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The Voluntary Provision of Public Goods: Toward A Unified Theory of Collective Action

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ABSTRACT

Mancur Olson in The Logic of Collective Action presents an analysis of the freerider problem faced by groups that provide a public good. His analysis is explicitly limited to the collective action problem in economic interest groups, such as unions and business associations. Olson specifically notes that his analysis does not apply to philanthropic organizations. In recent years, Walker (1991) and others have documented a substantial growth in what are called public interest groups, such as Greenpeace, Amnesty International and Common Cause. These public interest groups are examples of Olson s philanthropic groups because their goal is helping others or society in general, rather than solely benefitting the members of the group.

I propose an explanation of how public interest groups solve their collective action problem by incorporating two features not found in Olson s analysis. First, the public good provided by these groups is non-rival rather than rival as in the case of economic interest groups. Second, I modify the underlying rational, self interested axiom by introducing a modicum of altruism. Specifically, I show that pure altruism is required rather than warm-glow or a morally based notion of altruism.

I incorporate these two features into a formal model of voluntary contributions to the provision of a public good. Furthermore, I assume that the game is one of incomplete information. I show that a Bayesian equilibrium exists which provides for positive contributions to the public good. My solution is fundamentally different from Chong (1991) and Sandler s (1993) assurance game, and prisoner s dilemma version of the collective action problem faced which relies upon a pure strategy solution to the problem and assumes complete information.

Lastly, Cornes and Sandler (1996) propose a new size principle, the inverse of Olson s size principle. The larger the group, the easier it is to solve the collective action problem. I show that Olson s original size principle holds in the voluntary provision to public-interest groups.

Mancur Olson in "The Logic of Collective Action" presents an analysis of the freerider problem faced by groups that provide a public good. His analysis is explicitly limited to the collective action problem in economic interest groups, such as unions and business associations. Olson specifically notes (1965: 159-60) that his analysis has limited applicability to non-economic interest groups and does not at all apply to philanthropic organizations. In recent years, Walker (1991) and others have documented a substantial growth in what are called public interest groups, such as Greenpeace, Amnesty International and Common Cause. These groups are examples of Olson's non-economic groups because their goal are political goals or helping others or society in general, rather than solely benefitting the members of the group. Chong (1991), Sandler (1993), Runge (1983), among others, offer explanations of how these non-economic groups solved the collective action problem which is at substantial variance with Olson's analysis. For example, these authors argue that Olson's emphasis on the freerider problem is wrong, and that an assurance game underlies the collective action problem for both economic and citizen's groups. I show that their explanations of the solution to the collective action problem are incomplete at best.

I present herein an alternative explanation to the formation of public-interest groups. First, my analysis shows that altruism is a necessary motivation for public-interest groups. But whether the altruism is in the form of "warm glow" versus the more traditional "pure altruism" has substantial implications for the operation of interest groups. Second, I argue that public-interest groups regularly are opposed by competing public interest groups. And, the motivation of contributors is tied directly to the goals of the organization. These two factors transform the game. But it is neither a freerider problem (prisoner's dilemma), nor an assurance game as argued by Chong (1991)

and Sandler (1992). Third, I model the collective action problem as one of incomplete information. An assurance game has a straight forward Nash equilibrium in pure strategies. However, showing that there is a Nash equilibrium does not help us understand how the collective action problem is solved with millions of potential members who are not in contact with each other. Fourth, Runge (1984) and Cornes and Sandler (1996) posit that public interest groups follow an inverse size principle. I show that they are plagued by the same size principle that Olson noted.

I. The Collective Action Problem in Economic and Non-Economic Organizations

Olson's classic analysis The Logic of Collective Action linked the freerider problem with the provision of a public good by an economic organization. He showed that beneficiaries of an organization providing a public good had an incentive of not contributing to the organization but rather freeriding on the provision of the public good because it is non-exclusionary. Olson notes three possible solutions to the freerider or collective action problem. First, a privileged individual may provide the good. A privileged individual is one whose personal benefit from provision of the public good exceeds the cost of personally providing the good. Hence, a firm may build a road to its plant in order to facilitate its transportation needs. Second, coercion can force individuals to contribute to the provision of the public good. Governments force their citizens to pay taxes which cover the provision of public goods. Third, selective benefits can induce people to contribute to a group, which in turn provides a public good. Specifically, a private good is provided by the group in addition to the public good. Members pay for the private good, and part of the price of the private good covers the cost of providing the public good. In all three solutions, the self interest of the

members is the driving force.

One implication of Olson's analysis is what he calls the size principle. As potential groups become larger in size, the likelihood of them overcoming the freerider problem declines. This principle stems from the relationship between transaction and organization costs and the size of the group. Transaction and organization costs increase as the size of the group increases. Hence, business associations (which have a relatively small membership) should be more successful in organizing than consumer groups (which have very large potential memberships).

Missing from Olson's analysis is a complete theory of the formation of groups. First, Olson (1965) explicitly limits his analysis to economic groups which primarily produce public goods which are rival.[1] These groups want to redistribute money to themselves from other groups or individuals. As the society increases in size, the amount of contributions to the provision of the public good has to be increased, to provide everyone with the same amount of the public good. For example, John L. Lewis who was president of the United Mine Workers realized that to substantially increase miners' pay he would have to reduce the supply of miners. He signed a contract with mine owners that increased wages, allowed increased automation but required that there be fewer miners. And over a short period of time, membership in the UMW dropped from 300,000 to approximately 100,000 miners. Wages of miners increased, but the number of individuals receiving these wages went down. Money is a rival good. Hence, economic groups provide a benefit that is non-

[1] Even economic interest groups sometimes produce non-rival, public goods. For example, unions are primarily organized to promote the economic benefits of their members. But, they occasionally promote the right to organize, which is not a rival, public good. In addition, Olson does discuss the "inclusive" groups, which are groups that produce non-rival goods. But, he never uses the inclusive character of some groups when he discusses solutions to the collective action problem.

exclusionary but rival.

Economic interest groups, like trade associations, professional associations and unions, still comprise 80% of all interest groups in the United States (Schlozman and Tierney, 1986). But Walker (1991) and others have documented a dramatic growth in citizens groups starting in the early 1960s. Citizens groups entail a broad range of groups: environmental (for example, Greenpeace), philanthropic (for example, the Salvation Army) and public interest (for example, NOW). (Below, I subdivide these groups into two types: public-interest and philanthropic groups.)

The essential characteristic that these divergent citizens groups have in common is that they produce non-rival goods. For example, NOW and the NAACP fight for equal rights for women and blacks respectively. But these goals are non-rival. If these equal rights are provided, they are provided to all of the women and blacks equally, and any one individual s consumption of the benefit does not affect the consumption by anyone else. Philanthropic organizations that help the poor provide a private benefit to the beneficiary, but the primary benefit to the donor is the sympathetic benefit of seeing others better off. Sympathy is also a non-rival good, because when I see others better-off, I feel happier, irrespective of who contributed to the happiness of the less well-off, and irrespective of how many others feel the same sympathy. Lastly, environmental groups frequently (but not always) provide a non-rival good.[2] When a group works to save the whales, the benefit accrues to everyone and to the same degree.

