred event with probability 3/5. This presents an interesting case for game theory since each of the Nash equilibria is deficient in some way. The mixed strategy Nash equilibrium, when it exists is inefficient.

Appendix E: Prisoners' Dilemma

The prisoner's dilemma is one of the most popular cases in game theory. It was originally framed by Merrill Flood and Melvin Dresher in 1950 and the concept is the following: Two suspects are arrested but the police have insufficient evidence for their guiltiness. Officers keep both of them separately in two different prisons. The

policemen visit each of them proposing that if one testifies for the prosecution against the other, the betrayer goes free and the other in case that remain silent receives the full 10-year sentence. If both remain silent, both prisoners are sentenced to only 1 year in jail. If each betrays the other, each receives a five-year sentence. Each prisoner must choose to betray the other or to remain silent. The game is represented in the matrix below.

		Player 2	
		No Defect	Defect
Player 1	No Defect	1,1	10,0
	Defect	0,10	5,5

Taking into consideration that each player cares only about minimizing his own time in jail, then the prisoner's dilemma forms a non-zero-sum game in which the two persons may each cooperate with the other player. In game theory, the primary concern of each individual player is maximizing his own payoff, without any concern for the other player's payoff. Rational choice leads the two players to both choose to defect, even though each player's individual reward would be greater if they both act cooperatively, remaining silent.

Appendix F: Stag hunt Game

In game theory, the stag hunt is a game inspired from Jean-Jacques Rousseau, which describes a situation of conflict between safety and social cooperation. In this game is described a situation in which two individuals go out on a hunt and each can individually choose to hunt a stag or hunt a hare. Each player must choose an animal without knowing the choice of the other. If an individual hunts a stag, he must have

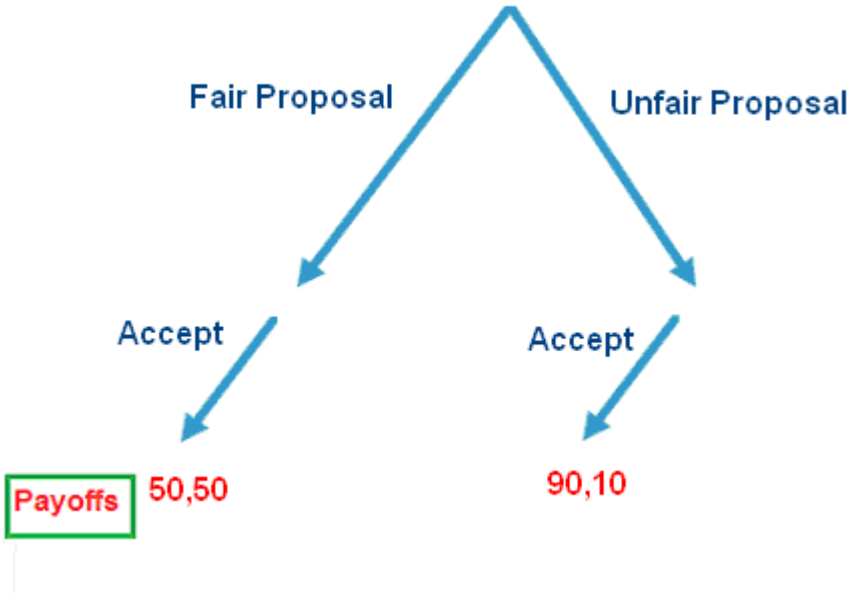
the cooperation of his partner in order to succeed. On the other hand, an individual can get a hare by himself, but a hare is worth less than a stag.

The stag hunt game differs from the Prisoner's Dilemma mentioned above in that there are two Nash equilibria: when both players cooperate and both players defect. However, in the stag hunt game, despite the fact that both players cooperating are Pareto efficient, the only Nash equilibrium is when both players choose to defect. An example of the payoff matrix for the stag hunt is represented in the table below.

		Player 2	
		Stag	Hare
Player 1	Stag	4,4	1,3
	Hare	3,1	3,3

Appendix G: Dictator Game

The dictator game is an experimental game, similar to the ultimatum game mentioned above. Experimental results in the dictator game have often been cited as a conclusive argument of the “homo economicus” model of economic behavior. In the dictator game, the first player proposes a split of an amount. The second player receives the rest of the amount. The role of second player is entirely passive and has no strategic input into the outcome of the game. As a result, the dictator game is not formally a game at all, as the term is used typically in game theory. To be a game, every player's outcome must depend on the actions of at least some others. Consequently, Dictator Game is one of decision theory and not game theory.



This game has been used to explore the homo economicus model of individual behavior. If individuals were only concerned with their own economic benefit, the players that propose the sharing of the amount would allocate the entire amount to themselves and give nothing to the other person. However, experimental results have indicated that individuals often allocate money to the responders, reducing the amount of money they receive.

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