Several explanations of how public-interest organizations solve the collective action problem

[2] When environmental groups work to provide parks or clean air or rivers, the benefits are rival because crowding out is common.

have been proposed. Walker (1991) argues that his study indicates that citizen's groups solve the freerider problem by means of sponsorship, i.e., a fat cat contributor (an individual or government) subsidizes the group. However, Bosso (1995) presents evidence that sponsorship is a minor factor in environmental group's finances.

A second set of explanations for successful formation of citizen's organizations is based upon the altruistic motives of their members. For example, Moe argues (1980) that people join and contribute to these organizations only to achieve the goal or purpose of the organization; they do not join for any material self interest or selective benefit. Hence, he differentiates between joining a group out of economic self interest and joining for purposive benefits. However, he offers no analysis of how purposive benefits lead to overcoming the freerider problem. The observation that people do not receive any material benefits, but act out of altruistic motives is at best a step in the direction of providing an alternative explanation.

I show that by modifying Olson's analysis in two respects an analysis of public-interest groups is feasible. Specifically, I first show that public-interest groups provide a non-rival good, rather than the rival public good that epitomizes economic interest groups. Second, I modify Olson's starting axiom of rational, self-interested behavior by introducing a degree of altruism. However, there are many forms of altruism and not all are sufficient to overcome the freerider problem.

The best of the existing explanations of the collective action problem in public interest groups are by Chong (1991), and Sandler (1992). However, their explanations are incomplete, as I show below. They argue that when altruistic motives are added to the benefits from contribution that the collective action problem changes from that of a prisoner's dilemma to that of an assurance game. Once the critical level is reached in the assurance game, the optimal strategy for players is

to contribute. Hence, we would expect to observe 100% of potential members contributing (Chong, 1991: 112). However, none of the public interest groups witness 100% membership. The highest membership among public interest groups seems to be around one percent of the potential members.

Lastly, Runge (1981) and Cornes and Sandler (1996) posit that an inverse size principle holds for public interest groups. Their size principle is the opposite of Olson's size principle where groups, as they grow in potential membership, find it more difficult to solve the freerider problem. As their numbers increase, the transaction costs of group membership increase. The inverse size principle posits that as groups grow in size, they find it easier to solve the collective action problem. I show that Olson's original size principle holds even in public interest groups.

Before turning to the analytic analysis of how citizen's organizations solve their collective action problem, I first review the histories of successful citizen's organizations.

II. The Organization of Public-Interest Groups

The best way to motivate my theoretical analysis is to review the history of the formation of several prominent public service organizations. I chose to focus on Common Cause founded by John Gardner, and several consumer groups founded by Ralph Nader because they exhibit features which are found in all citizen's organizations.

Nader, after he wrote "Unsafe at Any Speed," sued GM because of the tactics the company used in attacking him and his views. Nader won his lawsuit against GM and used $270,000 of the money from the lawsuit to place ads in papers around the country soliciting money to form and operate a consumer advocacy group. Only 62,000 people contributed out of a population of

approximately 150,000,000 adults. Yet the average contribution of $15 raised $1,000,000. These limited voluntary contributions were sufficient to launch his organization.

Likewise, John Gardner, a Republican lawyer, formed Common Cause in 1968. He placed ads in the New York Times and got 70,000 contributors, and thus was able to raise more than $1,000,000. (Rothenberg, 1992: p.9.)

In these two examples, the essential role of the entrepreneur is seen. Nader and Gardner both functioned as entrepreneurs in the formation of these public interest groups. They provided the seed money (the start-up costs), their organizational skills, and the risk-taking required to get the associations formed. Without their actions, it is hard to see how these public interest groups would have been formed.

The entrepreneurs are essential in providing the initial impetus toward organization, but how do the groups attract and maintain members, i.e., how do they overcome the freerider problem? Voluntary contributions from the members are the life blood of these organizations.[3] These groups do not provide selective benefits (e.g., low-cost insurance, journals, etc.) to induce people to join. Most people get very little back from the organization beyond a newsletter indicating the group's activities. These newsletters are a way to maintain a flow of contributions through annual solicitations. But the motivation for the contributors is altruism. They want to help society and their fellow man. But the degree, extent and type of altruism requires further examination.

[3] The character of the contributors relation to the organization differs in the Nader groups and Common Cause. In the case of Common Cause, the contributors have little say in the organization's policies, leadership, etc., except for the act of writing a check to the organization. The Nader groups by contrast, regularly send out questionnaires to their members to solicit their opinions on policy direction and issues.

There is substantial evidence that humans do exhibit altruistic behavior and goals. The problem is how to incorporate altruistic goals and still maintain the basic self-interested nature of humans. I propose a limited view of the extent and scope of altruism. Tullock (1983) has shown that Americans donate about 5% of their income to charity. This 5% figure is probably an exaggerated estimate of actual altruistic giving because a tax credit is provided for charitable giving. Thus individuals would not, simply because of altruism, voluntarily pay their income taxes. The dominant force in human behavior is still self interest, but we cannot deny that altruism does play a limited role in human motivation.

Hence, I assume that human goals are not exclusively self interested, but rather, include a low-grade altruism, i.e., people are willing to give some low amount (5%) of their income to help others or help society in general. Moreover, this altruistic impulse is not uniformly distributed in the human population. Some individuals are Scrooges, whose altruistic impulse is zero, and others are like Mother Theresa, whose altruistic impulse is to sacrifice most of their lives to help others. The majority of us fall in between. Hence, we can characterize the distribution of altruistic preferences in the population as normally distributed with a mean of 5% of income.

In both the cases of Common Cause and Nader-s group, the average contribution was about $15 per person.[4] This figure conforms to the low-grade altruism argued above. Individuals only contribute a small portion of their income to civic or charitable associations. In addition, the number of contributors out of the potential number of members is very small. As indicated, Ralph Nader s group to help consumers received 62,000 contributions out of a potential 150,000,000 which is about

[4] Both of these examples are from the 1960s. Hence, in real terms an equivalent donation today would be in the $50-70 range.

4 percent of 1%. Thus, the extent of even low-grade altruism is further limited to a small subset of the full population.

This low-grade altruism is sufficient to overcome the freerider problem only because the groups are providing a non-rival good. If the group was providing a rival good, the costs of providing the good would increase with the number of beneficiaries. Hence, as the beneficiaries increase, the number of contributors would have to increase also. But, altruism is limited and is inadequate when a large sacrifice is required of individual contributors; or a large proportion of the population is required to voluntarily contribute.

I now turn to an analytic derivation of the principles observed in the successful solution of the collective action problem by the above citizen s organizations. I show below that several different versions of altruism are possible. Only the pure version provides an explanation of how the collective action problem is solved, and simultaneously is consistent with the facts of the contributors to public-interest groups.

III. What do we Mean by Altruistic Giving?

A number of authors, e.g., Moe (1980), Chong (1991), and others have argued that altruistic giving is sufficient to solve the freerider problem for citizen s organizations. However, they do not provide a satisfactory answer by solely appealing to altruistic giving. I show that more detailed attention is needed because there are several different definitions of altruism, and each has different implications for solving the collective-action problem of public-interest groups.

Sen (1977) notes that there are two alternative views of pure altruism. The one view is that

altruism is based upon ethical norms; the other view is that it stems from a feeling of sympathy we experience when observing the state of others. Harsanyi (1991) and Fedderson (2001) use an ethics based altruism to solve the voting problem. Hume (17?) and Andreoni (1989, 1990) analyze human behavior using a sympathy-based notion of altruism. I follow Hume and Andreoni in adopting a sympathy-based version of altruism in the analysis below.

Individuals are endowed with wealth, which they can allocate between consumption of private goods, x_i, or gifts to the public good, g_i. Moreover, the total amount of the public good, G, is the same for all individuals because the good is non-rival.

$$U_i = U_i(x_i, G, g_i)$$

The utility functions of individuals can be written as:

Pure altruism is here in the sympathy sense (using Sen's terminology) a genuine concern for the well being of others. The donors utility from their contributions to the public good is a function of the contributions of all the givers. Hence, the greater the total contributions to the public good, G, the greater the happiness of all the donors. Pure altruistic sympathy, G, therefore, is a non-rival public good from the perspective of the pure altruists. Pure altruists all share in the public good and they share equally, i.e., each one experiences the same amount of pure altruism. Implicit in this formulation is that the public good, G, increases the happiness of the recipients, which in turn makes the donors better-off.

Thus, as noted by Sugden (1982), pure altruism is not sufficient to overcome the freerider problem because a sympathy version of altruism results in a pure public good, which is both non-

exclusionary and non-rival. Hence, altruistic contributions should fully crowd each other out. Andreoni (1989, 1990) addresses this problem by modifying the definition of altruism to include the concept of egoistical altruism or warm-glow altruism. In giving to others individuals, experience a "warm glow" or personal satisfaction; hence, the term egoistical altruism. The degree of one's warm glow depends upon one's individual contribution, g_i.

This pure and warm glow components can be either dependent or independent of each other. For example in the dependent version, if I took $50 and burned it, I should not experience any warm glow from my action. Likewise, if we contribute to a charitable organization, and later discover that the officers are using the funds for their own personal uses, rather than helping the poor, we do not experience any warm glow from our giving. The recent example of the American Red Cross and the money they solicited for the survivors of September 11^{th} is a case in point. Many individuals demanded their money back when they were informed that the Red Cross was not using their money to help the victims. This dependence of giving and its consequence is captured by the notion of impure altruism. Impure altruism is when an individual is motivated simultaneously by pure altruism and egoistical or warm-glow altruism. The act of contributing can be thought of as a joint-production process which simultaneously processes G_i and g_i. Individuals cannot be solely warm-glow altruists. Hence, it is essential that my contribution benefits someone else in order for my donation to be considered as altruistic.

An alternative view of impure altruism is that the warm-glow and pure altruistic components are independent of each other. Thus, my sense of warm glow ultimately does not depend upon whether my action (contributing to a group) results in the intended outcome (the group's goal). I experience warm glow just from the act of giving. Salisbury and Conklin (1998) argue that

contributors to public-interest groups are motivated by expressive considerations, i.e., an individual obtains benefit simply from the act of expressing their views, irrespective of whether the expression has any effect. Under this view, contributors to the American Red Cross would not complain when they found that some of their contributions went to other beneficiaries.

Andreoni (1989, 1990) argues that impure altruism has different behavioral implications for individuals than pure altruism. Specifically, if an individual acts out of pure altruism, contributions by others to the public good result in a fully offsetting reduction in contributions by the individual who is motivated solely by pure altruism. In effect, pure altruism is a pure public good. A $10 contribution by others, results in a $10 reduction in contributions by myself. By contrast, warm-glow altruism is a private good. Others' altruistic contributions only partially affect my contributions. Pure altruism leads to complete crowding out; while, warm-glow altruism leads to incomplete crowding out (Andreoni, 1989).[5]

Thus, this independent view of warm-glow altruism is akin to the expressive giving of

[5] This distinction between pure altruism and warm-glow altruism with regard crowding out explains Oliver's finding (1980) as to who engages in volunteer work. She found in interviews that those who volunteered to help in community work were much more pessimistic about the likelihood that others would volunteer. Those who did not volunteer were much more optimistic that others would volunteer. This difference can be explained by the role of pure altruism. A pure altruist who anticipated that others would volunteer would reduce their own contributions by an equal amount. Hence, we should expect those who are pessimistic about the altruistic motives of others to be more altruistic themselves.

Salisbury and Conklin (1998). It eliminates the freerider problem because warm-glow or expressive giving is a private good, it is only enjoyed if we actually contribute; we cannot freeride and get the warm-glow benefit.

Lastly, Sen (1977) argues for altruism as commitment. Commitment is based upon moral or ethical obligations to help others, while sympathy is ultimately based upon our experiencing increased happiness as the result of helping others. Sympathy is akin to a self-interested notion of altruism because it makes us happy to help others. Altruism based upon commitment has no connection to one's own happiness because we might be morally obligated to such an extent that we personally are substantially worse-off in terms of utility as a result of performing our moral commitments.

Having defined the different types of altruism, I return to the question of the collective action problem for citizen's organizations. Even with pure altruism, the freerider problem is not solved. It is still in the incentive for individuals not to contribute to the public good. This result stems from the fact that the happiness, G_i, we obtain from observing that others are happy from our donations is a pure public good. No one can be excluded from this benefit, and everyone receives the same amount of G_i. (See Sugden (1982 and 1984) where this observation as to the nature of pure altruism is first made.)

One way out of this conundrum is to shift to another version of altruism. Following Sen (1977), Chong (1991:93), Oliver and Maxwell (1988) and Runge (1984) adopt the notion of altruism as a moral obligation, rather than sympathy. Hence, one has a moral obligation to contribute to the public good even if freeriding provides a higher payoff to oneself. Hence, this shift to moral obligation allows analysts to bypass the traditional prisoner's dilemma version of giving. I argue

below that altruism as moral obligation is too strong an assumption because it does too much damage to the rational-choice postulate.

With the shift to warm-glow (impure) altruism we are able to begin to solve the freerider problem. The private benefit, g_i, that each person experiences when contributing to the public good or the needs of others entails two benefits. First, warm-glow altruism is a private good. We do not personally experience the warm glow of helping others if we freeride upon the actions of others. We obtain the warm-glow benefit only if we contribute to the public good. Second, because we are at the same time contributing to the public good, the crowding-out phenomenon is reduced or eliminated.

I show that all that is required to solve the collective action problem is a small amount of pure altruism even though altruism is a pure, public good. We do not have to appeal to moral obligation to solve the collective action problem, nor do we have to rely upon expressive giving, i.e., giving for the pure sake of giving.

VI. A Bayesian Solution to a Game of Incomplete Information

Chong (1991) and Sandler (1992) transform the collective action problem in the case of non-economic groups from a prisoner s dilemma to an assurance game. They make this transformation by redefining the contributors motivation to include altruistic motivation in the sense of moral obligation. Thus, the collective action problem becomes one of assurance: is there a sufficient number of altruistic individuals will contribute to the group.

The assurance game has a Nash equilibrium in pure strategies with cooperation being the dominant strategy when there are j+1 contributors. Since the assurance game has an equilibrium in pure strategies, Chong and Sandler do no pursue the question of how the collective action problem is solved any further. Sandler (1992:) and Walker (1982) moreover argue that citizen·s groups solve their collective action problem through sponsorship by outside agents. Chong (1991) argues that ethical imperative induces individuals to contribute and not pursue the freerider option. I argue that voluntary contributions are the dominant solution method.

My analysis of public-interest groups differs from Chong (1991) and Sandler (1992) in two fundamental respects. First, I argue that the motivation for contributing to the group is competitive in the sense that public interest groups invariably promote a policy which spawns a competing group. For example, both pro-choice and anti-abortion groups have been formed in the fight over abortion policy. The formation of each must be analyzed in terms of the dynamics of the competition between the two. Heretofore, the analysis of group formation has focused on the inducements that a group uses to get members to contribute some fixed amount of resources. The formation of the group is not an end in itself. Second, I argue the contribution strategy entails a game of incomplete information as opposed to complete information. Chong and Sandler assume that all individuals know the payoffs, contributions and this knowledge and moreover, everyone knows that everyone possesses this information. This information is common knowledge. Given the millions of potential members for these types of groups, the perfect information assumption is not in the least realistic.

An additional empirical weakness of the complete information version of Chong and Sandler is that cooperation is the dominant strategy after the threshold level of contributors is reached. Yet,

in none of the public interest groups has the membership exceeded one percent of their potential members. More than 99% of their potential members are freeriders, even though the dominant strategy is for everyone to join.

For these reasons, I turn to an incomplete knowledge analysis of the decision to contribute or to freeride. Specifically, I employ a Bayesian analysis of the decision to contribute or not contribute to public interest groups. With millions of potential members, no one individual can have complete information about the payoffs and costs of others. Hence, I will reinterpret the contribution game as one of incomplete information. Specifically, I assume that potential contributors do not know the number of other potential contributors to each group. I use a Poisson distribution to reflect their beliefs as to population size of the two competing groups.

A. Contributions as Competition between Groups

Olson analyzes the collective action problem for economic groups, but he notes that his analysis might not be appropriate for non-economic groups. First, it is necessary to differentiate non-economic groups into two sub-groups: those whose goal is the enactment of legislation (e.g., environmental, gun control and abortion policy) and those whose primary motivation is philanthropic, i.e., to help the needy. I refer to the former groups as public-interest groups, and the later as philanthropic groups. Philanthropic groups form a third distinct category of interest groups.[6]

[6] These categories are ideal typical. In practice, there can be overlap between the types. For example, philanthropic groups, for the most part, use their own resources to help the needy, and thus, do not foster the creation of groups opposed to their goals. By contrast, if the philanthropic groups are an advocacy group which demands government programs to help the poor, counter groups are a distinct possibility because everyone pays for the programs through

losses from the regulations desired by environmentalists. Hence, in these cases there is an asymmetry in the public good. The environmental groups see the benefit as non-rival, but the economic interests see the benefit as a rival, public good.

However, the public goods sought are not a positive good for everyone. These public goods regularly produce negative externalities for some groups. As in Sen s Liberal Paradox and the reading of Lady Chatterly s Lover, some groups of individuals experience a negative externality in the exercise of rights by others. Thus, opponents of abortion experience a negative externality when individuals exercise their right to abortion.

Public interest groups have as their essential characteristic the provision of a pure, public good, but in doing so they produce negative externalities for other groups. Thus, two opposing sets of interest groups are regularly found among public interest groups. If there were no opposition to some proposed legislation because everyone favored it, there would be little need for establishing an interest group to fight for enactment of the legislation. Even clean government, as promoted by Common Cause, finds substantial opposition in the case of campaign finance reform.

Hence, the benefits provided by public-interest groups are not only non-rival goods, but they are also: group specific, and they are simultaneously goods and bads for different groups of individuals. Just modifying Olson s analysis to indicate that the goods are non-rival is not sufficient in the analysis of public-interest groups.

Thus, the formation of public interest groups is embedded in a contest between two teams (for example, pro and anti environment). Thus, with two groups, G = 1, 2. (The formal analysis that follows parallels Palfrey and Rosenthal s (1985) and Myerson s (1998) exposition of the decision to vote with two candidates and two teams of supporters for the respective candidates.) I restrict my analysis to two groups, i.e., a pro and con side of, e.g.., gun control legislation. More groups are feasible, but for tractability I restrict the analysis to two groups. Members of the two teams make monetary contributions to their respective teams. The money collected by the two teams

(interest groups) ($\sum C_i$) is then used to influence the legislature in its choice of legislation. The money can be used to help candidates win elections or to bribe legislators. (See Baron (1994) for an analysis of money in campaigns, and Bennedsen (1998) for the role of money in buying votes.) I assume that contributions are primarily used to bribe policymakers.

Individuals can directly contribute to candidates. Therefore, why do they need to contribute through interest groups? One of the major advantages of interest groups is that their leaders are much better informed than the members about the politics, policymakers' preferences and policy options. Hence, the leadership is better able to strategically spend money contributions on legislators that are likely to increase the probability of passing the legislation favored by the group. Individual contributors might be knowledgeable about the preferences of their own representatives, but those representatives might not be the most influential with regard to a piece of legislation that the group favors. Hence, money contributions to the local representative would be totally wasted. Hence, the group's leaders are much better able to dispense the monies strategically.

My focus on the policy benefits from the formation of a group contrasts with the standard analysis of group formation. For example, Olson's (1965) selective benefit analysis emphasizes private benefits from groups that promote membership. Likewise, the coercive and sponsorship solutions focus upon exogenous factors that solve the collective action problem. Hence, the principal-agent problem is a common concern in the literature because members join groups for reasons other than those related to the policy objectives of the group. In the case of public interest groups the goals of the organization are the primary factor affecting contributions. Hence, the analysis emphasizes the ability of groups to achieve their desired policies rather than the formation of the group as a goal in itself.

The most important aspect of this reconceptualization of the group contribution process is that the game is no longer a prisoner's dilemma and thus a freerider problem. The dominant strategy is no longer to freeride. If one's group does not contribute, the payoff to each member is -1 because if the opposition contributes even a little, they obtain their preferred policy outcome. By contrast, in the freerider problem it is always the dominant strategy to not contribute because the worst that can happen is getting a payoff of zero when no one else contributes.

The collective action problem becomes one of whether to contribute or not; but the choice is contingent on the decision of others. In particular the choice depends upon whether one's contribution is pivotal. (Thus, the analysis exactly parallels that of the decision to vote.) I now present a formal analysis of the collective action problem facing public interest groups. The analysis combines the features discussed above. One, the motivation of individuals to contribute to the groups is the attainment of the goals of the group. Moreover, public interest groups invariably face opposing public interest groups. Hence, the collective action problem is no longer the freerider problem. Two, pure altruism is assumed to be a major motivation for individuals in their decision to contribute. Third, I assume that individuals make their choice in a state of incomplete information, i.e., they do not know how many other individuals from either group intend to contribute.

B. A Formal Analysis of Contributing

The decision to contribute to most public interest groups entails a cost-benefit analysis, which is also contingent on the choices of others. Thus, the net expected value (EV) from

contributing is the expected benefit minus the costs of the contribution. The classic equation for

$$EV = pB_I - C \quad (1)$$

the voting decision is:

If we add the probability of creating a tie, with a coin-toss to break the tie, the contribution equation becomes:

$$EV = (pB_I/2) - C \quad (1')$$

I assume that the contribution (C) one gives to the organization is the same for all individuals. This assumption simplifies the analysis and is based on the observation that any one individual s contribution is very small relative to the total amount raised. Individual contributions to public interest groups, like Greenpeace or Common Cause, range from $10 to $100. But this variation is miniscule relative to the total income of the groups.

Each potential member of the group receives a private benefit from the activities of the group (B_I). Whether one contributes to a group is conditional upon one s contribution being decisive. One can obtain the benefit without contributing if others contribute, and one s contribution can be meaningless if the opposition wins out in the policy process. The costs of this form of political participation are even higher than the costs entailed in the physical costs of voting. Thus, given the large number of potential contributors the probability that one s contribution will be decisive is very small and it is irrational to contribute to a public interest group.

However, strategically, not voting is not an equilibrium for everyone. If everyone decides not to vote, it is in my interest to vote because then my single vote will be decisive. Hence, game theorists have reformulated the decision to vote in strategic terms. The decision to contribute to a

public interest group has the same strategic features.

Having shifted the basic analysis of public interest group's formation to a contest between two groups, I now turn to incorporating an altruistic component. There is substantial evidence (e.g., Bosso, 1995) that public interest groups rely extensively upon voluntary contributions. Hence, altruistic motivation must be incorporated into the analysis to capture this feature. The type of altruism I employ is pure altruism, as discussed above.

Following Andreoni (1989, 1990), pure altruism posits that the beneficiary's utility from their charity to another is some function of the recipient's increased happiness. Hence, the greater the happiness of the recipient, the greater the utility to the beneficiary. In contrast to pure altruism, Andreoni introduces the concept of egoistical altruism or warm-glow altruism. In giving to others, individuals experience a "warm glow" or personal satisfaction, hence, the term egoistical altruism.

The introduction of mixed-altruism into the utility analysis requires a modification of equation #1, both pure (B_2) and warm-glow (W) altruistic components must be added. Thus, the net

$$EV = p(B_1 + B_2) - C + W \quad (2)$$

benefit from contributing to an organization is:

The warm-glow benefit (W) can be thought of as either independent or not independent of the pure altruistic benefit (B_2). If we consider warm glow as a private benefit we get from being helpful to others, then we obtain the warm-glow benefit only if we actually help others. In this interpretation, the warm glow is not independent of the pure altruistic benefit because we obtain the warm glow only to the extent our actions do help others.

The warm-glow benefit may also be independent of the pure altruistic benefit. The warm-

glow benefit can also be thought of as an expressive benefit. Salisbury and Conklin (1998) argue that the motivation for giving to public interest groups is the expressive benefit we receive. We feel a benefit from expressing our ties to the group to which we contribute, irrespective of whether our contribution helps the group achieve its goals. Thus, the expressive interpretation entails an increase in warm-glow benefit without an increase in pure benefit in response to our contribution. Both views are feasible, and I will analyze both herein.

The independent interpretation of warm-glow altruism is represented by equation #2. The

$$EV = p(B_1 + B_2 + W) - C \quad (2')$$

non-independent version takes the form:

Here the warm-glow benefit obtains only if the group is successful in providing the public good. Ex-ante, there must be some probability (> 0) of obtaining the benefit. If $p = 0$, then $pW = 0$, i.e., there is no expected warm glow.

In order to simplify the formal analysis, I normalize the private and pure benefits from contributions to equal one, i.e., $B_1 + B_2 = 1$. This simplification is easily justified, as the good (B_1) supplied by public interest groups is a non-rival public good, hence, everyone obtains the same benefit from the public good. Likewise, the pure altruistic benefit (B_2) is also a non-rival public good. In the case of individuals negatively impacted by others rights, the benefit of contributing are likewise positive and equal to one, because the good to them is preventing the negative impact.

The choice of whether to contribute to the organization or not now depends upon the probability that one s contribution will be decisive in getting the policy objectives of the group

enacted as in equation #2'.[8] Instead of being the classic collective action or freerider problem, the contribution question is now that of the rationality of contributing to an activity when the probability of one's action being decisive is so small.

As in the case of voting, because of the small probability that one's contribution will be

$$p(B_1 + B_2) < C$$

decisive, it would appear that contributing to an organization is irrational because:

i.e., the costs of contributing exceed the benefits from the organization.

However, if everyone adopts the non-contribution strategy, then it is rational to contribute because your contribution will be decisive. (I am making the assumption that if only one person contributes, that one person will be decisive in the lobbying game.) Hence, not contributing is not a dominant strategy. The question becomes, what is an equilibrium strategy for potential contributors? The answer, in part, depends upon the probability that one's contribution is decisive in obtaining the goal of the group.

Each individual can take one of three actions in the contribution game: contribute to Group 1; contribute to Group 2; or not contribute. In addition to the two teams, we have N_1 potential members of G_1 and N_2, potential members of G_2, and $N_1 + N_2 = N$. The payoff to members of Group 1 is seen in Table 1. The payoffs are normalized to +1, in the case when one's policy is adopted, to zero, when one's opponents' policy is adopted. For example, when G_1's total contributions exceed that of G_2, the per capita payoffs are $1-c_i$ for those who contributed to the

[8] The independent version of warm-glow (equation #2) allows for some contribution independent of the decisiveness of one s contribution. This version is analogous to including civic duty in the voting equations. I will compare the two versions below.

group. Those who freeride obtain a payoff of +1. A symmetric table for the members of Group 2's payoffs is straightforward to write. Thus, the payoffs are bounded on the interval [1, 0].

Table 1 About Here

B. Population Uncertainty

I now turn to the proposition that players do not have complete information as to the values and actions of hundreds of millions of other potential contributors. Their choice of actions are based upon a lack of information as to other actors decision process. Hence, I shift the analysis from one of complete to incomplete information and thus, following Harsanyi I adopt a Bayesian analysis of the collective action problem entailed in contributing to public-interest groups.

The reasons for the incomplete information can be many. Players: 1) don't know the physical outcome function of game; 2) don't know other players' utility functions; and 3) don't know their own or some other players' strategy spaces. Any private information possessed by one or some actors, but not common information to all players, creates the problem of incomplete information. Hence, we must be careful in specifying what is (are) the source(s) of incomplete information. In the case of contributing to a public interest group, there are several possible reasons for incomplete information. Players might have different degrees of pure altruism, warm-glow benefit, contribution levels, or the total number of players in each group can all be unknown to the players. To simplify the analysis, I follow Myerson (1998) in making population uncertainty the sole source

of incomplete information.[9]

Following Harsanyi (1969), we can transform the game of incomplete information into one of imperfect information by positing that nature creates different types of individuals, i.e., those in favor of a particular policy and those opposed, e.g., individuals who are anti abortion and those who are pro-choice. Thus, there are a set of types (T), with t = 1, 2, ...The number of individuals of each of the types is unknown. All that is know is that the distribution of each type is Poisson, with different means for each type. Define Z(k) as the probability of having k members in the group of individuals with characteristic t. For a Poisson random variable with mean λ equals any nonnegative

$$p(k \mid \lambda) = e^{-k} \lambda^{k} / k!$$

integer k with probability:

Furthermore, to have a game of imperfect information, we assume that each type is independently and identically distributed. It is clear that the set of types (T) is non-empty, and we can quite sensibly assume that it is finite.

The independent assumption also means that the aggregation property of Poisson distributions holds. Thus, the sum of independent random variables, here for each type, is also a Poisson random variable. This property will be very useful in establishing equilibrium and other

[9] The presence of several different sources of incomplete information should not affect the subsequent analysis of the contribution game but does substantially complicate the mathematics. Thus, this possibility is not pursued at this time.

characteristics below.

To show that an equilibrium to the contribution game must exist, we must specify the action set available to the players, the utility functions of the players and then link them to the population uncertainty. First, I define an action set (A) for members of the groups. I assume further that this action set is the same for all groups. Moreover, this set is finite and has at least two elements, to contribute and to not contribute.

Second, the utility payoff for each player is a function of three elements: the player's type (t); the player's action (a); and the number of other players choosing the various options (x). Thus the utility function U(t,a,x) is defined and we have a game with population in (Q, T, A, U) where T and A are finite (as above) and U is bounded. The existence of a fixed point or equilibrium to this game requires (following Kakutani's theorem): one, that the strategy set (a) for every player is convex, closed and bounded; and two, that each player's utility function is both continuous in a, and concave in the ith players strategy a_i, holding the other players' strategies a_{-i} as fixed. Note that one of the strategies may be a mixed Bayesian strategy. See Myerson (2000) for the proof of existence when the distribution is Poisson.

C. Characterizing the Equilibrium

Showing that an equilibrium exists is only a first step in the analysis of the contribution game. We want to characterize this equilibrium(a). We know that public interest groups are viable organizations. The question is whether the equilibrium analysis presented conform to three specific facts about public interests groups which I consider essential characteristics?

First, we know that the number of potential members who actually contribute to the group is low. For example, NOW has a paying membership of approximately 200,000.[10] The potential membership base, if we just limit it to females[11], is over one-hundred million adult females. Thus, the number of contributors is less than one per cent. Likewise, the NAACP membership is about 200,000, while it has a potential membership of over twenty million adults. I do not know of a public interest group that has a paying membership that exceeds one per cent of its potential base.

Second, individuals pay dues and contribute to these organizations with few if any specific benefits to induce membership. Hence, I assume that altruistic motives are the crucial factors in explaining contributions. The major coordination problem facing potential contributors is that altruism benefits are pure public good. Is a small amount of pure altruism sufficient to produce the one per cent contribution levels that seem to be the rule in public interest groups?

Third, individuals contribute based upon the pure altruistic benefit (B_2) and not just the expressive benefit (W). The example of the American Red Cross above reflects this empirical fact.

To analyze the equilibrium(a) of this game (now that we have shown existence), we return to the cost-benefit analysis of contributing as represented by equation #2'. I show that the equilibrium, besides existing, has three characteristics: it is symmetric, it is a mixed-strategy equilibrium, and it is unique. An individual will contribute to the group only if their contribution is pivotal in obtaining the goal of the group. Assume that there are two hundred million potential contributors which are divided into equal groups pro and con on a public interest issue such as

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[10] NOW is very secretive about its paying membership. Estimates of membership range from 150,000 to 300,000.

[11] Males can be members of NOW, and hence, the potential membership base is much larger.

abortion. (We will drop the assumption of equal size groups below.) The equilibria are symmetric with regard members of the groups. Each member of the group has the same payoffs and adopts the same probability of contributing. Table 1 presents the payoffs from voting and abstain, and thus, illustrates the symmetric payoffs.

In addition, the equilibrium from the population uncertainty game is a mixed-strategy equilibrium. This is clear from condition that equilibrium is symmetric, i.e., it is the same for all members of the group, and is the same for both groups. The only pure strategies available to members of either group are to vote or abstain. Clearly, not voting is not an equilibrium. Likewise, everyone voting is not an equilibrium when there is population uncertainty, i.e., when members of each group do not know exact number of individuals voting. Only a mixed-strategy equilibrium is feasible.

Lastly, the equilibrium of this game is unique. The proof of uniqueness is fairly complex. Myerson (2000) provides the proof for uniqueness in large Poisson games of this nature. See especially his Theorem 0.

Having argued that the equilibrium is symmetric, mixed and unique, I turn to the question if it also is consistent with the three empirical facts noted above. First, the analysis of contributing to groups must be integrated into a policy process. I assume that the public-interest groups use money to bribe a policymaker to adopt the policy favorable to that group.

Assume that there is a single policymaker who the interest groups bribe to make a decision favorable to themselves. The group that provides the more money is given the policy they prefer. In case of a tie, the policymaker flips a coin to determine which policy is enacted.

A pro-group member is pivotal in two cases. One, without the pro-member-s contribution,

such that there is a tie in the contributions levels, which the con policy wins in a coin toss. Two, without pro-s contribution, the con policy wins, although the pro policy would have won in a coin toss. The population uncertainty assumption entails that we do not know the number of contributors, but rather, that the pro and con contributors are independent Poisson random variables[12]. Hence,

$$\sum_{k=0}^{\infty}\left(\frac{e^{-100000000\rho}(100000000\rho)^{k}}{k!}\right)\left(\frac{e\text{-}100000000\lambda(100000000\lambda)^{k}}{k!}\right)\left(1+\frac{100000000\lambda}{(k+1)}\right)(1/2) \quad (3)$$

each potential pro-group contributor-s pivot probability is given by:

$$\sum_{k=0}^{\infty}\left(\frac{e^{-100000000\rho}(100000000\rho)^{k}}{k!}\right)\left(\frac{e\text{-}100000000\lambda(100000000\lambda)^{k}}{k!}\right)\left(1+\frac{100000000\rho}{(k+1)}\right)(1/2) \quad (4)$$

A comparable pivot probability is given for con-group members:

The pro-group members contribute with probability λ and the con-group members contribute with probability ρ. In a mixed-strategy equilibrium these probabilities are the randomization probabilities adopted by the members of the two groups that produce a Bayes-Nash equilibrium. These randomization strategies result in the individuals of each group being exactly indifferent between contributing and not contributing. There are no pure strategy equilibria when we have

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Install Equation Editor and double-click here to view equation.

[12] A binomial distribution version of this Poisson model is:

Install Equation Editor and double-click here to view equation.

A comparable pivot binomial-distribution probability exists for the con-group members.

population uncertainty.

Next, we define the benefit from contribution solely in terms of self interest as in equation

$$p = C/B_I \quad (5)$$

#1. Equation #1 then is rewritten as the pivot probability equal to the cost-benefit ratio:

This pivot probability is then set equal to .05 to represent a realistic measure of costs relative to private benefit. Since the average contribution to a public interest group is about $50, this means that the expected private benefit is $1000. This might be on the high end of expected, private benefit, but we would rather err on the side of overestimation.

To determine the equilibrium contribution levels by members of the two groups (λ and ρ) we solve for them simultaneously or set both pivot probabilities equal to .05. To solve for the Poisson pivot probabilities, we use an approximation developed Myerson (2000). This

$$\sum_{k=0}^{\infty}\left(\frac{e^{-\alpha}\alpha^{k}}{k!}\right)\left(\frac{e^{-\beta}\beta^{k}}{k!}\right)\left(1+\frac{\beta}{(k+1)}\right)(1/2) \approx \frac{e^{-(\alpha+\beta-2\sqrt{\alpha\beta})}}{4\sqrt{\pi\sqrt{\alpha\beta}}}\left(\frac{\sqrt{\alpha}+\sqrt{\beta}}{\sqrt{\alpha}}\right) \quad (6)$$

approximation is given by:

The α and β parameters are the means of the Poisson distributions for the two groups. There are equal to $N_1\,\lambda$ and $N_2\rho$ respectively. I solve equation #6 for the equilibrium randomization strategies of the group members. This approximation of the Poisson shows that the ratio of costs to benefits set equal to .05 produces contributions rates of .00000032 for each group. Hence, if there are one hundred million members of each group, approximately 32 individuals will contribute. Thus, they are not even remotely close to those observed for public interest groups.

Hence, we shifted to the pure altruistic formulation as found in equation #2'. To obtain contribution levels of approximately 1% by the members of the two groups we need a ratio of costs to benefits of approximately .0003. Thus, a contribution of fifty dollars must produce a benefit of $166,650 per member. This requirement to produce the observed level of contributions can only be supported by altruistic benefits because it is unrealistic to expect that each member of the groups can expect to receive individual benefits of this magnitude.

The intuition behind this finding is that as the altruistic benefit increases from contributing to the public-interest group the equilibrium probability for contributing increases. This probability is the randomization strategy between contributing and not contributing to the group. The payoffs from contributing and non-contributing are given in Table 1. Thus, even though the probability of being pivotal declines, the probability of contributing increases as the benefit ($B_1 + B_2$) increases.

Figure 1 plots the equilibrium probability of contributing (L) from .005 to .05, the size of the groups (N) ranging from ten million to a hundred million members, and the cost-benefit ratio (the vertical axis) from .000 to .010. The product of the group size (N) and the probability of contributing gives us the total number of contributors from each group. As can be seen, as the benefits increase, (the cost-benefit ratio decreases) the probability of contributing increases.

The analysis above assumes that the two groups have the same number of potential members. I now turn to the case where the two groups are different membership size, i.e., $N_1 \neq N_2$. Changing the size of the two groups does not affect the equilibrium number of contributors. The intuition behind this is fairly straight forward to see. Since, both groups use mixed-strategies in determining whether to contribute, they randomize so that the other group's members are indifferent between contributing and not contributing. Hence, both groups are indifferent in equilibrium only

when the expected number of contributors from either group is the same. For this to occur, the smaller group must assign a higher probability of contributing than the larger group to offset the larger group's size.

This adjustment is evident from equation # 6. The means (α and β) of the Poisson distributions for the two groups are equal to $N_1 \lambda$ and $N_2\rho$ respectively. The means must be equal in equilibrium. Hence, if one group is larger than the other, the randomization strategy of the members of the groups (α and β respectively) must adjust to compensate for the group size. Thus, if group one is larger, group two must randomize with a higher probability of contributing to the group. Thus, group size differences do not affect the analysis derived from the case of groups of equal size.

Thus, voluntary contributions motivated by a low grade of altruism can explain the level of contributions to public-interest groups. The amount of altruism required however is not extensive. I am not claiming individuals are not primarily self interested. However, it is a fact that we do contribute a portion of our income (about 3% by some estimates) to charitable causes. A $50 contribution to NOW, Greenpeace or the NRA is not that extensive an altruistic act. Hence, altruism is a suitable explanation for public-interest groups. I would not, however, expect individuals to pay their taxes voluntarily or out of altruistic motives.

V. An Inverse Size Principle?

Olson (1965) noted that in the case of economic-interest groups, the larger the group the less

likely the group was to overcome the freerider problem. This argument is known as the size principle. In the case of non-economic groups, Runge (1983) and Cornes and Sandler (1996) argue that an inverse size principle holds, i.e., the larger the potential group, the greater the probability of overcoming the collective action problem. Runge suggests an inverse size principle, while Cornes and Sandler present a more formal analysis. Hence, I focus upon the Cornes and Sandler (1996:) analysis. I show, using the framework already developed, that an inverse size principle does not hold in the case of public interest groups.

Their alternative size principle stems from the non-rival character of the good provided by public-interest groups. Olson s version of the size principle is based on the rival nature of the public good provided by economic-interest groups. In the case of a non-rival good, the cost of providing it is fixed at some absolute number (k) of contributors. Public-interest groups are primarily engaged in lobbying government for various policies, such as air quality or consumer protection laws. The lobbying costs are roughly the same for these public-interest groups. Further, let us assume that the percentage of altruistic individuals in a society is fixed. For illustrative purposes say 1% of the population is sufficiently altruistic when it comes to supporting public-interest groups. Hence, as the potential beneficiaries of the group members increase in number, the likelihood of k voluntary contributors emerging increases.

Their analysis, therefore, does not view the public-interest group to be in competition with an opposing group. When there is competition between groups over policy decisions, there is no fixed costs for providing the benefits for the members of the group. The amount required to be spent is a function of what the opposition is spending. It is this feature of public-interest groups that underlies my analysis. It is therefore fairly easy to show that Olson s original size principle holds

even in the case of public-interest groups.

A formal proof of the Olson-s size principle also follows from my analysis. Start with the case that the two groups are of equal size ($N_1 = N_2$) and thus the two voting probabilities are the same, i.e., α equals β. Set equation # 6 equal to C/B (the pivot probability). Set the pivot probability

$$g = (N, \lambda) = (1/2)(e \frac{- N\lambda - N\lambda + 2\sqrt{N^2 \lambda^2}}{\sqrt{\pi \sqrt{N^2 \lambda^2}}}) \quad (7)$$

equal to a constant. The modified equation becomes:

$$c/B = \frac{1}{2\sqrt{\pi N \lambda}} \quad (8)$$

This equation in turn reduces to:

Since C/B is a constant, it is clear that there is an inverse relationship between the number of potential members and the probability of contributing to the organization.

When the two groups differ in size, the same relationship holds. Because the contribution probabilities are a Bayes-Nash equilibrium, the two groups randomize so that each is indifferent between contributing and not contributing. Thus, as the size of the groups diverge from one, the contributing probabilities adjust so that $N_1\lambda = N_2\rho$. (See Myerson (1998) or Palfrey and Rosenthal (1984) for this condition.)

Thus, Olson-s original size principle holds even in the case of public-interest groups. This conclusion follows from analyzing the motive for contributing as a competition between two groups as opposed to one group attempting to reach some threshold of contribution as assumed by Runge (1984) and Cornes and Sandler (1996).

VI. Discussion

Formal analysis should attempt to conform to the observed facts of the phenomenon it is attempting to explain. There are three regular facts of public-interest groups. One, their primary source of revenue is voluntary contributions from members. There is limited or no specific benefits provided by the groups to their members. Hence, altruistic motivation is a necessary component of any formal analysis. Two, no more than one per cent of any public-interest group's potential membership base ever contributes to the organization. Three, contributors' motivation is for the most part instrumental. It is not primarily expressive. If members perceive that the organization is not performing its functions, the members withold their contributions. My formal analysis presented herein supports all three empirical facts in its explanation of the organization of public-interest groups.

More specifically, Olson's solutions to the collective action problem are limited to economic groups, and he specifically excludes philanthropic and public-interest groups from his analysis. I have shown that an analysis of how the collective action problem is solved in the case of public-interest groups requires some changes in Olson's analysis. First, I keep the self-interested axiom with a modification allowing a low-grade altruism. More specifically, impure altruism is required, as opposed to pure altruism which is incorporated in a number of alternative explanations. Hence, the basic self-interested character of man is preserved. (See Jankowski, (2000a, b) for parallel analyses in the case of voting behavior.) Second, public-interest groups' contributors give money because their goal is the attainment of the group's policy goals. Third, there is invariably an

opposing group who is injured by the policy pursued by the first group. This situation gives rise to competition between groups in contributing to candidates for political office. Thus, the collective action problem is no longer the prisoner s dilemma, nor that assurance game posited by Chong (1991) and Sandler (1992). Rather, it is a coordination problem between the members of the two groups. Fourth, the decision to contribute must be seen as one of incomplete information because of the great uncertainty when millions of potential members are actors in the contribution game.

My analysis differs fundamentally from that found in the literature. Chong (1991) and Sandler (1992) analyze the collective action problem as an assurance game. Chong notes (1991: 93) that a moral obligation on the part of the contributors precludes freeriding. Thus, Chong s analysis follows Sen (1977) in positing the centrality of moral obligations over sympathy or pure altruism.

Shifting to moral obligation as the rationale for contributing to citizen s organizations does produce a logically consistent analysis. However, this shift has two major drawbacks. First, the introduction of moral obligations does serious damage to the rational, self-interested analysis of human behavior. Moral obligations, it can be argued, do supercede self-interest in any of a number of different realms of behavior. Hence, for all practical purposes, we must abandon the rational, self-interested model of human behavior.

Instead of abandoning the rational, self-interest analysis of human behavior, I have used the notion of pure altruism, which does the least amount of injury to the self-interested component of the analysis, and which is consistent with the observed behavior of individuals.

The second drawback of making the shift to moral obligations is that it places an unlimited burden on giving. In principle, moral obligation can entail substantial costs to the individual. However, we observe that individuals follow a 5% rule for altruistic giving. Tullock (1983) has

shown that Americans donate about 5% of their income to charity. Hence, we can reasonably expect individuals to contribute $50 to an environmental organization, but they will not voluntarily (out of moral obligation) pay their taxes.

Hence, for both theoretical and empirical reasons, I reject the shift to moral obligation as a way of overcoming the freerider problem and explaining human behavior more generally.

Likewise, I reject the expressive explanation (which is a form of Andreoni-s warm-glow altruism in the independent version of impure altruism), because the evidence indicates contributors care about the effectiveness their contributions.

The third piece of my analysis, the shift to mixed-strategy solutions, has not been suggested for public-interest groups. It explains why we see such low membership rates (less than one percent of potential membership) when a pure strategy assurance game has cooperation as the dominant strategy, once the threshold level of contributions has been reached.

At the outset of this paper, I identified three types of groups: economic, public-interest and philanthropic. My analysis of public-interest groups compliments Olson-s analysis of economic interest groups. However, before a totally unified analysis of groups is presented, an analysis of philanthropic groups is still required.

Three caveats are in order. One, my integration of game of contributing to interest groups and the political process assumes that the money collected is used to bribe a policymaker. Clearly, a competitive, electoral process is also possible. I am presently working on such a modification of the analysis. Two, the categories of groups developed are ideal typical. This means that in practice we find groups which overlap categories. The NRA, for example, functions are a public-interest group and a narrow, special interest group. Hence, it obtains some of its revenues from those

motivated by altruistic considerations, i.e., maintaining freedom of gun ownership, and some contributors (who may disagree with its policy goals) who are interested purely in the specific benefits provided by the organization.

Three, competition between groups over public policy can be between public-interest and economic-interest groups. For example, environmental groups are regularly in conflict with businesses over pollution. Both contribution to candidates to get their respective policies enacted. I have yet to formally analyze this form of competition.

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Table 1
Payoff Matrix for Contributors in Group 1

	Individual B	
	Contribute	Do Not Contribute
$N_1 > N_2$	$1-c_i$	1
$N_1 < N_2$	$-c_i$	0
$N_1 = N_2$	$1-c_i$	0

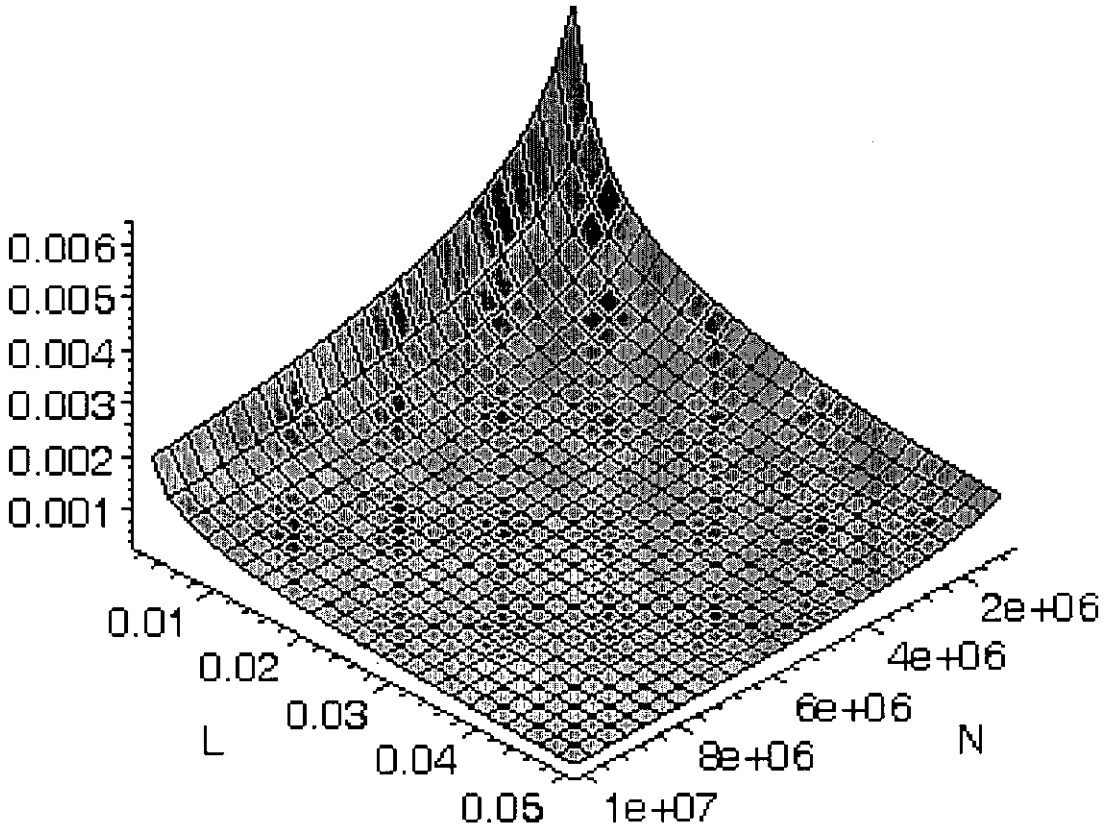

Figure 1: Probability of Voluntary Contribution and the Cost-Benefit Ratio